MEPSEAS Training Course on the Legal Implementation of the International Convention for the Control and Management of Ships’ Ballast Water and Sediments (BWM Convention)
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The Course

Purpose of the Course

This is an introductory course for personnel having different skills, knowledge and experience in legal aspects of ballast water management. This course will thus provide a common set of knowledge and skills to all participants to enable them to take appropriate action in their various capacities towards the implementation of the Ballast Water Management (BWM) Convention into their national legislation. The participants will be able to learn from others, review and discuss jointly issues of common interest as well as acquire new skills required to encourage them to implement the BWM Convention into their national legislation.

Following the highly successful GloBallast training course *Introduction to Ballast Water Management*, GloBallast Partnerships developed a number of specialized training courses. The present course was re-written as part of the MEPSEAS Project (IMO-NORAD) to give a refreshed view of the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM Convention) and its legal obligations.

This course has a global dimension, and it is not specific to any country in particular. It was designed to be delivered in any country, adapted to local characteristics and according to how advanced the country is on the issue. The course provides an excellent opportunity to gather stakeholders together and to establish national and regional cooperative networks.

Objectives of the Course

Provide participants with skills and knowledge necessary to implement the BWM Convention into their national legislation. This is to be achieved through developing and implementing the provisions of the BWM Convention, taking into account other legal instruments, and drafting procedures for a Ballast Water Management Act.

Training Methodology

The training course was designed and developed using partially the TRAIN-X methodology. The course consists of five modules covering three major themes:

- **The BWM Convention and other relevant legal instruments**
- **The key steps towards the legal implementation of the BWM Convention**
- **The drafting procedures for a Ballast Water Management Act.**

The introductory module provides the background for the subsequent modules which focus on the provisions of the BWM Convention, associated guidelines and other international conventions, and the practical procedures to implement the BWM Convention within the national legislation.

The flowchart below presents the logical sequence of the modules.
MEPSEAS Training Course on the Legal Implementation of the Ballast Water Management Convention

1. Introduction to Ballast Water Management

2. Ballast Water Management Convention and Guidelines

3. Other International Conventions and Principles relevant to Ballast Water Management

4. Implementing the Ballast Water Management Convention

5. Guide to Drafting a Ballast Water Management Act

Based on

[Images of Manual, Trainees, Instructor, Case Studies]
Training Techniques used in the Course

This Training Course is not an academic course. It is a hands-on course with exercises, discussions of case studies and a number of practical activities. The instructors will present the content of the modules and guide the discussions of the most relevant issues. It is expected that the participants will contribute substantially, by sharing their knowledge and experiences.

The Structure of Participants Manual

The Participants Manual of the MEPSEAS Training Course on the Legal Implementation of the BWM Convention is composed of five modules and is the main source of reference for the course.

Formats used in the Text

In the Participants Manual two formats are used to indicate points that are especially important:

- This symbol represents an important concept or situation, requiring the trainee's special attention.

- Boxes are used to highlight examples or case studies of the most significant issues that are dealt with in each module.
MEPSEAS Training Course on the Legal Implementation of the Ballast Water Management Convention

1. Introduction to Ballast Water Management

2. The Ballast Water Management Convention and Guidelines

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4. Implementing the Ballast Water Management Convention

5. Guide to Drafting a Ballast Water Management Act

MODULE 1: OBJECTIVES

- Describe the role that ballast water plays in the introduction of invasive species
- List the various initiatives established to deal with the problem
- Distinguish the options to manage ballast water to minimize the risk of introduction and considering the ship’s safety.

Based on

Manual  Trainees  Instructor  Case Studies
Module Aims & Objectives of Module 1

This Module aims to provide an overview of ballast water as a vector for the introduction of harmful aquatic organisms and pathogens, the options for ballast water management and the international response to deal with the issue. At the end of this module participants will be able to:

- Describe the role that ballast water plays in the introduction of invasive species;
- List the various initiatives established to deal with the problem; and
- Distinguish the options to manage ballast water to minimize the risk of introduction and considering the ship’s safety.

The Module is divided into five parts, namely:

1. The Issue;
2. The International Response;
3. Ballast Water Management Options;
4. Standards for Ballast Water Management; and
5. Compliance Monitoring and Enforcement.
1. The Issue

2. The International Response

2.1. The GloBallast initiative

2.2. GloBallast Phase I

2.3. GloBallast Partnerships

3. Ballast Water Management Options

3.1. Main requirements under the BWM Convention/Annex

3.2. Ballast Water Exchange

3.2.1. Methods for Exchange of Ballast Water

3.2.1.1. The Sequential Method

3.2.1.2. The Flow-through Method

3.2.1.3. The Dilution Method

3.2.2. Safety Considerations during Ballast Water Exchange

3.3. Treatment of Ballast Water

3.3.1. Mechanical Treatment

3.3.2. Chemical Treatment

3.3.3. Physical Treatment

3.4. Implementation of ballast water management methods

4. Standards for Ballast Water Management

4.1. The Ballast Water Exchange Standard (D-1)

4.2. The Ballast Water Treatment Performance Standard (D-2)

5. Compliance Monitoring and Enforcement

5.1. Key Elements

5.2. Operational aspects

5.2.1. Maritime awareness, crew training and familiarization with the BWM regime and CME system requirements

5.2.2. Ballast water sampling and testing protocols

5.2.3. A methodology for ensuring ballast water exchange (BWE) has been undertaken
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1. The Issue

Shipping is essential to the global economy, providing the most cost-effective means of transporting bulk goods over great distances. Over 90% of all global trade – including everything from food and fuel to construction materials, chemicals and household items - is carried by ships, with some 50,000 merchant ships sailing the world's oceans, with a combined tonnage of around 600 million gross tons.

Ships are specifically designed and built to move safely through the water while carrying this cargo. But, when the ship is travelling either without cargo, or only partially laden, it must take additional weight on board to enable it to operate effectively and safely by, for example, keeping the ship deep enough in the water to ensure efficient propeller and rudder operation. This additional material is called ballast. When ships were first built years ago, they carried solid ballast, in the form of rocks, sand or metal. However, since around 1880, after the introduction of iron hulls, ships have used water as ballast principally because it is more readily available, much easier to load on and off a ship, and is therefore more efficient and economical than solid ballast. When a ship is empty of cargo, it fills with ballast water. When it loads cargo, the ballast water is discharged (Figure 1).

![Figure 1: Cross section of ships showing ballast tanks and ballast water cycle. (Source: GloBallast Programme).](image)

While ballast water is crucial to the safe operation of ships, studies have shown that when ballast water is taken on board, the organisms living in that water are also drawn into the ballast tanks. Depending on the duration of the voyage and other factors, many of these organisms are then able to survive the journey and are subsequently released alive into the waters of the destination port when the ballast water is discharged. Thus, ballast water serves as a vector for the transfer of species from one part of the world to another. Where this new area is outside of their natural geographic range, the species which have been transferred is commonly known as alien species (alternative terms are non-native or non-indigenous). If the environmental conditions in this new geographic area are suitable, the alien species may then not only survive, but may establish and spread, in many cases causing, or with the potential to cause, harm to the local environment, economy, or human health (see following examples). Such species are generally called invasive alien species,
but other terms used for marine invasive include Introduced Marine Pests (IMPs) (Australia and New Zealand), Aquatic Nuisance Species (ANS) (United States), Harmful Aquatic Organisms and Pathogens (HAOP) (IMO BWM Convention). The BWM Convention defines the latter as follows:

“Harmful Aquatic Organisms and Pathogens’ means aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into freshwater courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.”

Invasive alien species are now generally recognized as one of the greatest threats to biodiversity globally. They also have serious economic, environmental and health impacts and, as a result, place major constraints on development; this is particularly important for industries such as aquaculture which are very prone to pathogenic breakout and are at high risk when exposed to the introduction of new pathogens (bacteria, viruses) which may be transported by ballast water (Drillet et al 2016). In marine and coastal environments, invasive species have been identified as one of the four greatest threats to the world’s oceans along with:

- Land-based sources of marine pollution;
- Over-exploitation of living marine resources; and
- Physical alteration/destruction of marine habitats.

Ballast water is of particular concern as a vector for the introduction of invasive alien species both because of the large quantities of ballast water being used and discharged into new environments around the world, but also because of the huge variety and numbers of species which it may transfer.

It is estimated that some 3-5 billion tons of ballast water are transferred throughout the world each year with an individual ship carrying anything from several hundred liters to more than 130,000 tons of ballast water, depending on the size and purpose of the vessel. Since just one cubic meter of ballast water may contain up to 50,000 zooplankton specimens (Locke et al. 1991, 1993; Gollasch 1996; Kabler 1996) and/or 10 million phytoplankton cells (Subba Rao et al. 1994), and the majority of marine species include a planktonic phase in their life cycle, there are literally thousands of different marine species that may be carried in ships’ ballast water - basically anything that is small enough to pass through a ships’ ballast water intake ports and pumps. This includes bacteria and other microbes, small invertebrates and the eggs, cysts and larvae of various species, including most fish, although not all of these will survive in the ballast tank because it is a hostile environment with considerable disturbance, lack of food and light.

Closely associated with ballast water are ballast sediments. When a ship takes on ballast water it also takes on material contained in the water. In turbid or shallow waters this often includes solid material. When this material enters the ballast tank it settles to the bottom as ‘sediment’ and provides a substrate for a variety of marine species with resting stages or cysts such as Copepods, dinoflagellates (Drillet et al 2008; Trottet et al 2018). These dormant stages are capable of surviving for years or decades buried in the sediment. According to the BWM Convention sediments are defined as “Matter settled out of ballast water within a ship".
Ballast water is thus recognized as one of the principal vectors of potentially invasive alien species and is estimated to be responsible for the transfer of between 7,000 and 10,000 different species of marine microbes, plants and animals globally each day (Carlton, 1999).

**EXAMPLE**

**Comb jelly (Mnemiopsis leidyi)**

The comb jelly, *Mnemiopsis leidyi*, is endemic to temperate to subtropical estuaries along the North and South American Atlantic coast. It was first recorded in the Black Sea in 1982, where it became well established, occurring in massive numbers. It also spread rapidly to the Azov, Marmara and Eastern Mediterranean, and towards the end of 1999, was recorded in the Caspian Sea, where its biomass eventually exceeded levels ever recorded in the Black Sea. *Mnemiopsis* feeds on the same zooplankton as many of the commercial fish species in the area and had a devastating impact on the fisheries. Landings of anchovy, for example, dropped to one-third of their previous levels, causing losses of around $500 million per year. Similar reductions in the biomass of kilka were experienced in the Caspian. The decrease in zooplankton caused by *Mnemiopsis* also had impacts on the food web, causing an increase in phytoplankton, and a decline in predatory fish species and seals. More recently, the introduction into the Black Sea of another comb jelly – *Beroe cf ovata* – which is a predator of *Mnemiopsis*, has resulted in a major decline of *Mnemiopsis* there, and a substantial recovery of the ecosystem.


**EXAMPLE**

**Toxic Algae / Red Tides**

There are at least four dinoflagellate species found in Australian waters that are believed to be introduced: *Gymnodinium catenatum*, *Alexandrium minutum*, *A. tamarensis* and *A. catenella*. All four are bloom-forming species and all produce resting cysts that can lie dormant in bottom sediments for several years. These cysts germinate to produce free swimming cells that reproduce by division. When environmental conditions are favourable, cell growth and division is rapid resulting in dense blooms of cells that can extend over large areas. Such blooms are usually short lived (several weeks).

Impacts: the toxins produced by all four dinoflagellates species are accumulated by shellfish such as oysters, mussels and scallops making them toxic to humans and causing Paralytic Shellfish Poisoning (PSP) when eaten. Symptoms of PSP range from nausea, vomiting, dizziness and tingling or numbness in the face in mild cases to muscular paralysis and death from respiratory paralysis in severe cases. Harmful algal blooms (commonly called Red tides) pose a major threat to the viability of both wild and shellfish fisheries and shellfish farming operations.

Cholera, a major disease in human history, has terrorized the world through seven pandemics (Hu et al 2016). In the past two centuries, cholera has emerged and spread from the Ganges Delta six times and from Indonesia once to cause global contagions. The seventh pandemic started in Makassar, Sulawesi, Indonesia in 1961 and spread globally, currently infecting 3–5 million people annually (Ali et al 2012). In January 1991, epidemic cholera emerged in Peru and spread to most other countries of Latin America. A million cases were reported and almost 9000 people died between January 1991 and December 1993. (Guthmann 1995). This led to the conclusion that it had been introduced by marine traffic.

The global economic impact of HAOP has not been thoroughly quantified but is likely to be in the region of tens of billions of US dollars a year or more. Direct economic impacts are the actual costs caused by the HAOP in the invaded environments, including costs from reduction in fisheries production, closure/reduction of aquaculture physical impacts on coastal infrastructure (fouling), reduction in economy of shipping (fouling) and closure of recreational and tourism beaches. Overall, the projected costs of responding globally were estimated at up to around four per cent of the total global economic impact (Pughiuc 2010).

2. The International Response

Growing recognition of the impacts of invasive species generally has seen a widespread response to the issue, in the form of legal instruments as well as programmes aimed at developing practical, technical solutions. The Convention on Biological Diversity (CBD) (1992), for example, provides a comprehensive basis for measures to protect all components of biodiversity against invasive alien species. Moreover, in 1995, Contracting Parties to the CBD adopted the “Jakarta Mandate on Marine and Coastal Biological Diversity”, which included alien species as a thematic issue. The goal of the programme of
work under the Jakarta Mandate is: “to prevent the introduction of invasive alien species into the marine and coastal environment, and to eradicate to the extent possible those invasive alien species that have already been introduced.” This is being implemented through the UNEP Regional Seas Programme. In 2010, during the Conference of the Parties to the CBD, a revised Strategic Plan for Biodiversity was adopted, and it includes the Aichi targets for the period 2011-2020. Target 9 of the Aichi Targets is to identify and prioritize, as well as control or eradicate, invasive alien species and pathways by 2020 and to have measures in place to manage pathways to prevent the introduction and establishment of alien invasive species.

Initiatives more specific to ballast water have been on the agenda of a wide range of international organizations for the last 30 years. Today, a very wide range of key stakeholders, including shipping, ports, environmental groups, tourism bodies, public health organizations, seafood producers etc. are working on various aspects of the problem both individually, within their own countries and regions and in international forums. At the forefront of the international initiatives is the International Maritime Organization (IMO) - the specialized agency of the United Nations responsible for the international regulation of ships’ safety and security as well as for the prevention of marine pollution from ships.

IMO has been working through its Member States to tackle the problem of ballast water since 1973 when, at the conference to adopt MARPOL, the ballast water problem was raised. The conference adopted Resolution 18 “Research into the effect of discharge of ballast water containing bacteria of epidemic diseases” which noted that “ballast water taken in waters which may contain bacteria of epidemic diseases, may, when discharged, cause a danger of spreading of the epidemic diseases to other countries”, and requested the IMO and the World Health Organization (WHO) to “initiate studies on that problem on the basis of any evidence and proposals which may be submitted by governments”. In the late 1980s and early 1990s a number of IMO member States presented case study research to the Marine Environment Protection Committee (MEPC) and argued for international rules on this issue. The IMO then established a Ballast Water Working Group under the MEPC and has been actively engaged in seeking a solution to the ballast water problem.

In 1991, non-binding rules entitled Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships’ Ballast Waters and Sediment Discharges, originally drafted by Canada and modified in a working group, were adopted by the MEPC. These were further developed in light of more experience and adopted in 1993 by the IMO Assembly. In 1994 a Working Group began to examine the possibility of legally binding regulations that tried to address the ship and human safety issues. In 1997 the IMO Assembly adopted Resolution A.868 (20), which revised the earlier Guidelines. One of the more significant features of the revision was the formal adoption of a risk minimization management approach to the problem, as reflected in the title, Guidelines for the control and management of ships’ ballast water to minimize the transfer of harmful aquatic organisms and pathogens. The Guidelines are important because they apportion responsibility for prevention to both ships (Flag State) and Port States. In April 2001, the MEPC Working Group reviewed a draft negotiating text. The text of the draft BWM Convention has adopted an approach that reflects the more traditional IMO regulatory strategy with its focus on the flag State responsibility with management/certification rules, and little or no emphasis on Port State export prevention responsibilities. Following from the draft negotiating text came the international legal instrument - the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM Convention), which was adopted by consensus at a Diplomatic Conference at IMO Headquarters in London on 13 February 2004 and which entered into force on 8 September 2017.

In March 2000, IMO launched the implementation of the GloBallast Programme, a GEF-UNDP programme providing technical assistance in this area.
As of the 8th of January 2019, the number of Contracting States to the BWM Convention is 79 and the combined merchant fleets of which constitute approximately 80.94% of the gross tonnage of the world’s merchant fleet (Status of IMO Treaties, IMO 8 January 2019).

2.1. The GloBallast initiative
In 2000, the IMO, Global Environmental Facility (GEF), and UN Development Program (UNDP) initiated the Global Ballast Water Management Programme for the Removal of Barriers to the Effective Implementation of Ballast Water Control and Management Measures in Developing Countries - (the GloBallast Programme) - a global technical cooperation program to assist developing countries to:

- Reduce the transfer of harmful organisms from ships’ ballast water;
- Implement the IMO Ballast Water Guidelines; and
- Prepare for implementation of the IMO BWM

2.2. GloBallast Phase I
The first phase of the programme was implemented between 2000 and 2004, and focused on six demonstration sites, intended to represent the six developing regions of the world. Demonstration sites were Dalian (China, Asia/Pacific), Khark Is. (I.R Iran, Middle East), Mumbai (India, South Asia), Odessa (Ukraine, Eastern Europe), Saldanha (South Africa, Africa) and Sepetiba (Brazil, South America).

Activities included:
- Communication, education and awareness-raising;
- Risk assessment and port surveys for each of the demonstration ports;
- Review of existing ballast water management legislation;
- Compliance, enforcement and monitoring; and
- Regional cooperation and replication.

The programme was recognized as being one of the most successful of GEF International Waters projects.

2.3. GloBallast Partnerships
The second phase of the Programme (GloBallast Partnerships (GBP) was initiated in late 2007 and built on the progress made in the original project. It finished in 2016 and was focused on national policy, legal and institutional reforms in targeted developing countries with an emphasis on integrated management. The approach encompassed:

- Building on the achievements and momentum, and utilizing the capacity and skills generated by the pilot phase;
- Replication of best-practices and technical activities in the beneficiary countries with a view to stimulating policy reforms at national level;
- Supporting especially vulnerable and/or environmentally highly sensitive countries in their efforts to effect legal reforms to implement the BWM Convention;
- Working towards advanced integration through other interested structures, mechanisms and programs, including where optimal, GEF-IW LME projects and UNEP Regional Seas; and
- Promoting collaboration with industry to facilitate the successful transfer of new technologies from developed to developing countries.

GBP was implemented in 5 high priority sub-regions: the Caribbean, Mediterranean, Red Sea and Gulf of Aden, the South-East Pacific, and the West Coast of Africa, through 13 Lead Partnering Countries and more than 70 Partner Countries.

3. Ballast Water Management Options

As has been described in section 1.1, when ballast water is taken on board by ships, it generally contains thousands of organisms which are then transported on the ship until the ship de-ballasts. While many of these organisms may not survive the journey itself, or the introduction into a different environment, others may survive and establish viable populations in the new surroundings. Where such aliens become invasive, they frequently cause serious ecological, economic and public health impacts.

Until the early 1990s, when the issue of the transfer of harmful aquatic organisms and pathogens (HAOP) by ships ballast water came into prominence, the use of ballast water in ships was regulated solely on the basis of requirements relating to the safe operation of the ships, except in rare cases where specific ports had additional requirements (e.g. the port of Albany on the Hudson River). The ship’s decisions on uptake and discharge were based solely on operational and technical requirements, without any considerations of the potential ecological consequences of the discharge of the ballast water. Thus, ballast water operations were generally limited to (1) and (2) below:

1. **Uptake of ballast water** – which is usually done when the ship has no cargo or partial cargo onboard and is done to maintain optimum stability, optimum immersion, longitudinal strength, forward visibility, maneuverability and other operational requirements of the ship to enable it to operate safely and efficiently.

2. **Discharge of ballast water** – which is usually done when the ship is near or in a port and is about to, or is in the process of, loading cargo.

However, with the growing understanding of the risk posed by inter regional transfer of harmful aquatic organisms and pathogens (HAOP), a third operational requirement was introduced, namely:

3. **The ‘control’ or ‘management’ of the ballast water**, both on board the ship - which normally refers to the process of ‘undertaking ballast water exchange’ or ‘treating ballast water’ – and during uptake and discharge. ‘Management’ may also refer to transferring ballast water between tanks on board, to adjust to varying operational or sea conditions such as weather, fuel consumption, trim and vibration, etc. but for the purpose of this module (and course) the former definition generally applies.

Therefore, when a Master is planning how to manage the ship’s ballast water, two main issues have to be taken into account:
safety of the ship and its crew, and

minimization of the transfer of HAOP.

To enable the ship to undertake the necessary planning in relation to ballast water management, the requirements and options available must be understood both by the ship’s personnel and all related relevant parties, such as company operational and technical staff, classification societies, port authorities, charterers, terminal operators and the ship’s agent.

Different options to manage ballast water are shown on Figure 2.

![Figure 2: Example of options for the management of ballast water. (*- similar to the flow through method).](image)

### 3.1. Main requirements under the BWM Convention/Annex

The main requirements of the BWM Convention directly applicable to ships include:

- that ships have a Ballast Water Management Plan in place which outlines the specific ballast water management arrangements for the ship concerned;
- ships must have on board a Ballast Water Record Book, in which each ballast water operation must be recorded so as to enable auditing of ballast water operations;
- the phased implementation of ballast water management standards (where levels are set at which numbers of organisms are allowed to be discharged in ships’ ballast water) based on the ships ballast water capacity and its construction date;
- operational parameters for ships conducting ballast water exchange;
- sediment management for ships;
- duties of officers and crew in relation to BW management;
- special requirements in certain areas and the communication about such to mariners;
- actual standards to which ballast water management methods must adhere; and
• survey and certification requirements. The ship is required to be issued a new International Ballast Water Management Certificate every 5 years with intermediate/annual surveys.

3.2. Ballast Water Exchange

Regulation B-4 of the Annex to the BWM Convention covers Ballast Water Exchange (BWE), requiring ships to conduct ballast exchange at least 200 nautical miles from the nearest land in water at least 200 meters in depth. Where this is not possible then at least 50 nautical miles from shore in water at least 200 meters in depth. In areas where neither of these parameters can be met - generally enclosed or semi-enclosed seas – the port State/s concerned may designate ballast water exchange areas.

The regulation also provides that:

• ships may be exempted from the requirement to undertake BWE where the safety of the ship is threatened;
• the recording of reasons for non-compliance in the Ballast Water Record Book; and
• that ships should not be normally be required to deviate from their voyage planned route or unduly delay their arrival for the purpose of meeting these requirements.

Detailed guidance on ballast water exchange is contained in the IMO Guidelines for Ballast Water Exchange (G6; MEPC.124(53)), which cover aspects such as responsibilities, exchange requirements, safety considerations, crew training requirements and information to be included in the Ballast Water Management Plan.

It should be noted that ports may designate contingency ballast exchange areas in the vicinity of the port where ships may conduct BWE in cases where they had been unable to do so during their voyage and no other option is available. Such areas will be determined by the port after scientific studies aimed at minimizing ecological impacts and following the IMO Guidelines on designation of areas for ballast water exchange (G14; Resolution MEPC.151(55)). The ship must, after obtaining the port’s concurrence to exchange ballast in such zone, remain strictly within the boundaries of such area when performing contingency ballast exchange.

3.2.1. Methods for Exchange of Ballast Water

There are three methods that are in general use for exchange of ballast water at sea - the Sequential, Flow-through and Dilution methods.

3.2.1.1. The Sequential Method

This entails the complete discharge of the tanks containing ballast water in mid ocean, to be immediately filled afterwards with ‘clean’ ocean water. In order to minimize the amount of ballast and sediment remaining on board, the ship should be trimmed and heeled to optimize the performance of the pumps, and ballast water discharge should continue until suction is lost. Stripping pumps or eductors should be used if possible, for further emptying effect. This method of changing ballast must strictly adhere to safety guidelines in the approved Trim
and Stability Data and the Ballast Water Management Plan on the number of tanks being emptied and filled simultaneously, to avoid undue stresses and torsional forces.

### 3.2.1.2. The Flow-through Method

This is based on the simultaneous filling and outflow of the ballast tanks, with the water being pumped in through the filling line and overflowing through the respective vent pipes or manholes on deck depending on the design of the ship. In order to ensure at least a 95% exchange of the original water, the amount of water passing through the tank is required to be at least equal to three times the volume of the tank. This is a good alternative in situations when bad weather and sea conditions or structural stresses do not allow for the sequential method, provided that care is taken to ensure ballast tanks are not over-pressurized.

> It must be remembered that if multiple tanks are being filled through a common line by a pump or pumps, flow of water into the tanks nearest the pump or pumps will be greater than the flow into the further tanks.

Thus, although the pumps may pump a volume of water equal to three times the volume of all the tanks combined, the exchange in each individual tank may not be three times its volume (thus some tanks may have four times the volume exchanged and others perhaps only twice the volume). In order to ensure the correct volume is exchanged for each tank, it is important that the lines are set so that the output of one or more pumps is directed to one tank or one set of tanks at a time.

The sequential and flow-through methods of BE are illustrated in Figure 3.

**Figure 3: Ballast Water Exchange Options**

### 3.2.1.3. The Dilution Method

This entails pumping ‘clean’ ocean water onto the top of the water in a ballast tank, while at the same time pumping out or releasing the original ballast water from the bottom of the tank at the same rate of inflow, until a volume equal to three times the contents of the tank has been exchanged. Most ships operating today are not designed or equipped to use this method.
3.2.2. Safety Considerations during Ballast Water Exchange

Although the primary focus of the BWM Convention and associated guidelines is to prevent, minimize and ultimately eliminate the introduction of harmful aquatic organisms and pathogens, they also contain requirements and recommendations to ensure the safety of the crew and ship. Thus, the Ballast Water Management Plan (BWMP) must also detail the safety procedures for the ship and the crew during ballast water management operations.

These safety procedures must take into account the following issues, as applicable:

- avoidance of over and under-pressurization of ballast tanks which can cause severe deformation of the tank’s steel structure;
- maintenance of adequate intact stability in accordance with an approved trim and stability data set placed onboard - stability to be maintained at all times to values not less than those recommended by the Classification Society or Administration. This is very important as deficient stability can have disastrous consequences for the ship such as capsizing;
- free surface effects, where the weight of a wedge of water moving in the tank can cause reduction of stability;
- permissible seagoing strength limits of shear forces and bending moments not to exceed those permitted by the ship's classification society with regard to prevailing sea conditions – shear forces and bending moments being forces that act on the longitudinal girders of the ship that can put extreme stresses at the points on which they act;
- sloshing loads in tanks that may be partially filled at any one time where significant structural loads may be generated by sloshing action in the partially filled tank;
- torsional forces, where relevant; especially when emptying or filling tanks that are not horizontally adjacent to each other in the port to starboard direction;
- minimization of hull vibration;
- minimum forward and aft draughts and trim that affect visibility, propulsion efficiency, maneuverability and slamming in heavy weather;
- limits of tolerability of weather conditions, weather routing and avoiding action in areas seasonably affected by severe low pressures, hurricanes, or heavy icing conditions;
- contingency procedures for situations which may affect the ballast water exchange at sea, including deteriorating weather conditions, pump failure, loss of power, etc.;
- fatigue of crew taking into account the amount of time to complete the ballast water exchange, considering that the ballast water may represent 50% of the total cargo capacity for some ships; and
- protection of crew from particular occupational hazards that may arise in circumstances associated with ballast water exchanges.

If the flow through method is used, additional caution should be exercised, in that:

- air pipes are not designed for continuous ballast water overflow and the rate of pumping should take that into consideration;
• certain watertight and weather tight closures (e.g. manholes) which may be opened during ballast exchange, are re-secured at the end of the operation; and

• water flowing out of the overflowing tanks may enter adjacent compartments where it may cause damage to machinery, equipment or cargo.

### Capsizing of the MV. Cougar Ace

The Singaporean Flagged RoRo (car carrier) MV. Cougar Ace capsized in the North Pacific Ocean (off Alaska) while her crew were carrying out ballast water exchange prior to arrival port in the USA. The reason for the incident was improper planning and execution of ballast water exchange in that insufficient weight of water was kept in the tanks below the waterline resulting in loss of stability. There were no fatalities during the loss of stability, but one naval architect died during salvage operations. 5000 brand new cars had to be scrapped resulting in a direct loss of an estimated 103 Million USD.

![Capsizing of the MV. Cougar Ace](image)

**Photos: courtesy of the US Coast Guard.**

Ballast water exchange at sea, especially the flow through method should be avoided where possible in freezing weather conditions. However, when it is deemed necessary, particular attention should be paid to the hazards associated with the freezing of overboard discharge arrangements, air pipes, ballast system valves, together with their means of control, and the accretion of ice on deck.

Ships, if not already fitted with a loading instrument or purpose written software, may need the fitting of such to perform calculations of shear forces and bending moments induced by ballast water exchange at sea and to compare with the permissible strength limits.

The ballast water management plan should include a list of circumstances in which ballast water exchange cannot or should not be undertaken. These circumstances may be critical situations of an exceptional nature, stress of weather, or any other circumstances in which human life or safety of the ship is threatened.

*IMO Resolution MEPC 149(55), Guidelines (G11), contains guidelines for ballast water exchange design and construction standards that can be employed on new ships so as to maximize the efficiency and safety of ballast water exchange, while minimizing exchange time and sediment accumulation.*

### 3.3. Treatment of Ballast Water

Treatment implies the subjection of the ballast water to approved mechanical, physical or chemical processes, which will render harmless potentially harmful aquatic organisms or
pathogens (HAOP) and/or reduce their numbers to the levels set in the performance standard of the BWM Convention. Several methods are used and Ballast Water Treatment Systems should be approved before they are fitted onboard ships. The process to be followed, and the technical specifications to be met, is outlined in the Code for Approval of Ballast Water Management Systems (G8) which is applicable to all treatment systems and the Procedure for Approval of Ballast Water Management Systems that Make Use of Active Substances (G9) which is applicable to treatment systems using active substances (chemicals), and the Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes (G10).

In order to strengthen the type approval process of Ballast Water Management Systems, the initial Guidelines for Approval of Ballast Water Management Systems (G8) have been revised by the IMO through the work of correspondence group reporting to the Ballast Water Working Group of MEPC. The Code supersedes the Guidelines G8 and makes the testing procedures mandatory (Resolution MEPC.300(72)).

A brief explanation of the different potential treatment methods follows.

### 3.3.1. Mechanical Treatment
This entails filtration of the ballast water either during the uptake or discharge, or cyclonic separation, or a combination of both. In filtration, the ballast water is passed through screens of decreasing mesh sizes. It may then also be submitted to 'cyclonic separation', with the residues being either returned to the sea (if treatment is carried out during ballasting) or stored in separate tanks (if treatment is carried out during deballasting).

### 3.3.2. Chemical Treatment
Known technologies include the addition/application of ‘active’ or other substances such as ozone, chlorine, hydrogen peroxide, free oxygen and other disinfectants and/or organic biocides or additives such as copper/silver ions, to the ballast water. It must be noted that the potential for undesirable environmental side-effects is a serious concern in relation to chemical treatment options. However, there have been some promising technological developments which involve producing these active substances using electro chemical cells which use seawater as their operation media. Such technologies will reduce the space, hazard and costs associated with carriage of such chemicals onboard vessels.

### 3.3.3. Physical Treatment
Includes thermal, ultraviolet, magnetic and ultrasound devices and heat treatment. Heat treatment, if selected, would most likely be obtained primarily from the heat exchangers fitted to various sources of thermal radiation from the ship’s machinery.

It is generally observed that a single treatment methodology would not be sufficient to achieve IMO standards for all targeted species, ballast water from all sources, and on all ship types.

To date, there are 75 BWTS which have been type approved to date by flag states; 37 are using active substances (approved under G8 and G9) and 35 are using mechanical/physical treatment (UV being considered a physical treatment; approved under G8). When installed onboard a ship, the ship should be keeping a copy of the Type Approval certificate on which
is stated a range of important information that the Port State Control Officer may use during inspection (holding time, range of treatment capacities, limiting conditions of use…etc.).

3.4. Implementation of ballast water management methods

The selection of a ballast water management method/s for a particular vessel will depend on what technology is available at the time of construction (or when it is overhauled), and what is appropriate for the ship type. The ship’s Ballast Water Management Plan is then obviously largely based on what technology is available on board. Whether that is implemented or not on a particular voyage rests mainly with the ship’s Master, depending on the circumstances (mainly weather conditions and other safety considerations) during the voyage.

The Master’s decision must take into account the specific requirements of the port state into whose territorial waters the ship will discharge her ballast. The ship Master must make every effort to comply with such requirements, within of course, the safety parameters set out in the ballast water management plan. If he cannot comply, or has not complied, then he must inform the Port State accordingly (see example of Pre-Arrival Notification form in figure below):

| 4.5 Ballast Water Management Convention |
| 4.5.1 Does the Convention apply? |
| ☐ 1. No. |
| ☐ 2. Yes. If it applies, please proceed to 3 below. |
| ☑ 3. Does the vessel have IBNMC / Statement of Compliance? |
| ☑ 4. Is the ship exempted under Regulation A4? (A4: Exemption from the installation of ballast water management systems) |
| ☑ 5. Vessel complying with Regulation D1, D2 or D4? (D1: Ballast water exchange standards / D2: Ballast water performance standards / D4: Prototype ballast water treatment technologies) |
| ☑ 6. If D1 was BWE conducted? |
| ☑ 6.1 If No. Reason why BWE not conducted: |
| ☑ 6.2 Is ship planning to discharge BW in port? |
| ☑ 6.2.1 If ship is planning to discharge BW in port, estimated quantity of unmanaged Ballast water proposed to be discharged: Cubic meters(e.g., 2000.00) |
| ☑ 7. If D2 is the BWMS operational? |
| ☑ 7.1 If No, was BWE carried out as Contingency Measure: |
| ☑ 7.1.1 If BWE was not carried out as Contingency Measure, is ship planning to discharge BW in port? |
| ☑ 7.1.1.1 If ship is planning to discharge BW in port, estimated quantity of unmanaged Ballast water proposed to be discharged: Cubic meters(e.g., 2000.00) |
| ☑ 8. If D4, is the ship holding ‘Statement of Compliance for prototype ballast water treatment technology’? |
4. Standards for Ballast Water Management

The BWM Convention contains standards for Ballast Water Management, including both exchange and treatment options (Section D of the Annex to the BWM Convention). These standards will be introduced in a phased manner, as a legal perspective will be described in 2.4, Module 2.

The BWM Convention through its Regulation B-3 had defined dates at which a ship, depending on its date of construction and its ballast water capacity would be required to meet the standards of the BWM Convention. In 2007, because of the lack of availability of type approved ballast water management systems, the IMO agreed on Resolution A1005(25) to postpone these obligations. In 2013, the IMO recognized that the uncertainty for ships regarding the application of regulation B-3 (and A1005(25)) because of the time elapsed since the adoption of the BWM Convention and agreed to apply another delay through Resolution A1088(28). This was further reviewed during MEPC 71 through the resolution MEPC.287(71) which refer to MEPC71/17 Annex 2 as the dates to use for the implementation of the BWM Convention. The Final amendments to regulation B-3 were adopted by the Resolution MEPC.297(72). These are reflected in the Figure 4.

In brief:

- All Ship must:
  - be issued an International Ballast Water Management Certificate (issued by the administration),
  - have onboard a Ballast Water Record Book and
  - have onboard a Ballast Water Management Plan (including provisions for the management of ballast water tank sediments)

- All ships must comply to Regulation D-1 (Ballast Water Exchange) until the regulation D-2 applies to them following the timeline defined in the following bullet points:
  - Ships constructed on or after September 8, 2017 to comply with the D-2 biological standard on their delivery.
  - Ships constructed before September 8, 2017, are to comply with the D-2 standard at the first MARPOL IOPP renewal survey completed on or after:
    - September 8, 2019 (Reg B-3/10.1.1); or
    - September 8, 2017, in the event a MARPOL IOPP renewal survey is completed during the period on or after September 8, 2014 and prior to September 8, 2017 (Reg B-3/10.1.2).
  - For ships constructed before September 8, 2017 and which are not subject to the MARPOL IOPP renewal survey, compliance with the D-2 standard is required not later than September 8, 2024 (Reg B-3/8).
Figure 4: Infographics explaining the dates at which a ship is to comply with the D-1 and D-2 Standards of the BWM Convention.

### 4.1. The Ballast Water Exchange Standard (D-1)

The Ballast Water Exchange standard (Regulation D-1) states that ships performing ballast water exchange are required to achieve an efficiency of at least 95 percent volumetric exchange of ballast water of each tank where exchange has taken place. Further, for ships exchanging ballast water by a “pump through” method, pumping through three times the volume of each ballast tank shall be considered to meet the standard of 95% volumetric exchange per tank. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95% volumetric exchange is met.

According to the *Guidelines for Ballast Water Exchange* (G6) three methods of BWE have been accepted by the IMO: the sequential, flow-through, and dilution methods. Of these, the flow-through and dilution methods are considered as “pump through” methods, and therefore subject to the requirements indicated above. For ships using the sequential method to meet the standard, they must ensure maximum emptying out of tanks prior refilling. This is also illustrated in Figure 3 above.

The BWM Convention also prescribes where BWE should be conducted, i.e. at a sufficient distance from land and at a minimum depth to maximize the efficiency of the exchange. This is based on the theory that organisms from a coastal environment are very unlikely to survive in an open ocean environment, due to the differences in water characteristics (salinity, temperature, etc.). However, a fundamental principle is that a ship shall not normally be required to deviate from its intended voyage, or delay the voyage, in order to comply with any particular requirement mentioned above.
Safety considerations

A ship conducting ballast water exchange shall not be required to comply with standards defined, if the master reasonably decides that such exchange would threaten the safety or stability of the ship, its crew, or its passengers because of adverse weather, ship design or stress, equipment failure, or any other extraordinary condition.

When a ship is required to conduct ballast water exchange and does not do so in accordance with this regulation, the reasons shall be entered in the Ballast Water Record Book and all supporting evidence such as weather reports, stress calculations or record of other unusual occurrences shall be maintained for later inspection and verification.

4.2. The Ballast Water Treatment Performance Standard (D-2)

The Ballast Water treatment performance standard is the result of extensive negotiations between the IMO Member States and represents a compromise – in the face of the reality that there are currently no completely effective treatments - aimed at promoting further development of safer and more effective ballast water management options that will eventually result in the elimination of the HAOP transfers via ballast water.

The performance standard is based on numbers of organisms per unit of ballast water and use microbes as an indicator in the human health standard.

Regulation D-2 provides a detailed description of the performance standard. Essentially, once the treatment has been applied to the ballast water, the number of organisms remaining in the water must be reduced to the levels stipulated in the standard. This is achieved by installing a ballast water treatment system onboard the ship. The system usually treats the ballast water during both ballasting (when water is pumped into the tanks) and deballasting (when water is pumped out). Several different treatment systems have been developed and are available on the market, using variety of treatment processes, usually employing a combination of mechanical, physical and chemical treatments to ensure that the D-2 standards are fulfilled.

5. Compliance Monitoring and Enforcement

Once a system of ballast water management has been established – based on IMO and national requirements - it is necessary to have an accompanying mechanism to monitor compliance with that system, and to provide for enforcement thereof. This is very important because enforcement is a key mechanism to ensure the proper functioning of a regulatory regime (Pomeroy et al 2015). This mechanism is known as a Compliance Monitoring and Enforcement (CME) system.

CME is thus an essential component of the overall BWM regime – or National Strategic Framework (see GloBallast Guidelines for development of National Ballast Water Management Strategies, GloBallast Monograph Series No. 18) – and is designed to:
• assess whether or not a ship has met the IMO and Port State’s BWM requirements; and
• when necessary, enforce those requirements.

There are various mechanisms which a competent authority can use to satisfy itself that the ‘rules’ and ‘requirements’ are being met. These may involve sampling or testing, auditing of records, observation or any other action, or a combination of these actions.

While CME systems might vary from one country or region to another, they must all meet three essential criteria:

• They must be based on, and fully consistent with, the BWM regime that they form part of;
• They must be consistent with the IMO BWM Convention;
• They must be capable of assessing whether the Port State’s BWM requirements have been met, and if not, ensuring that appropriate action is taken.

Just as each country’s BWM regime will be an amalgamation of the BWM Convention and country-specific requirements, so also will the CME.

The BWM Convention recognizes the essential role of a CME system any BWM regime (for example, in Article 9 on inspections). Furthermore, the BWM Convention provides considerable guidance as to what kinds of records should be maintained to facilitate the CME function, as well as on application of the provisions, level of penalties, inspections, verification of records, violations etc.

5.1. Key Elements

Inspections serve to ascertain compliance with both the requirements of the State and also those of the BWM Convention. In addition to satisfying the essential criteria described above, any comprehensive and effective CME system should have a number of key elements. These include:

• a requirement for ships to collect and record information about their BWM practices;
• a requirement for ships to make available this information to the Port State’s BWM regulatory authority (the RA) and receive directions from them;
• provision for examination/auditing of the ships’ official logbooks and other official records to ascertain compliance with the BWM requirements of the Port State;
• provisions to enable the appropriate authority, either the RA or someone acting on their behalf, to take ballast water (and sediment) samples and carry out any necessary testing;
• a legal provision for ‘enforcement’, where necessary, for ships found in non-compliance with the BWM requirements; and
• a requirement for notification of arrangements to IMO and other interested parties.
Sanctions or penalties in case of non-compliance should apply and are addressed further below.

**EXAMPLE**

Ships have been detained in Europe and the US because of deficiencies found in their ballast water management systems (BWMSs) and practices, an analysis by BWTT has found. In mid-March, just over six months after the IMO’s BWM Convention came into force, the Paris MOU secretariat’s online inspection database showed that between 8 September 2017 and 18 March (when the analysis was carried out), ballast treatment deficiencies had been found in 145 inspections on 144 ships, of which 15 had been detained. Class society DNV GL published a similar analysis in March, covering the period from 8 September 2017 to the end of that year. It assessed the reasons for the deficiencies and found that about a third were for incorrect, not properly filled in or missing entries in the BWM record book, or the book itself was missing. Another 25% were the result of incorrect ballast water exchange: either it was not exchanged at all, or the amount of water exchanged was insufficient. Other deficiencies included BWM plans that had not been approved, were incorrect or missing.


### 5.2. Operational aspects

Once a country’s BWM requirements, as part of its National Strategic Framework, have been finalized, it can begin to construct a CME system, ensuring that all the aforementioned criteria and key elements are incorporated - although the country may also introduce additional requirements. To carry out this task effectively a number of operational aspects also need to be considered and put in place:

**Accurate and readily available data**

This includes the form in which data are recorded, held and communicated and covers a vast array of information. The main elements relate to the vessel, its BWM procedures, the port(s) visited, the time and volumes of uptake and discharge of ballast water and location, the volumes and time of Ballast Water Exchange (BWE) or other details of approved ballast water treatment options carried out. This information, combined with the receiving port’s decision-making processes (as embodied in their BWM regime), enables decisions to be taken concerning any specific action required of the vessel in relation to ballast water management.

*It is essential that the information is available in a timely manner both in terms of the established BWM measures and for compliance monitoring verification.*

Three tools exist to document ballast water information: the Ballast Water Record Book (BWRB), the Ballast Water Reporting Form (BWRF) and the self-monitoring parameters from the Ballast Water Treatment Systems (BWTS).

- The **BWRB** as required by the IMO BWM Convention (see Regulation B-2 and Appendix II of the BWM Convention) is the most suitable current means for collecting and recording this information and becomes a component of the official logbooks and must be made available to Port States during inspections to assist with the
verification of compliance. The BWRB should include information such as location, day, time and dimension of each ballast water operation (uptake, discharge and recirculation within the vessel).

- The BWM Convention, however, does not include specific reporting requirements although the Regulation on BWM Plans refers to such requirements. A Port State may introduce such requirements – and in this case, this should be done by using the IMO BWRF (given in IMO Resolution A868 (20)) to ensure the necessary standardization of such reporting. Some Port States have already developed their own specific forms based on the IMO’s BWRF. For example, they will record such details as the use of the ships ballast pumps during ballast water exchange (BWE) at sea has been carried out. This will allow the RA to verify ballast water volumes and whether in fact the ballast pumps have been operated during the recorded times of BWE.

- Finally, through the mandatory application of the Code for the Approval of Ballast Water Management Systems, information pertaining to the use of the BWTS may be extracted. This includes for example shut-downs, alarms, operational parameters such as flow rates and pressures. This allows the Port State Control Officer to verify that the system was used within its treatment capacity as defined in the Type Approval Certificate available on-board the ship. As per the Code, the System Design Limitation parameters and their corresponding data should be automatically recorded.

5.2.1. Maritime awareness, crew training and familiarization with the BWM regime and CME system requirements

The shipper/cargo owner or manager/operator as well as the ship’s Master and crew and the ship’s agents must be aware of the BWM and associated CME arrangements for all the port(s) their ships are visiting. They can only comply with the requirements and legitimately be held accountable for non-compliance, if they are properly aware of such requirements and where appropriate, trained in their application.

It is the shipping side’s responsibility to ensure for maritime awareness of the international requirements, and the Port State’s responsibility to make them aware of national requirements. In an effort to support the training of seafarers, the GloBallast Partnership has developed a e-learning Portal (see link net page).

(http://archive.iwlearn.net/globallast.imo.org/learning/index.html)

5.2.2. Ballast water sampling and testing protocols

Ballast water sampling is part of the Port State’s National BW Strategy and its operational requirements and is important in the verification of the vessel’s compliance with BWM obligations. Ballast water sampling guidelines (G2) have been developed through the IMO Resolution MEPC.173(58) and have been levelled up through the development of an ISO protocol (ISO 11711-1). The sampling and analyses of ballast water is an essential step in verifying that a ship is meeting the D-2 discharge standard of the BWM Convention and is required for the type approval testing of BWMS and their commissioning. Sampling and analysis may be required on a regular basis in the future as part of survey and certification. In order to support the PSC in their preparation to the CME of the BWM Convention, the IMO has completed a Guideline for Port State Control (Resolution MEPC.252(67). The Guideline defines a four stage PSC approach including two stages focusing on the inspection of the
documentation pertaining to Ballast Water Management and two stages defining the sampling approach to verify compliance with the D-1 / D-2 Standards. It is to be noted that a PSC may decide not to follow the four stages approach of the Guidelines and use the prevailing Article 9 of the BWM Convention to carry out sampling as a first step of inspection.

A list of methodologies acceptable for the evaluation of compliance is reported in the BWM2/Circ.42 (rev1). In order to ensure that a representative sample is taken from the ship and analyses of water can be done, sampling arrangement are to be prepared. PSCO may decide to opt for an indicative sample and indicative analyses in order to estimate whether the water from the ship is in compliance or not with the D-2 Discharge Standard of the BWM Convention.

Table 1). Sampling for full compliance using detailed analyses of the samples can be complicated and multiple cubic meter of water may be discharged in the bilge if no arrangement for a duplicate sampling port exists (sampling facilities).

| EXAMPLE | The SGS BWS1 ballast water sampler allows the concentration of organisms in the 10-50 µm size class which is the most difficult size class to sample (Left: credit SGS SA). A technician counting viable organisms in the 10-50 µm size class using the staining approach of cells using CFMDA and FDA Cellular stains. **Credit: Left (SGS SA); Right (Guillaume Drillet)** |

Table 1: Definition and differences between indicative and detailed analysis for the D-2 standard (From BWM2.2-Circ.42-Rev.1)

<table>
<thead>
<tr>
<th></th>
<th>Indicative analysis</th>
<th>Detailed analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>To provide a quick, rough estimate of the number of viable organisms</td>
<td>To provide a robust, direct measurement of the number of viable organisms</td>
</tr>
<tr>
<td><strong>Sampling</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>Small or large depending on specific analysis</td>
<td>Small or large depending on specific analysis</td>
</tr>
<tr>
<td>Representative sampling</td>
<td>Yes, representative of volume of interest</td>
<td>Yes, representative of volume of interest</td>
</tr>
<tr>
<td><strong>Analysis method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td>Operational (chemical, physical)</td>
<td>Direct counts (biological)</td>
</tr>
</tbody>
</table>

5.2.3. Testing Ballast water during commissioning

The stated purpose of commissioning testing is “to validate the installation of a ballast water management system (BWMS) by demonstrating that its mechanical, physical, chemical and biological processes are working properly” (MEPC 73/WP.10). Commissioning is a requirement under the part 8 of the Code for BWMS (the Code) and a provision of the BWM.2/Circ.70 under which testing biological discharge is made mandatory. The MPEC has requested Administration to transfer these requirements to their Class Societies.

Paragraphs 4.2 and 4.3 of the circular BWM.2/Circ.70 stipulate that the discharged sample should be collected according to the Guidelines on ballast water sampling (G2) and that the representative samples should be analyzed for all size classes included in the D-2 standard using indicative analysis methods listed BWM.2/Circ.42/Rev.1. However, due to the large effort associated in collecting samples of sufficient volume, the relatively minor cost and effort in adding detailed analysis methods, and the large added value of the results of detailed analysis (compliance statement) it is recommended by experts to analyze commissioning samples using both indicative and detailed analysis methods (Ref: Global TestNet, 2019).

The commissioning should be designed to aim at the conclusion that the BWMS is functional (within its System Design Limitations - SDL). At delivery, the BWMS should be able to kill organisms in the water to ensure that the maximum number of organisms in the discharge has met the requirement of the D-2 Discharge Standard of the Convention for all size classes.

Paragraph 6.2.2 and 6.2.5 of G2 requires that a representative sample is taken from the discharge line and have a volume which allows to conclude that the sample meets the D-2 Discharge Standard. It should be done using an isokinetic sampling probe (Annex Part1 of G2).

For all the size fractions, this volume is already defined in the BWMS Code and is 3 cubic meters for the organisms ≥50um in size (BWMS Code Annex Part2 - 2.8.6.2 and 2.43.1.2). This step is very useful for ship-owners to ensure that the filtration step that most BWMS make use of is working properly.
Analyses may be carried out using indicative analyses or detailed analyses. The indicative analyses approved through the BWM2/Circ42.Rev1 can be used to generate a likelihood of compliance which may be enough for some administrations. The Global TestNet supported the idea that the detailed analyses should be used when possible.

The microbiological analyses must be done in a laboratory. There are no approved indicative methods in the fraction for organisms <10um in size which does not require a laboratory to carry out incubations under controlled conditions.

5.2.4. A methodology for ensuring ballast water exchange (BWE) has been undertaken

As BWE is today the most common worldwide practice by ships to manage their ballast water, it is essential that one of the elements of any CME should be a method to verify exchange.

5.2.5. Effective communication arrangements

This is an often neglected, but very important element of any effective CME system. Agreed communication protocols are needed for all operative areas, on board the vessel in the port, between Port States and between the port and ship prior to its arrival in port.

The communication between Port States is supported by the work carried out between the different MoU (Memorandum of Understanding) whereby Port States in different countries in a region share information on ships being boarded by Port State Control Officers. There are 10 PSC regimes Globally:

- Europe and the North Atlantic (Paris MoU); 1978 (oldest MoU)
- Asia and the Pacific (Tokyo MoU);
- Latin America (Acuerdo de Viña del Mar);
- Caribbean (Caribbean MoU);
- West and Central Africa (Abuja MoU);
- Black Sea region (Black Sea MoU);
- Mediterranean (Mediterranean MoU);
- Indian Ocean (Indian Ocean MoU);
- Riyadh MoU.
- The United States Coast Guard maintain the tenth PSC regime

In the Asia-Pacific Region the Tokyo MOU was concluded in December 1993 at its final preparatory meeting in Tokyo and it shares a Database center: Asia-Pacific Computerized
Information System (APCIS). The MoU promotes the training of PSCO and the development of seminars, the harmonization of procedures and practices relating to inspection, rectification and detention; it develops and review guidelines for carrying out inspections under the Memorandum; it develops and review procedures for the exchange of information.

The communication between the ship and the Port State is also important and may be supported partially by the submission of Pre-Arrival Notification forms and Ballast Water Reporting forms which may support the ship and the Port Authorities in finding solutions prior to arrival in case of potential non-compliance with the regulations of the BWM Convention.

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**Figure 5.**

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Figure 5: Example of Questions related to Ballast Water Management to be reported in the Pre-Arrival Notification (PANS) to the Maritime and Port Authorities of Singapore (https://www.mpa.gov.sg/assets/app/ePANS/epan.html; as retrieved 30 March 2019)

5.2.6. National legislation and enforcement provisions

National legislation is an essential element of any truly effective CME system, and must serve not only to establish the country’s requirements with respect to ballast water management, but also to put in place provisions which enable it to enforce those requirements (See below example.). The latter can include penalties or fines, the level of intensity of their inspections, and the legal power to direct ships where – or where not – to discharge their ballast water. Examples of deficiencies reports (and codes) from MoUs is given is Module 4.

A scientific team collecting and analyzing ballast water from a ship’s tanks during one of the multiple tests carried out during the Study led by Singapore on the evaluation of the compliance framework (information submitted to IMO in MEPC 68/2/13) (courtesy Maritime and Port Authorities of Singapore).

Example of communication from the USCG about the violation of National Ballast Water regulation in the USA (Note that the USA are not a party of the BWM Convention)

The principal purpose of the CME system is to verify that the Port State’s BWM requirements, which in themselves should be consistent with the IMO requirements, have been met by the ship.
5.2.7. Compliance monitoring during the Experience Building Phase
However, MEPC 71 adopted an important MEPC resolution MEPC.290(71), on “the experience-building phase associated with the BWM Convention” (EBP). This envisages a three-stage approach – data gathering; data analysis; and BWM Convention review (Figure 6). This process envisages that, based on the experience and feedback as well as data gathering and analysis, if amendments to the BWM Convention are needed they would be put forward at MEPC 79 (2022). As with other international treaties, Parties may also propose amendments at any time. During the EBP, the CME of all Port States should be developed and implemented to gather data according to the BWM.2/Circ.67 but no penalization of the cases of non-compliance should be made.

![Flowchart of the data gathering to be done by stakeholders (from BWM.2-Circ67)](image)

Ballast water sampling and analysis during the EBP may be undertaken:
- on a mandatory basis, by or under the authority of a PSC officer pursuant to article 9 of the BWM Convention (in which case the inspection should be in accordance with the PSC Guidelines); or
- independently of a PSC inspection with the voluntary participation of the ship (in which case the sampling may be undertaken by appropriate personnel of the port State, the flag State or another entity).

Recently, Singapore has awarded a Project to SGS SA for the sampling and analyses of ballast water against the D-2 Standard. The Project is expected to start in 2019 (Figure 7). Enforcement in Singapore is carried out as per Singapore’ PPS(BWM) regulations and IMO’s PSC guidelines. MPA inspectors do carry our regular indicative sampling/testing and also have engaged experts to carry out detailed sampling/testing. However, the results of this sampling/testing are not used for punitive purpose at this stage (unless required as per 4 step PSC guidelines) but more for the purposes to gather information and support IMO’s EBP efforts pertaining to the BWMC.
Figure 7: Screenshot of the Award Notice from Gebiz.gov.sg mentioning about the provision of ballast water sampling and analyses.

6. References and additional sources of information


Gollasch, S. 1996. Removal of barriers to the effective implementation of ballast water control & management measures in developing countries. Informal paper.


MEPSEAS Training Course on the Legal Implementation of the Ballast Water Management Convention

1. Introduction to Ballast Water Management

2. The Ballast Water Management Convention and Guidelines

3. Other International Conventions and Principles relevant to Ballast Water Management

4. Implementing the Ballast Water Management Convention

5. Guide to Drafting a Ballast Water Management Act

MODULE 2: OBJECTIVES

- Have a good knowledge of the provisions of the BWM Convention.
- Be able to identify the aspects of the BWM Convention that need to be incorporated in the national legislation.
- Be aware of the Ballast Water Management Guidelines developed for implementation of the Convention

Module Aims & Objectives of Module 2

This Module presents the main features of the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM Convention) including the Guidelines. At the end of the module the participants will:

- Have a good knowledge of the provisions of the BWM Convention;
- Be able to identify the aspects of the BWM Convention that need to be incorporated in the national legislation; and
- Be aware of the Ballast Water Management Guidelines developed for implementation of the BWM Convention.

The Module is divided into three parts, namely:
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2. Technical Provisions in the Annex; and
3. Flag State and Port State Obligations under the BWM Convention.
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The BWM Convention, as structured, sets out general provisions and obligations, and encapsulates regulations of technical nature in an Annex. It is important to note that Article 2.2 of the BWM Convention states that “the Annex forms an integral part” of the BWM Convention, and a reference to the BWM Convention constitutes at the same time a reference to the Annex. The main features of the BWM Convention are outlined below, including the Guidelines which were developed and adopted to facilitate the implementation of the requirements of the BWM Convention.

1. The Preamble

The Preamble to the BWM Convention refers to the following: the 1992 United Nations Conference on Environment and Development (UNCED) and its request that IMO develop rules on ballast water discharge; the need for a precautionary approach called for by Principle 15 of the “Rio Declaration on Environment and Development”; States’ obligations under UNCLOS to prevent the spread of alien species; and the conservation and sustainable use of marine biodiversity obligations under the “Convention on Biological Diversity” regime. Reference is also made to the 2002 World Summit on Sustainable Development (WSSD), which in paragraph 34(b) of its Plan of Implementation, calls for action at all levels to accelerate the development of measures to address invasive alien species in ballast water. The Preamble also notes that several States have taken unilateral action which is also a cause for concern in that there is a need for globally applicable regulations and guidelines for effective implementation and uniform interpretation. The preamble firmly connects the BWM Convention to the UNEP/WHO biosecurity/state responsibility agenda and the UN Office for Ocean Affairs (UNCLOS Secretariat) as well as the more traditional IMO concerns about ship safety, cleaner seas and internationally agreed upon standards. It also clearly links it with the sustainable development goals and integrated management practices advocated at UNCED and in Agenda 21. At a macro-system level, this reflects the increasing integration of the various UN agencies.

2. Definitions

A set of definitions is provided in Article 1 Definitions of the BWM Convention. In particular, some specific notions in the context of the BWM Convention, such as Ballast Water, Ballast Water Management, Harmful Aquatic Organisms and Pathogens, sediments are given a specific definition. A second set of definitions, of a more technical nature, is provided in Regulation A-1 of the annex to the BWM Convention. It is also important to note that a number of specific definitions are to be found in the Guidelines for the implementation of the BWM Convention.

2.1. Definitions found in the BWM Convention

“Ballast water” means water with its suspended matter taken on board a ship to control trim, list, draft, stability or stresses of a ship.
"**Ballast Water Management**" means mechanical, physical, chemical, biological or other processes to kill, remove, render harmless or avoid the uptake or discharge of harmful aquatic organisms and pathogens within ballast water and sediments.

"**Certificate**" means the International Ballast Water Management Certificate.

"**Convention**" means the International Convention for the Control and Management of Ships’ Ballast Water and Sediments.

"**Gross tonnage**" means the gross tonnage calculated in accordance with the tonnage measurement regulations contained in Annex I of the International Convention on Tonnage Measurement of Ships, 1969 or any successor Convention.

"**Harmful aquatic organisms or pathogens**" means aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to human health, harm to living resources and aquatic life, damage to amenities, impairment of biological diversity or interfere legitimate uses of such areas.

"**Organization**" means the International Maritime Organization.

"**Secretary General**" means the Secretary General of the Organization.

"**Sediments**" means matter settled out of Ballast Water within a ship.

"**Ship**" means a vessel of any type whatsoever operating in the marine environment and includes submersibles, floating craft and fixed or floating platforms, floating storage units (FSUs) and floating production storage and off-loading units (FPSOs).

### 2.2. Other definitions that may be relevant for national legislation

"**Active Substance**" means a substance or organism, including a virus or a fungus, that has a general or specific action on or against harmful aquatic organisms and pathogens.

"**Administration**" means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of any State, the Administration is the Government of that State. With respect to floating platforms engaged in exploration and exploitation of the sea-bed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of its natural resources, including FSUs and FPSOs, the Administration is the Government of the coastal State concerned.

"**Alien species**” means

(a) a species that is not an indigenous species; or

(b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

"**Annex**” means the Annex to the Convention.

"**Anadromous**” means species that spawn/reproduce in freshwater environments but spend at least part of their adult life in a marine environment.

"**Anniversary date**” means the day and month of each year corresponding to the date of expiry of the Certificate.

"**Authority**" means the agency responsible for managing the port/coastal State functions under national legislation. The Authority and the Administration may be the same government agency in some countries. (The South African Maritime Safety Authority is an
example of an Authority that is responsible for managing the port and coastal functions of South Africa.)

“Ballast water capacity” means the total volumetric capacity of any tanks, spaces or compartments on a ship used for carrying, loading or discharging ballast water, including any multi-use tank, space or compartment designed to allow carriage of ballast water.

“Ballast Water Discharge” means the ballast water as would be discharged overboard

“Ballast water management code” means the Code for Approval of Ballast Water Management Systems adopted by resolution MEPC.300(72), as may be amended by the Organization, provided that such amendments are adopted and brought into force in accordance with Article 19 of the present Convention relating to amendment procedures applicable to the Annex.”(Amendments to the Annex to the Convention adopted by MEPC 72)

“Ballast Water Management Plan” means a plan specific to the ship that has been approved by the Administration as meeting the requirements of the international Guidelines under IMO Resolution A.868 (20) or Regulation B-1 of the Annex to the Convention.

“Ballast water management system (BWMS)” means any system which processes ballast water such that it meets or exceeds the ballast water performance standard in regulation D-2. The BWMS includes ballast water treatment equipment, all associated control equipment, piping arrangements as specified by the manufacturer, control and monitoring equipment and sampling facilities. For the purpose of these guidelines, BWMS does not include the ship's ballast water fittings, which may include piping, valves, pumps, etc., that would be required if the BWMS was not fitted.

“Biogeographic region” means a large natural region defined by physiographic and biologic characteristics within which the animal and plant species show a high degree of similarity. There are no sharp and absolute boundaries but rather more or less clearly expressed transition zones.

“Ballast Water Management Record Book” means the onboard record that ships are required to use for recording ballasting operations in accordance with the IMO Resolution A.868(20) Guidelines (or Regulation B-2 of the Annex to the Convention.

“Ballast Water Management Tank” means any tank, hold or space used for the carriage of ballast water as defined in Article 1 of the Convention.

“Catadromous” means a species that spawn/reproduce in marine environments but spend at least part of their adult life in a freshwater environment.

“Control and monitoring equipment” means the equipment installed for the effective operation and control of the BWMS and the assessment of its effective operation.

“Control Equipment” means the installed equipment required for proper functioning of the prototype ballast water treatment technology.


“Company” means the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Safety Management Code

“Cryptogenic” means species that are of unknown origin, i.e. species that are not demonstrably native or introduced to a region.

“Dilution Method” means a process by which replacement ballast water is filled through the top of the ballast tank intended for the carriage of ballast water with simultaneous discharge
from the bottom at the same flow rate and maintaining a constant level in the tank throughout the ballast exchange system.

“Donor Port” means port or location where the ballast water is taken onboard.

“Freshwater” means water with salinity lower than 0.5 psu (practical salinity units).

“Marine water” means water with salinity higher than 30 psu.

“Minimum Dimension” means the minimum dimension of an organism based upon the dimensions of that organism’s body, ignoring e.g., the size of spines, flagellae, or antenna. The minimum dimension should therefore be the smallest part of the “body”, i.e. the smallest dimension between main body surfaces of an individual when looked at from all perspectives. For spherical shaped organisms, the minimum dimension should be the spherical diameter. For colony forming species, the individual should be measured as it is the smallest unit able to reproduce that needs to be tested in viability tests.

“Non-indigenous species” means any species outside its native range, whether transported intentionally or accidentally by humans or transported through natural processes.

“Party” means a State which is a Party to the Convention.

“Preparation” means any commercial formulation containing one or more Active Substances including any additives. This term also includes any Active Substances generated on board for purposes of ballast water management and any Relevant Chemicals formed in the ballast water management system that make use of Active Substances to comply with the Convention.

“Prototype Ballast Water Treatment Technology” means any integrated system of ballast water treatment equipment as under regulation D-4, participating in a programme for testing and evaluation with the potential of meeting or exceeding the ballast water performance standard in regulation D-2 including treatment equipment, all associated control equipment, monitoring equipment and sampling facilities. A prototype ballast water treatment technology may be a mechanical, physical, chemical, or biological unit process, either singularly or in combination that may or may not use Active Substances that remove, render harmless, or avoid the uptake or discharge of Harmful Aquatic Organisms and Pathogens within ballast water and sediments. Prototype ballast water treatment technologies may operate at the uptake or discharge of ballast water, during the voyage or in any combination of these phases.

“Recipient port” means the port or location where the ballast water is discharged.

“Relevant Chemicals” means transformation or reaction products that are produced during and after employment of the ballast water management system in the ballast water or in the receiving environment and that may be of concern to the ship’s safety, aquatic environment and/or human health.

“Representative sampling” means sampling that reflects the relative concentrations (chemicals) and numbers and composition of the populations (organisms) in the volume of interest. Samples should be taken in a time-integrated manner and the sampling facility should be installed in accordance with the annex, Part 1 of the Guidelines on ballast water sampling (G2).

“Sampling facilities” refers to the means provided for sampling treated or untreated ballast water as needed in the Guidelines developed by the Organization.

“Sampling Point” means that place in the ballast water piping where the sample is taken

“Sequential Method” means a process by which a ballast tank intended for the carriage of ballast water is first emptied and then re-filled with replacement ballast water to achieve at least a 95 per cent volumetric exchange.
“System Design Limitations of a BWMS” means the water quality and operational parameters, determined in addition to the required type approval testing parameters, that are important to its operation, and, for each such parameter, a low and/or a high value for which the BWMS is designed to achieve the performance standard of regulation D-2. The System Design Limitations should be specific to the processes being employed by the BWMS and should not be limited to parameters otherwise assessed as part of the type approval process. The System Design Limitations should be identified by the manufacturer and validated under the supervision of the Administration in accordance with these Guidelines.

“Target species” means the species identified by a Party that meet specific criteria indicating that they may impair or damage the environment, human health, property or resources and are defined for a specific port, State or biogeographic region.

“Viable organisms” mean organisms that have the ability to successfully generate new individuals in order to reproduce the species.


3.1. General obligations

The general objective of the obligations listed under Article 2, General Obligations, is to ensure an effective application of the BWM Convention by the Parties. Particularly, under Article 2.1, Parties undertake to give full and complete effect to the provisions of the BWM Convention and its Annex in order to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships’ ballast water and sediments.

In addition, Parties are given the right to take, individually or jointly with other Parties, more stringent measures, consistent with international law, to achieve this objective (Art 2.3) and shall endeavor to cooperate for the purpose of effective implementation, compliance and enforcement of the BWM Convention (Art 2.4).

3.2. Application of the BWM Convention

According to Article 3, Application, the BWM Convention applies to all ships that carry ballast water, which fly the flag of a Party or which operate under the authority of a Party. The BWM Convention does not apply to ships operating only within the jurisdiction of a Party, to ships owned or operated by a State on non-commercial service (such as warship), and to ships carrying permanent ballast water in sealed tanks.

With respect to ships of non-Parties to the BWM Convention, Parties shall apply the requirements of the BWM Convention as may be necessary to ensure that no more favorable treatment is given to such ships.

- The IMO developed Guidance on entry or re-entry of ships into exclusive operation within waters under the jurisdiction of a single Party (BWM.2/Circ.52/Rev.1)

- The IMO approved circulars on the application of the BWM Convention to mobile offshore units and offshore support vessels (BWM.2/Circ.44).
3.3. Control of the transfer of harmful aquatic organisms and pathogens through ships’ ballast water and sediments

In terms of Article 4, Control of the transfer of harmful aquatic organisms and pathogens through ships’ ballast water and sediments, each Party shall require that ships to which the BWM Convention applies and which are entitled to fly its flag or operating under its authority comply with the requirements set forth in this BWM Convention, including the applicable standards and requirements in the Annex, and shall take effective measures to ensure that those ships comply with those requirements. (Art 4.1) Parties shall also with due regard to its particular conditions and capabilities, develop national policies, strategies or programmes for ballast water management in its ports and waters under its jurisdiction that accord with, and promote the attainment of the objectives of the BWM Convention (Art 4.2).

3.4. Sediment and Ballast Water Reception facilities

Under Article 5, Sediment Reception Facilities, Parties undertake to ensure that ports and terminals where cleaning or repairs of ballast tanks occurs have adequate reception facilities for the reception of sediments. The IMO Guidelines for Sediment Reception Facilities (G1) provide guidance for the provision of facilities for the reception of sediments from ballast water tanks.

In addition, Regulation B-3.6 provides that the requirements of ballast water management standards do not apply to ships that discharge ballast water to a reception facility. The IMO Guidelines for Ballast Water Reception Facilities (G5) provide for guidance for the provision of facilities for the reception of ballast water.

3.5. Research and monitoring

Article 6, Scientific and Technical Research and Monitoring, calls for Parties individually or jointly to promote and facilitate scientific and technical research on ballast water management and monitor the effects of ballast water management in waters under their jurisdiction.

3.6. Survey and certification

Under Article 7, Survey and certification, each party shall ensure that ships flying its flag or operating under its authority and subject to survey and certification are so surveyed and certified in accordance with the regulations in the Annex. (Art 7.1).

A party implementing measures in accordance with Art 2.3 and Section C of the Annex shall not require additional survey and certification of a ship of another Party, nor shall the Administration of the ship be obligated to survey and certify additional measures imposed by another Party. Verification of such additional measures shall be the responsibility of the Party implementing such measures and shall not cause undue delay to the ship. (Art 7.2).

3.7. Violations
Under Article 8 Violations, a Party, including in its capacity as a flag State, shall prohibit, under its law, violations to the requirements of the BWM Convention and establish sanctions. Article 8 also requires that Administrations informed of violations shall investigate the matter. National legislation should reflect these requirements and a maritime Administration is required to fulfill these obligations. It is also important to note that sanctions shall be adequate in severity to discourage violations. This is discussed again in module 5.

Two situations are addressed:

- **Wherever the violation occurs**: when the administration of the Flag of the ship is informed about a violation, it shall investigate the allegation. When sufficient evidence of the violation is provided, the administration shall cause proceedings as soon as possible according to its law.

- **Violation occurring within the jurisdiction of a Party**: this Party shall cause proceedings in accordance with its law or inform the administration of the ship concerned and provide evidence of the violation that may be in its possession.

    The draft Ballast Water Management Act of South Africa includes an entire chapter on enforcement and a subsection on offences and penalties. In accordance with this draft legislation any person who contravenes any provision of the Act, or who fails to comply with any provision thereof with which it is his or her duty to comply shall be guilty of an offence. The Act also provides that the owner and the master of a ship that does not comply with the requirements of the Act shall be guilty of an offence. The chapter on enforcement includes further subsections on:

    - The service of documents on shipowners, application of fines etc.
    - Administrative penalty on admission of guilt
    - Jurisdiction
    - Restriction on jurisdiction over offences outside of South Africa
    - Suspension of proceedings at flag State request
    - Admissibility of documentary evidence
    - Appeals
    - Decisions
    - Protection of Government and public officers

**3.8. Inspection of ships**

In terms of Article 9, Inspection of Ships, ships may be inspected by port State control officers who can verify that the ship has a valid certificate; inspect the Ballast Water Record Book; and/or sample the ballast water. Models for Ballast Water Management Certificate and Ballast Water Record Book can be found in Appendixes 1 and 2 of the BWM Convention.

Under Article 9, if a ship does not carry a valid certificate or if the ship, its equipment or its crew are failing to comply with the requirements of the BWM Convention, then a detailed inspection may be carried out and “the Party carrying out the inspection shall take such steps as will ensure that the ship shall not discharge ballast water until it can do so without presenting a threat of harm to the environment, human health, property or resources.”
Verifying Compliance to the Regulations

The PSC officers boarding a ship may not have comprehensive understanding of BWMS but can easily verify that the BWRB and the BWMP documentation exist and are updated. One way for a PSC to verify that ballast water has been treated is to scan through the Log data of the BWMS and verify that the water was properly treated during intake (and eventually discharge as alarm logs should be recorded by the BWMS). In the case ballast water treatment has failed the ship should have implemented a contingency measure as described in their BWMP (see IMO Ballast water management how to do it; 2017). In case the PSCO is not confident that the water has been treated adequately, he/she may take actions and forbid the ship to discharge ballast water. Sampling is also a possibility for the PSC officer. In the picture here, a sampling team has been deployed on-board the ship to take a sample for D-2 compliance- it takes 2-4 hours from beginning to end to install the sampler, take a sample and remove the sampler (Photo: Guillaume Drillet). Note however that sampling often means that some water is discharged in the environment because it is not always possible to sample during tank to tank operations. Additional information on procedures to samples have been published by EMSA (2019).

PSC officers will be authorized to sample and analyses the ballast water to ensure that it meets the discharge criteria as required by the BWM Convention. PSC Officers can also detain the ship if:

- The BWM Certificate is not valid.
- The ballast water record book is not maintained correctly.
- The ship’s ballast sample does not meet the specifications as required by the BWM Convention.
- The condition of the ship or its BWC associated equipment does not correspond to the particulars in the certificate.
- The ship staff are not familiar with or have not implemented the essential shipboard procedures relating to BWM.

In order to prepare better for an inspection, the PSCO may use the Pre-Arrival Notification forms and include questions about the capacity and use of BWMS (See example of questions from ePANS of Singapore in Module 1; Figure 5). Other examples of Ballast Water reporting forms have been by the IMO and can be found in annex of the Guidelines G6 of the BWM Convention.

The IMO has completed a Guideline for Port State Control (Resolution MEPC.252(67)). The Guidelines defines a four stage PSC approach including two stages focusing on the
inspection of the documentation pertaining to Ballast Water Management and two stages defining the sampling approach to verify compliance with the D-2 Standards. Yet, because the Articles of the BWM Convention prevail over the Guidelines, a PSCO may consider sampling without having to follow the Guidelines proposed by IMO (Figure 8).

**Figure 8:** Port State Control Guidelines (Res MEPC.252(67)) (Credit: Guillaume Drillet)

BWMS are approved with Operational Limitations and System Design Limitations; these data are reported on the Type Approval Certificate of the BWMS onboard the ship. For example, a BWMS which has not been approved for being used in freshwater should not be used in such conditions. It is relatively easy for a PSCO to verify this without being required to sample.

In the absence of a fully developed Port State control inspection program to determine compliance with the D-2 standard, an alternative may be considered by administrations within the framework of harmonized surveys (see sections 3.6 and 4.5). In such a case, requirements within the annual/intermediate and renewal surveys framework to ensure that BWMS are still ensuring compliance with D-2 could be included. Such test could be carried out in line with the tests required for the commissioning of BWMS (IMO BWM.2/Circ.70).

### 3.9. Detection of violations and control of ships

As a principle, Article 10, Detection of violation and control of ships, states that Parties shall co-operate in the detection of violations and the enforcement of the BWM Convention (Art 10.1). Under Article 10.2, when a violation is detected, the Flag State or the coastal/port State take steps to warn, detain or exclude the ship. The ship may be given permission to leave the port or the terminal to discharge its ballast water or proceed to the nearest repair yard or facility available. However, if the ships pose a threat to the environment, human health, property or resources, the Coastal/Port State shall prohibit such ship from discharging ballast water until the threat is removed (Art 10.3).

The coastal/port State can also inspect a ship if a request for investigation is received from another Party, with sufficient evidence that a violation has been committed. The Coastal/Port State carrying out the investigation shall send a report to the Party that requested the investigation and to the Flag State administration (Art 10.4).
When a violation is detected, the ship shall be notified and a report sent to the Flag State administration. If an action is taken, the flag state administration or its diplomatic representation shall be informed, as well as the organization which issued the certificate. The next port of call of the ship shall also be informed.

All possible efforts shall be made to avoid a ship being unduly detained or delayed (Art 12, Undue Delay to Ships) and the ship which has been unduly detained or delayed is entitled to compensation.

**EXAMPLE**

*Pollution Crimes Cost Greek Shipper $2.7 Million, Ships Barred from USA, NEW ORLEANS, Louisiana*

Polembros Shipping Ltd., a Greek ship management company, was sentenced federal court in New Orleans to pay $2.7 million criminal fine for violating anti-pollution laws, ship safety laws, and making false statements during a U.S. Coast Guard investigation of M/V Theotokos. The ship violated the Nonindigenous Aquatic Nuisance Prevention and Control Act, by failing to maintain accurate ballast water records and making false statements by concealing the fact that fuel oil was leaking into the forepeak ballast tank. Polembros was also ordered to pay a separate $100,000 community service payment to the Smithsonian Environmental Research Centre.

*Source: The United State Department of Justice*


**Enforcement of the BWMC obligation on the Ship Pilion**

On 31 January 2018, The Ship Pilion was controlled by the German Marine Police and a violation of the BWMC was found. A security deposit of >30,000 Euro was requested for discharging ballast water in Germany without having been carrying out Ballast Water Exchange between the last port of call and Hamburg.

*Source: MFAME*

[http://mfame.guru/ship-violated-ballast-water-convention/?utm_source=VIP+Subscriber+List+1&utm_campaign=d8fd007bd1-EMAIL_CAMPAIGN_2018_02_02&utm_medium=email&utm_term=0_803198feb7-d8fd007bd1-98406545](http://mfame.guru/ship-violated-ballast-water-convention/?utm_source=VIP+Subscriber+List+1&utm_campaign=d8fd007bd1-EMAIL_CAMPAIGN_2018_02_02&utm_medium=email&utm_term=0_803198feb7-d8fd007bd1-98406545)

### 3.10. Notification of control actions

Under Article 11, Notification of control actions, a ship shall be notified if an inspection, conducted in accordance with Article 9 or 10, indicates a violation of the BWM Convention. A report shall be forwarded to the Administration, including any evidence of the violation. (Art 11.1)

If any action is taken in accordance with Art 9.3, 10.2 or 10.3, the officer carrying out such action shall inform, in writing, the administration of the ship concerned of all the circumstances in which the action was deemed necessary. If this is not possible then the consul or the representative of the ship concerned. The recognized organization responsible for the issue of Certificates shall also be notified. (Art 11.2).
3.11. Undue delay to ships

All possible efforts shall be made to avoid a ship being unduly detained or delayed under Article 7.2, 8, 9 or 10. When a ship is unduly detained or delayed under these articles, it shall be entitled to compensation for any loss or damage suffered. (Art 12.)

3.12. Technical assistance and cooperation

Under Article 13, *Technical Assistance, Co-operation and Regional Co-operation*, Parties undertake, directly or through the Organization and other international bodies, as appropriate, in respect of the control and management of ship’s ballast water and sediments, to provide support for those Parties which request technical assistance to train personnel; to ensure the availability of relevant technology, equipment and facilities; to initiate joint research and development programmes; and to undertake other action aimed at the effective implementation of the BWM Convention and of guidance developed by the Organization related thereto.

3.13. Communication of information

Under Article 14, *Communication of information*, each Party shall report to the Organization, and where appropriate, make available to other Parties the following information:

(a) any requirements and procedures relating to ballast water management, including its laws, regulations and guidelines for implementation of the BWM Convention;

(b) the availability and location of any reception facilities for the environmentally safe disposal of ballast water and sediments; and

(c) any requirements for information from a ship which is unable to comply with the provisions of the BWM Convention for reasons specified in regulations A–3 and B–4 of the Annex.

The Organization shall notify Parties of the receipt of any communications under Article 12 and shall circulate to all Parties any information communicated to it under the provisions of Article 14.

3.14. Dispute settlement, relationship to international law and other agreements, signature, ratification, acceptance, approval and accession, amendments, denunciations, depositary, and languages:

Articles 15, 16, 17, 19, 20, 21 and 22 deals with dispute settlement, relationship to international law and other agreements, signature, ratification, acceptance, approval and accession, amendments, denunciations, depositary, and languages.

It is important to highlight that Article 19 confers upon the MEPC the right to amend the BWM Convention. It is therefore crucial that MEPC decisions must be consulted during the drafting process to ensure that the latest guidelines and recommendations are reflected.
3.15. Entry into force of the BWM Convention

The BWM Convention entered into force on 8 September 2017, 12 months after the ratification by 30 States, representing 35 per cent of world merchant shipping tonnage (Article 18, Entry into Force).

WHAT DO SHIPS NEED TO DO, NOW THAT THE BWM CONVENTION IS IN FORCE?

From the date of entry into force, ships in international traffic are required to manage their ballast water and sediments to a certain standard, according to a ship-specific ballast water management plan. Ships have to carry:

- **A ballast water management plan** - specific to each ship, the ballast water management plan includes a detailed description of the actions to be taken to implement the ballast water management requirements and supplemental ballast water management practices

- **A ballast water record book** - to record when ballast water is taken on board; circulated or treated for ballast water management purposes; and discharged into the sea. It should also record when ballast water is discharged to a reception facility and accidental or other exceptional discharges of ballast water; and an International Ballast Water Management Certificate (ships of 400 gt and above) this is issued by or on behalf of the Administration (flag State) and certifies that the ship carries out ballast water management in accordance with the BWM Convention and specifies which standard the ship is complying with, as well as the date of expiry of the Certificate.

- **An International Ballast Water Management Certificate** issued by the Flag State (see Survey and Certification)

- **A copy of the BWMS Type Approval Certificate**


The Annex comprises five sections which address, *inter alia*, applicability, technical requirements, additional measures, standards and certification.

4.1. Section A: General Provisions, exception, exemptions and equivalence

*Under Regulation A-2, General Applicability it is stated that except where expressly provided otherwise, the discharge of Ballast Water shall only be conducted through Ballast Water Management, in accordance with the provisions of the Annex to the BWM Convention.*
4.1.1. Regulation A-3, Exceptions
Regulation A-3, Exceptions sets exceptions to the general principle above, such as the need to ensure the safety of a ship in emergency situations or saving life at sea, accidental discharges resulting from a damage to a ship or to its equipment, the need to avoid or minimize pollution incidents from the ship, the situation where the uptake and discharge of ballast water and sediment are taking place in the high seas or if the uptake and discharge of ballast water and sediment originate from the same location.

4.1.2. Regulation A-4, Exemptions
Regulation A-4, Exemptions provides that a Party, under certain conditions, may grant exemptions to ballast water management requirements to ships which only operate between specified ports or locations. The IMO Guidelines for Risk Assessment under Regulation A-4 of the BWM Convention (G7) provide advice and information regarding risk assessment principles, methods and procedures for granting exemptions. A revision of the guidelines has now been generated in order to cater for the Risk Assessment to be carried out in the development of a Same Risk Area (Resolution MEPC.289(71); Figure 9).

Figure 9: A Same Risk Area is defined as “an agreed geographical area based on a completion of a risk assessment carried out in line with these Guidelines” (G7). Source: Stuer-Lauridsen et al 2018.

The concept of the Same Risk Area has been recently included as an approach the to grant exemptions to ship navigating only within a Same Risk Area. Proposition and examples of such risk assessments are being developed with some example to be presented at the IMO (Between Denmark and Sweden, between Korea and China...etc.).

4.1.1. Regulation A-5, Equivalent Compliance
Under Regulation A-5, Equivalent Compliance, the Flag administration can issue equivalent compliance, under certain conditions, to pleasure craft. In doing so, the administration shall take the IMO Guidelines for Ballast Water Management Equivalent Compliance (G3).
### Same Risk Area in the MEPSEAS Region

The Government of Singapore has been initiating studies to evaluate the possibility of developing an SRA in the ASEAN region. The study carried out by hydrodynamics experts shows a high degree of passive connectivity due to currents in the south-east Asian region. **This potentially offers the regional governments to work towards the development of a Same Risk Area in which 100’s of ships on short sea shipping routes could be offered an exemption**; potentially saving millions of dollars to the industry.

Sources: Graph on the left Bioregion from IMO-GloBallast (MEPC70 INF.21; Same risk area approach to exemptions under regulation A-4 of the Ballast Water Management Convention); Graph on the right: area of study where a 2D particle tracking model was used to evaluate the connectivity between the ports of South-East Asia (DHI; Same Risk Area Phase 1, Desk-top Water Connectivity Study; June 2018 – Courtesy from The Marine and Port Authority of Singapore).

### 4.2. Section B: Management and Control Requirements for Ships

#### 4.2.1. Ballast Water Management Plan (Regulation B-1)

Ships are required to have on board and implement a Ballast Water Management Plan approved by the Administration (Regulation B-1). The Ballast Water Management Plan (BWMP) is specific to each ship and includes a detailed description of the actions to be taken to implement the Ballast Water Management requirements and supplemental Ballast Water Management practices. The IMO Guidelines for Ballast Water Management and the Development of Ballast Water Management Plans (G4) provide guidance to Governments, relevant authorities and interested Parties on ballast water and sediments management options and procedures, as well as on the development of BWM Plan (mandatory and non-mandatory information, format…).

#### 4.2.2. Ballast Water Record Book (Regulation B-2)

Ships must have a Ballast Water Record Book (Regulation B-2) to record when ballast water is taken on board; circulated or treated for Ballast Water Management purposes; and discharged into the sea. It should also record when Ballast Water is discharged to a reception facility and accidental or other exceptional discharges of Ballast Water.

#### 4.2.3. Implementation dates for the different Standards (Regulation B-3)

Regulation B-3, *Ballast Water Management for Ships*, sets out the calendar for the application of standards which ships must meet when effecting ballast water management.
under the BWM Convention. Those standards are enunciated in Section D of the Annex to the BWM Convention and consist of the ballast water exchange standard (Regulation D-1) and the ballast water performance standard (Regulation D-2). The effect of Regulation B-3 is to phase in the application of the Regulation D-2 standard (Ballast Water Performance Standard); in the interim, prior to the application of that standard, ships are subject at least to the Regulation D-1 standard (Ballast Water Exchange Standard). The phase-in calendar of the Regulation D-2 standard was initially based on the ballast water capacity and the year of construction of the ship. The MEPC through the resolution MEPC.287(71) approved amendments to the Regulation B-3 and the schedule set initially has been superseded (Figure 4) using the date set for the IOPP survey of the MARPOL Annex 1 as a referential (See Module 1 for more detailed information).

Other methods of ballast water management may also be accepted as alternatives to the ballast water exchange standard and ballast water performance standard, provided that such methods ensure at least the same level of protection to the environment, human health, property or resources, and are approved in principle by IMO’s Marine Environment Protection Committee (MEPC).

In accordance with the new schedule for implementation compliance with the D-2 standard will be phased in over time for individual ships, up to 8 September 2024. Over time, more and more ships will be compliant with the D-2 standard.

**AS OF 8 SEPTEMBER 2017**

**ALL SHIPS MUST HAVE**

- A ballast water management plan;
- A ballast water record book; and
- An International Ballast Water Management Certificate.

**EXISTING SHIPS**

- must meet at least the D-1 standard (ballast water exchange);
- they may also choose to install a ballast water management system or otherwise meet the D-2 standard but this is not mandatory until the corresponding compliance date.

**NEW SHIPS**

- must meet the D-2 standard (ballast water performance).
4.2.4. Ballast Water Exchange (Regulation B-4)

Regulation B-4 Ballast Water Exchange addresses the conditions under which ballast water exchange should be conducted by the ship. Under Regulation B-4, all ships using ballast water exchange should:

- whenever possible, conduct ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 meters in depth, taking into account Guidelines developed by IMO;

- In cases where ship is unable to conduct ballast water exchange as above, this should be as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water least 200 meters in depth (Figure 11).

The IMO Guidelines for Ballast Water Exchange (G6) provide guidance to shipowners and operators on requirements, operational procedures, including safety precautions, and methods for conducting ballast water management.

When the parameters set forth in the regulation B-4 cannot be met, areas may be designated by the port State where ships can conduct ballast water ballast water exchange (Regulation B-4.2). The IMO Guidelines on Designation of Areas for Ballast Water Exchange (G14) provide guidance to port States for the identification, assessment and designation of areas where ships may conduct ballast water in accordance to Regulation B-4.2 of the BWM Convention.
Figure 11: Example of areas for water exchange following the D-1 Standard of the BWM Convention in the South-East Asia area. Note that the region has very limited BWE areas and may need to cater for this in the future (Courtesy, DHI)

In 2014, the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic proposed sets out designated ballast water exchange areas in the North Sea for intra North Sea traffic. Within Norwegian territorial waters and economic zone, the Norwegian national regulation applies. The designation of areas of ballast water exchange is a temporary regulation and terminates when all ships shall meet regulation D-2 of the BWM Convention (Figure 12).

EXAMPLE

The removal and sampling of sediments in ships can be difficult due to complicated access to structures and dangerous conditions working in confined spaces.
Figure 12: The North Sea and Norwegian ballast water exchange areas (OSPAR 2014). It is a temporary regulation and terminates when all ships shall meet regulation D-2 of the BWM Convention.

4.2.5. Sediment Management for Ships (Regulation B-5)
Regulation B-5 *Sediment Management for Ships* provides that ships constructed after 2009 should be designed and constructed with a view to minimize the uptake of sediments and facilitate its removal and sampling (Regulation B-5.2). The IMO *Guidelines on Design and Construction to Facilitate Sediment Control on Ships (G 12)* provide guidance to ship designers, ship builders, owners and operators in the development of ship structures and equipment to achieve the objective of Regulation B-5.2.

4.3. Section C: Additional measures

4.3.1. Additional Measures (Regulation C-1)
Under Regulation C-1, *Additional Measures* a Party, individually or jointly with other Parties, may impose on ships additional measures to achieve the objectives of the BWM Convention.
In these cases, the Party or Parties should consult with adjoining or nearby States that may be affected by such standards or requirements and should communicate their intention to establish additional measures(s) to the Organization at least 6 months, except in emergency or epidemic situations, prior to the projected date of implementation of the measure(s). When appropriate, Parties will have to obtain the approval of IMO.

The IMO Guidelines for Additional Measures Regarding Ballast Water Management including Emergency Situations (G13) provide guidance to Parties in determining if additional measures are necessary in order to achieve the objectives of the BWM Convention.

4.3.2. Warning concerning ballast water uptake in certain area (Regulation C-2)

The Regulation C-2, Warning concerning ballast water uptake in certain area and related flag state measures stipulates that a party should notify mariners when the quality of the water is not adequate for ballasting because it contains high concentration of potential harmful organisms and pathogens or when the water is presenting high turbidity (which may cause malfunction of the BWMS).

4.4. Section D: Standards for Ballast Water Management

4.4.1. Ballast Water Exchange Standard (Regulation D-1)

Ships performing Ballast Water exchange shall do so with an efficiency of 95 per cent volumetric exchange of Ballast Water. For ships exchanging ballast water by the pumping-through method, pumping through three times the volume of each ballast water tank shall be considered to meet the standard.

The IMO Guidelines for Ballast Water Exchange Design and Construction Standards (G11) provide guidance to shipbuilders, ship designers, owners and operators of ships in designing new ships ballast water systems.

Ballast water exchanges (time, area, volume, methods...etc.) should be reported in the BWRB and may need to be reported in the ballast water reporting forms to the different authorities (Figure 13).
4.4.2. Ballast Water Performance Standard (Regulation D-2)

To measure the ballast water performance standard, the Regulation D-2 sets specific biological parameters by which ships conducting ballast water management shall discharge less than a certain volume/concentration of viable organisms. Ships conducting ballast water management shall discharge less than 10 viable organisms per cubic meter greater than or equal to 50 micrometers in minimum dimension and less than 10 viable organisms per milliliter less than 50 micrometers in minimum dimension and greater than or equal to 10 micrometers in minimum dimension; and discharge of the indicator microbes shall not exceed the specified concentrations.

The indicator microbes, as a human health standard, include, but are not be limited to:

1. Toxicogenic *Vibrio cholerae* (O1 and O139) with less than 1 colony forming unit (cfu) per 100 milliliters or less than 1 cfu per 1 gram (wet weight) zooplankton samples;
2. *Escherichia coli* less than 250 cfu per 100 milliliters; and
3. Intestinal Enterococci less than 100 cfu per 100 milliliters.

Figure 13: Areas of Ballast Water Exchange and trends extracted from the submissions of ballast water reporting forms to the Authorities. Note the 50 and 200nm operational limits as followed by ships carrying out exchanges (left) and the cumulated volume exchanged (right) (Courtesy Billy Gehardt; subsequent publication: Gerhard and Gunsch (2018))

4.4.3. Approval requirements for Ballast Water Management systems

(Regulation D-3)

Several methods are used and Ballast Water Treatment Systems and should be approved before they are fitted onboard ships. The process to be followed, and the technical specifications to be met, is outlined in the Code for Approval of Ballast Water Management Systems (G8) which is applicable to all treatment systems and the Procedure for Approval of Ballast Water Management Systems that Make Use of Active Substances (G9) which is applicable to treatment systems using active substances (chemicals).
In order to strengthen the type approval process of Ballast Water Management Systems, the initial Guidelines for Approval of Ballast Water Management Systems (G8) have been revised by the IMO through the work of correspondence group reporting to the Ballast Water Working Group of MEPC. The Code supersedes the Guidelines G8 and makes the testing procedures mandatory (Resolution MPEC.300(72)).

According to Regulation D-3.2, BWMS that make use of active substances (chemicals) are approved by the IMO and the procedure for approval of such systems provides the safeguard for the sustainable use of active substances. The procedure consists of a two-tier process – basic approval and final approval – that involves extensive consultations among IMO Member States and independent scientific advice from a technical group called to evaluate the physical and chemical standards and ensure that a respective BWMS does not pose an unreasonable risk for environment, human health, property or resources. The technical group was established by MEPC in 2006 under the auspices and with direct support of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) (Pughiuic 2010)

The Global TestNet was created under the umbrella of the GloBallast Partnership. This organization of testing facilities involved in type approval and compliance testing is sharing technical information to render the testing of BWTS more robust and comparable (http://www.globaltestnet.org/Home).

On 13 April 2018 the MEPC adopted amendments to the Annex to the BWM Convention and these include amendments to regulation D3 – Approval requirements for ballast water management systems:
Paragraph 1 is replaced with the following:

"1 Except as specified in paragraph 2, ballast water management systems used to comply with this Convention shall be approved by the Administration as follows:

- ballast water management systems installed on or after 28 October 2020 shall be approved in accordance with the BWMS Code, as may be amended; and
- ballast water management systems installed before 28 October 2020 shall be approved taking into account the guidelines developed by the Organization or the BWMS Code, as may be amended."

Important implications of the entry into force of the BWM Convention

 NB: From the date of entry into force of the BWM Convention, 8 September 2017, all ships must conform to at least the D-1 standard; and all new ships, to the D-2 standard.

 Eventually, all ships will have to conform to the D-2 Standard. For most ships, this involves installing special equipment to treat ballast water.

 IMO Member Governments, meeting in the MEPC, have agreed upon an implementation timetable for existing ships, linked to the ship’s International Oil Pollution Prevention Certificate (IOPPC) renewal survey.

IOPPC RENEWAL SURVEYS

<table>
<thead>
<tr>
<th>Between 8 Sept 2017 &amp; 8 Sept 2019</th>
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<tbody>
<tr>
<td>- If the previous IOPPC renewal survey was between 8 September 2014 and 8 September 2017, then the ship must comply with D-2 standard by this renewal survey.</td>
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<tr>
<td>- If the previous IOPPC renewal survey was before 8 September 2014, then the ship can wait until the next renewal survey (which will be after 8 September 2019).</td>
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<tr>
<th>After 8 Sept 2019</th>
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<tr>
<td>- A ship undergoing a renewal survey linked to the ship’s International Oil Pollution Prevention Certificate after 8 September 2019 will need to meet the D-2 standard by the date of this renewal survey.</td>
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<tr>
<th>Ships Without IOPPC Renewal Survey</th>
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<tr>
<td>- The ship should meet the D-2 standard at a date determined by its flag State, but not later than 8 September 2024.</td>
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4.4.4. Prototype technologies (Regulation D-4)
Regulation D-4 covers Prototype Ballast Water Treatment Technologies. It allows for ships participating in a programme approved by the Administration to test and evaluate promising Ballast Water treatment technologies to have a leeway of five years before having to comply with the requirements of the BWM Convention. The IMO Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes (G10) are aimed at assisting the administrations in this respect.

4.4.5. Review of standards by the Organization (Regulation D-5)
Under regulation D-5, the IMO is required to review the Ballast Water Performance Standard, taking into account a number of criteria including safety considerations; environmental acceptability, i.e., not causing more or greater environmental impacts than it solves; practicability, i.e., compatibility with ship design and operations; cost effectiveness; and biological effectiveness in terms of removing, or otherwise rendering inactive harmful aquatic organisms and pathogens in ballast water. The review should include a
determination of whether appropriate technologies are available to achieve the standard, an assessment of the above-mentioned criteria, and an assessment of the socio-economic effect(s) specifically in relation to the developmental needs of developing countries, particularly small island developing States.

4.5. Section E: Survey and Certification Requirements for Ballast Water Management

4.5.1. Requirements from section E
This section is common for most of the IMO Conventions and contains specific requirements for initial, renewal, intermediate, annual, and additional surveys and certification requirements.

Survey are required for all ships of 400 GT and above, excluding floating platforms, FSUs and FPSOs to which the BWM Convention applies. The administration shall establish appropriate measures for ships that are not subject to the provisions of the BWM Convention to ensure that appropriate provisions of the BWM are complied with. Upon completion of the surveys (initial and renewal), certificates or endorsements are to be issued indicating that the survey has been completed. Surveys for the issuance of the Certificate are to be carried out at minimum every 5 years.

Regulations E – 2 to E – 5 set out the requirements with the regard to the issuance and endorsement of the International Ballast Water Management Certificate (IBWMC). In most cases this activity is carried out by recognized organization on behalf of the Flag State.

RESOLUTION MEPC.299(72) in 2018 (Endorsements of additional surveys on the International Ballast Water Management Certificate) proposed amendments to regulations E-1 and E-5 of the BWM Convention concerning endorsements of additional surveys on the International Ballast Water Management Certificate and makes a provision for annual or intermediate surveys.

Prior to the entry into force of the BWM Convention, survey and certification guidelines were provided for in the Interim Survey Guidelines under the Harmonized System of Survey and Certification (BWM.2/Circ.7). These guidelines have since been incorporated in the most recent Survey Guidelines under the Harmonized System of Survey and Certification (HSSC Guidelines) these guidelines should be considered.

There are two Appendices attached to the BWM Convention providing standardized formats for the Ballast Water Management Certificate and Ballast Water Record Book (Annex I).

4.5.2. Note on De-coupled IOPP and IOPP re-coupling at BWMS commissioning
On its website the Class society DNV-GL note the following: “any requirements for IOPP re-coupling by the flag administration are to be considered. If the vessel's IOPP was de-coupled in 2017, then usually the D-2 standard becomes due 5 years later at the next IOPP renewal in 2021/2022. In case a vessel has a de-coupled IOPP and the BWMS is fitted before the BWM D-2 due date, the IOPP should remain de-coupled until the scheduled IOPP renewal. In this case, both standards, “D-1 + D-2”, can be ticked off on the BWMC certificate until the scheduled IOPP renewal. The IOPP re-coupling is to be performed in any case by an IOPP renewal survey. To be noted: The first IOPP renewal survey after 8 September 2019 requires the BWMS to be commissioned. By completion of survey D-2 becomes mandatory and only “D-2" shall be ticked off on the BWMC certificate."
5. Summary of Flag State and Port State Obligations under the BWM Convention

5.1. Flag State obligations
To ensure that vessels flying their flag are compliant with the BWM Convention.
1. Flag States are required to enact national laws to make the BWM Convention applicable to vessels under their jurisdiction, and including penalties and sanctions adequate in severity to discourage violations;

2. Flag States are required to ensure that all vessels under their jurisdiction have a Ballast Water Management Record Book and Certificate, both of which must be made available to port authorities on request. Further, that on each vessel, an officer is designated to take responsibility for ensuring compliance with the BWM Plan and for reporting to port authorities;

3. Flag States must ensure that crew members engaged in Ballast Water Management and Supplemental Ballast Water Management practices are adequately trained in implementing the BWM Plan and the procedures specific to that ship (generic and specific training); and

4. The flag State must establish appropriate procedures for the issuing of the International Ballast Water Management Certificate. This requires a specific initial survey and interim surveys to ensure that the vessel complies with the BWM Convention requirements. The surveys may be carried out by the flag State or by a nominated recognized organization (classification society).

During MEPC74 requests for amending the template for the International Ballast Water Management Certificates were discussed. It was proposed to add an additional option in the list of method used for ballast water management. In addition to the Mention “in accordance to D-1; D-2 or D-4, an option for “other approach in accordance with regulation” is likely to be added and approved through a resolution during MEPC75

5.2. Port and/or coastal State obligations
Port/Coastal States are required to enact national laws to make the BWM Convention applicable in areas under their jurisdiction and including penalties and sanctions adequate in severity to discourage violations.
1. Port/coastal states must establish a CME system, including procedures for the inspection of vessels entering their ports consistent with the BWM Convention;

2. Ports and terminals where ballast tanks are cleaned or repaired must have adequate facilities for sediment reception;

3. States are required to notify IMO and other Parties of their national requirements and procedures for Ballast Water Management including the location of reception facilities and any requirements for ships unable to comply with the BWM Convention (follow their BWM Plan); and
4. Coastal States impose more stringent requirements in certain areas where they are warranted, provided that the IMO and other Parties are notified.

6. References


IMO MEPC.70 INF.21; Same risk area approach to exemptions under regulation A-4 of the Ballast Water Management Convention (Saunders J., Drillet G. and Foulsham G.)


Module 3: MEPSEAS Training Course on the Legal Implementation of the Ballast Water Management Convention

1. Introduction to Ballast Water Management

2. The Ballast Water Management Convention and Guidelines

3. Other International Conventions and Principles relevant to Ballast Water Management

4. Implementing the Ballast Water Management Convention

5. Guide to Drafting a Ballast Water Management Act

MODULE 3: OBJECTIVE
• Identify the relevant provisions of the international legal instruments to be taken into consideration when implementing the Ballast Water Management.

Module Aims & Objectives of Module 3

The purpose of this Module is to introduce the range of international conventions and the principles relevant to ballast water management issues. It provides practical guidance and checklists to help identify relevant requirements to be addressed at the national level. At the end of the module the participants are expected to be able to:

- Identify the relevant provisions of the international legal instruments to be taken into consideration when implementing the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM Convention) at national level.

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Combatting alien invasive species is a global issue and is cross-sectoral by nature. In addition to the BWM Convention, which is specific to ballast water as a vector for alien invasive species, there are also other international conventions that contain provisions that are either specifically devoted to preventing the movement of alien invasive species or that are relevant to alien invasive species.

## 1. International Instruments

When drafting and proposing national legislation to incorporate the BWM Convention a wide range of international conventions and widely recognized principles relevant to ballast water must be taken into consideration as well as regional agreements that may be applicable. Customary international law is also applicable and there is a general rule that States must not allow their nationals to discharge matter into the sea that could cause harm to the nationals of other States.

Although structured in the traditional IMO format, inspired from the widely accepted MARPOL 73/78 Convention, the BWM Convention clearly links with the United Nations Convention on the Law of the Sea (UNCLOS) and recognizes the precautionary approach, the principle of sustainable development and the integrated management practices promoted by the World Summit on Sustainable Development (WSSD) in its Plan of Implementation (Pughiuc 2011).


The United Nations Law of the Sea Convention (UNCLOS), ratified by 168 parties, was adopted in 1982 and came into force in 1994.

#### 1.1.1. State Obligations under UNCLOS to prevent pollution from vessels

UNCLOS places a responsibility on States to protect and preserve the marine environment from intentional or unintentional introduction of alien species. More specifically, UNCLOS has as one of its objectives the prevention of pollution from vessels. UNCLOS defines “pollution of the marine environment” as the “introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.” Ballast water, a result of the normal operations of ships, is as such one form of pollution from vessels. Rules and standards to prevent, reduce and control pollution from vessels are found in Article 211.

---

¹ UNCLOS Article 1(4)
1.1.2. State Obligations under UNCLOS to take action to protect the marine environment

Part 12 of UNCLOS, “Protection and Preservation of the Marine Environment” sets out a framework, rather than detailed marine pollution provisions. Relevant articles include:

- States “have the obligation to preserve and protect the marine environment (Art 192).

- States shall take all measures consistent with UNCLOS that are necessary to prevent, reduce and control pollution of the marine environment from any source, using the best practical means at their disposal (Art 194(1)).

- States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention (Art 194(2)).

This obligation can include regulation of the activities of all ships registered and operating under the State’s flag or authority.

- Measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat depleted, threatened or endangered species and other forms of marine life (Art 194(5)).

Furthermore Article 184 adds more to the State obligations to prevent, reduce and control pollution of the marine environment, by stipulating that:

1. States shall take, individually or jointly as appropriate, all measures consistent with the Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavor to harmonize their policies in this connection.

2. States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention.

3. The measures taken pursuant to this Part shall deal with all sources of pollution of the marine environment. These measures shall include, inter alia, those designed to minimize to the fullest possible extent:

   (b) pollution from vessels, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels;

4. The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.

1.1.3. State liability for polluting the marine environment

While the above provisions highlight the States’ obligations to promptly adopt the preventive measures, UNCLOS goes further to impose liability on States for polluting the environment. In this respect, Article 235 stipulates:
1. States are responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment. They shall be liable in accordance with international law.

2. States shall ensure that recourse is available in accordance with their legal systems for prompt and adequate compensation or other relief in respect of damage caused by pollution of the marine environment by natural or juridical persons under their jurisdiction.

3. With the objective of assuring prompt and adequate compensation in respect of all damage caused by pollution of the marine environment, States shall cooperate in the implementation of existing international law and the further development of international law relating to responsibility and liability for the assessment of and compensation for damage and the settlement of related disputes, as well as, where appropriate, development of criteria and procedures for payments of adequate compensation, such as compulsory insurance or compensation funds. (emphasis added).

In addition to the obligations above, UNCLOS requires the States to prevent reduce and control pollution from the use of technologies or introduction of species to a particular part of the marine environment. In this respect Article 196 stipulates:

1. 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.

The inclusion of the words “alien” and “new species” indicates that this obligation is not necessarily limited to identified pests or harmful organisms but also includes the broader issue of the introduction of non-indigenous or alien species that may cause significant changes in a marine ecosystem.

Although the definition of ‘pollution of the marine environment’ (Art. 1(4) does not specifically include ‘introduction of alien species’, the fact that Art. 196 above refers to both pollution and introductions, suggests that provisions related to pollution cover introductions of alien species too, particularly as both may have ‘deleterious’ effects.

1.1.4. States’ rights to take action to protect the marine environment

Under UNCLOS, States also have correlative rights to take action to protect the marine environment in all waters where the State either has sovereignty or exercises some level of jurisdiction.

The regime is detailed and differs between the maritime zones outlined under UNCLOS – Internal Waters, Territorial Sea, Contiguous Zone, Exclusive Economic Zone (there are also combinations of elements to respond to specific geographical configurations such as archipelago waters, international straits, islands, etc.). For this reason, the key provisions relevant to each zone or jurisdictional area are set out below. It should be noted that there is a distinction between legislative or prescriptive jurisdiction and enforcement jurisdiction, particularly in connection with foreign flag vessels.

The regime governing enforcement rights is primarily under Part XII of the UNCLOS. These rights are very complex and depend on a range of factors including the restrictions – safeguards – placed upon the right to inspect and detain ships to institute proceedings and impose penalties (Arts. 220, 226-232).

1.1.5. The issue of Internal Waters (landward of baselines) and ports

UNCLOS does not specifically address the scope of coastal State jurisdiction in its Internal Waters, however, in principle the coastal State has the same rights as it has on land (Except for newly created internal waters). In principle a State has a sovereign right to determine the basis of entry into its internal waters (i.e., many ports), subject to the customary practice...
regarding situations where human lives are in danger and commercial agreements (Article 211).

In this respect Article 25(2) provides that:

2. In the case of ships proceeding to internal waters or a call at a port facility outside internal waters, the coastal State also has the right to take the necessary steps to prevent any breach of the conditions to which admission of those ships to internal waters or such a call is subject.

Although it appears that a country may pass legislation and impose whatever conditions it wants on ships seeking to enter its port, Article 25(2) must be read carefully in light of the provisions set out under Territorial Sea, regarding the regime of Innocent Passage and the duty of States under Article 24 not to hamper Innocent Passage.

1.2. The Rio Declaration, Agenda 21 and the Sustainable Development Goals (SDGs)

The Rio Declaration on Environment and Development and Agenda 21: Programme of Action for Sustainable Development was endorsed by the international community at the 1992 United Nations Conference on Environment and Development. The Rio Declaration is one of the key documents associated with sustainable development. It comprises 27 key principles supported by all States attending the Conference as a providing guidance for the future development of national and international law, decision making and actions in order to achieve both socio-economic development and environmental protection – two goals that were seen as, ultimately, inseparable. Among the better known of the 27 principles are:

- the precautionary approach to decisions that may affect the environment;
- the polluter pays principle (internalization of costs and use of economic instruments); and
- the need for environmental impact assessment (EIA).

These principles are now reflected in and inform most modern domestic regulatory systems, although the political process of balancing economic and environmental priorities in any one case is never simple.

1.2.1. Nature

Agenda 21 is also not an international convention, rather it is a comprehensive global management plan to achieve sustainable development in the 21st Century. Accordingly, it is not binding per se as a legal instrument of international law, however its influence on subsequent legal and institutional development at all levels and in all sectors has been substantial. The document covers almost all sectors of human activity and environmental interaction. It identifies fragmented or sectoralized governmental decision making as one of the main problems impeding the ability of countries to achieve sustainable development.

1.2.2. Application

Chapter 17 of Agenda 21 deals with the protection of oceans and coastal areas. Much of it is specifically focused on coastal State responsibility to carry out integrated management of activities affecting the ecological health of oceans and seas. In particular it notes that coastal States should protect marine biodiversity and habitats and conduct surveys, gather and disseminate data, identify fragile areas or areas in need of special protection and carry out environmental impact assessments.

With respect to sea-based activities – shipping – Agenda 21 primarily calls upon all States to better implement existing conventions and to support the work of IMO and other agencies to develop an international regime to protect the marine environment from shipping related
pollution. It also contains a provision directly related to States’ international, regional and national commitments to develop international rules governing ballast water discharges to prevent spread of non-indigenous organisms.

The Sustainable Development Goals (SDGs) from part of the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015. There are 17 SDGs and they build on the Millennium Development Goals. Of particular importance is SDG 15 the SDG on life on land which specifically calls for the eradication of alien invasive species by 2020. Also relevant is SDG 14, Life below water, which calls for the conservation and sustainable use of the oceans, seas and marine resources for sustainable development.

1.3. The 1992 Convention on Biological Diversity (CBD) and associated instruments

The 1992 Convention on Biological Diversity (CBD) adopted at the same time as Agenda 21, came into force several years later, and by September 2001, 191 States have declared themselves bound by its provisions.

The CBD sets out States’ obligations to protect biological diversity, which includes marine biodiversity. The CBD is based on a systemic or ecosystem view. It can be understood as an elaboration of the holistic approach to understanding and managing the relationship between human activity and the environment, which was articulated in the Preamble to UNCLOS. The focus is on understanding, managing and protecting the interdependence amongst parts of the system as well as the parts themselves. Humans and human activities are understood as a part of, rather than outside, this system.

By Article (2) the CBD defines biological diversity and ecosystem as:

A. “Biological Diversity” means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

B. “Ecosystem” means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

To the extent that it deals specifically with marine biodiversity, the CBD itself must be regarded as building upon and elaborating the State obligations set out in UNCLOS concerning conservation and preservation of the marine environment. Article 22(2) of the CBD specifically notes this relationship:

Contracting Parties shall implement this Convention with respect to the marine environment consistently with the rights and obligations of States under the Law of the Sea.

Article 8 of the CBD reiterates, on a broader level, the obligation found in UNCLOS Art. 196 regarding the introduction of alien or new species. Article 8, In-Situ Conservation, requires, inter alia, that:

Each Contracting Party shall, as far as possible and as appropriate:

h) Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species;

It is important to note that these obligations apply not only to biodiversity in the port State’s territory but also these obligations have applicability to biodiversity to all areas within the national jurisdiction or areas beyond the limits of the national jurisdiction. In this connection Article 4 (dealing with the jurisdiction) provides:

Subject to the rights of other States, and except as otherwise expressly provided in this Convention, the provisions of this Convention apply, in relation to each Contracting Party:

(b) In the case of processes and activities, regardless of where their effects occur, carried out under its jurisdiction or control, within the area of its national jurisdiction or beyond the limits of national jurisdiction.

It is clear then that most States already have an international obligation to address the problem of alien species transfer, to the extent that it occurs within their territory or because of an activity under their control. This can be understood to include the role of flag States and ship-owning and operating States. It is clearly relevant to the question of States international responsibility to prevent both the export and the import of alien species and pathogens in ships’ ballast water. The emergence of rules dealing with ballast water is, therefore, simply the rules designed to deal with one specific pathway or vector amongst others to be addressed by the State.

In 2010, during the Conference of the Parties to the CBD, a revised Strategic Plan for Biodiversity was adopted, and it includes the Aichi targets for the period 2011-2020. Target 9 of the Aichi Targets is to identify and prioritize, as well as control or eradicate, invasive alien species and pathways by 2020 and to have measures in place to manage pathways to prevent the introduction and establishment of alien invasive species.


IMO rules and standards are accepted by Governments and the global shipping industry because they provide a single universal framework governing maritime operations (Pughiuc 2006).

1.4.1. Scope

MARPOL is a general or an umbrella agreement that has been amended by Protocols in 1978 and in 1997 (NIF), with substance specific regulations set out in Annexes. The Preambular statement to MARPOL 73 indicates that the original intent of MARPOL was to respond to marine pollution from the “deliberate, negligent or accidental release of oil and other harmful substances from ships...” and to eliminate “international pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharges of such substances.”

1.4.2. Application

Although a stand-alone IMO instrument, the BWM Convention has multiple similarities with MARPOL Convention. The following features and principles represent some of the commonalities of the two instruments:

- an international certificate based on multiple flag State surveys for specified ships;
- accommodating existing ships and new ship design requirements through a phase-in process;
- ship and human safety defences;
- a tiered system of discharge standards to deal with marine areas needing additional environmental protection;
- reception facilities.
• a ship may be denied entry or subject to other action for breach of the BWM Convention; and
• non-party States do not get more favorable treatment.

Based on such similarities, some States may choose to amend MARPOL related national legislation to accommodate the provisions of the BWM Convention. The Guidelines may also be implemented in part under national MARPOL 73/78 implementation legislation; however, it is important to recall that there are coastal/port State responsibilities in the Guidelines that are not part of MARPOL.

1.5. International Convention for Safety of Life at Sea, 1974 (SOLAS) as amended including the ISM Code

1.5.1. Scope
The SOLAS Convention is a comprehensive code that sets international standards for minimum equipment and other requirements for ensuring safety in ship operations, including ship stability. These standards are implemented and enforced through national legislation. It is relevant to the question of ballast water management, in that any treatment or management system must meet these requirements. For example, concerns have been expressed that using "mid ocean" exchange or even sequential exchange for ballast water management may put a ship’s master in contravention of SOLAS Chapter II-1, Regulation 22 (part of intact stability) which requires that the vessel’s master be supplied with information permitting him or her to quickly and easily calculate the stability of the vessel under varying conditions of service (and of the parts of SOLAS).

1.5.2. Application
Given the multiple variables affecting stability in a ballast exchange while the vessel is en route, compliance may prove difficult. The existing SOLAS requirements will need to form part of the overall assessment of safety and vessel stability and strength. In addition, parts of SOLAS and relevant national legislation may need to be amended to harmonize the two instruments. The current relevance of SOLAS from the perspective of domestic regulatory design is that a ship’s master should not be forced by law to carry out operations that place him or her in a position of noncompliance with the international technical standards for ship safety. The emphasis on the overriding interest in ship safety is reinforced in the Regulation B-4(4) of the BWM Convention, which provides that:

“A ship conducting ballast water exchange shall not be required to comply with paragraphs 1 or 2, as appropriate, if the master reasonably decides that such exchange would threaten the safety or stability of the ship, its crew or its passengers because of adverse weather, ship design or stress, equipment failure, or other extraordinary condition.”

The International Safety Management Code (ISM Code) is essentially a set of Guidelines for international standards for management practices to implement SOLAS and the IMO pollution prevention conventions. It also provides an international recognized Certificate attesting to ships’ and company’s safety practices and compliance with mandatory rules and regulations. The Code itself is internationally vague in its wording to allow for changing requirements and rules and would not necessarily require amendment to implement the BWM Convention. However, the safety management manuals for evaluating practices would need to be changed to include ballast water and sediment management when these requirements become mandatory.

1.6.1. Scope
The STCW Convention and Code set out the international standards for seafarers training and competency. These are the minimum standards (mandatory in 2002) required for a seafarer to obtain an internationally recognized certificate for the position he or she holds on the ship. These requirements, de facto, also set the minimum content for the curricula in Maritime Training and Education (MET) institutions. They are implemented in domestic legislation and are integral to the efficacy of the IMO ship safety/pollution prevention regulatory system.

1.6.2. Application
They are relevant to implementation of both the Guidelines and the BWM Convention in that both require an officer/crew to be responsible for the documentation and safe implementation of the ship’s Ballast Water Management Plan and precautionary ballast uptake practices. The STCW requirements, in particular the detailed Code, will need to be altered to consider ballast water and sediment management practices.


The FAL Convention came into force in 1967 and has been amended a number of times with the most recent amendments in 1999, coming into force in 2001.

1.7.1. Scope
The FAL sets out standards and recommended practices for entry related documents and procedures for ships, cargo, crew and passengers travelling from one country to another. The FAL standards are in addition to the Universal Postal Convention and the International Health Regulations requirements. The purposes of FAL are multiple and relate in part to the inherent value in any system with multiple factors, of uniform and consistently applied procedures, which each country can assume have been carried out by the others. This is an important matter for an international industry such as transport that can raise concerns about the movement of unapproved immigration and cargo.

The FAL Convention also seeks to avoid a proliferation of differing documentation (forms) and information requirements that can delay the movement of ships and their cargo. It also serves to avoid overburdening ships’ masters with a plethora of paperwork requirements that may distract from his or her full attention to navigational concerns. The IMO States have developed a number of standardized forms relating to the maximum information requirements that port States are to impose. Recent amendments have dealt with specific issues such as commercial samples, electronic data management processing, stowaways, and illicit drug trafficking etc. It should be noted that recent FAL documentation encourages electronic filing where possible. Countries are expected to report on any variance from the FAL standards.
1.7.2. Application
Currently, the provisions of the BWM Convention which establish ballast water reporting requirements and procedures as a precondition to port entry appear to be at variance to the international standards under FAL. Countries wishing to implement the BWM Convention will need to review their legislation implementing FAL and report any national information requirements and forms to the IMO as a variance on FAL standards. In turn, the FAL Convention will need to be amended to accommodate the new requirements.


The AFS Convention is aimed at preventing the introduction of toxic chemicals in the aquatic system, and ultimately, in the human food chain. The AFS Convention came into force as of August 2008.

The AFS Convention regulates the chemical content of paint that is used on ships’ hulls to prevent aquatic organisms from attaching to it (fouling). Vessel fouling is also an important pathway for the transfer of aquatic species between parts of the marine environment. Paints have been developed that are very effective in preventing fouling, thereby reducing the risk of transfer posed by this pathway. However, the most effective paints are also highly toxic and after the entry into force of the AFS Convention became prohibited. This in turn means that ship fouling may once again pose a risk of species transfer. It was pointed out earlier that the CBD's Subsidiary Body on Scientific, Technical and Technological Advice Committee (SBSTTA) has called for action with respect to this pathway. It also noted the problem that:

\[\text{[t] the conflict between effective chemical and biological control for aquatic species (e.g. mollusks) and the desired reduced pollution to these environments seriously hampers control through existing measures...Gaps in prevention tools are being created by the elimination of fumigants and pesticides due to environmental concerns. The same loss of tools is true in marine systems, in which hull fouling is a major vector of maritime organisms along shipping routes.}\]

It should be noted that IMO has responded proactively to this challenge by adopting in July 2011 the Resolution MEPC.207(62) on Guidelines for the control and management of ships’ biofouling to minimize the transfer of invasive aquatic species.

2. Applicable Principles

2.1. Scope
States now operate within the framework of Agenda 21 and the principles set out in the Rio Declaration on Environment and Development and the imperative of sustainable development. The issue of harmful aquatic organism and pathogen transfer in ships’ ballast water, when a technological solution to eliminate the problem has not yet been found, provides a challenge for principled regulatory design. For example, in the context of ship source pollution, in most cases, a country will have both economic and ecological security needs that overlap for some sectors (fishing/Aquaculture; Drillet et al 2016) and provide conflict for other sectors (shipping).

The question of ballast water management is particularly difficult because mid-ocean exchange, the operational treatment method currently viewed as the most effective, has
raised concerns about ship and human safety (See Course Introduction example). At the same time, if a harmful organism is introduced, it may cause irremediable harm to health, economic/property and ecological interests. Governments have an obligation to protect all of these interests. In the absence of globally endorsed technological solution an approach based on minimizing risk and balancing these interests has been adopted. There is a need to consider the principles that should inform national regulatory design to address these problems.

2.2. Application
The international community has already developed some guidance in this respect. The IMO Guidelines are premised on precautionary, preventative and cooperative risk minimization practices to accommodate concerns about ecological protection and ship and human safety, with primacy in all cases given to ship and human safety.

The Guidelines can also be seen as respecting the principle of subsidiarity in that the final decision as to the level of acceptable risk, both onboard ship and in the coastal State, are decided by the authority most affected by and in the best position to assess the risk. This approach is consistent with ideas articulated in Agenda 21 and the principles found in the 1992 Rio Declaration on Environment and Development.

Fifteen “guiding principles” were recommended by the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to the Conference of the State Party to the CBD. These Principles are entitled *Alien species: guiding principles for the prevention, introduction and mitigation of impacts*, of particular relevance to the implementation of the BWM Convention is the precautionary principle, two-stage hierarchical approach, three-planning principle, the Role of States, four-shipment control and quarantine measures, five-Exchange of information, six-control and seven.

2.2.1. Guiding Principle 1: Precautionary Approach
Given the unpredictability of the impacts on biological diversity of alien species, efforts to identify and prevent unintentional introductions as well as decisions concerning intentional introductions should be based on the precautionary approach.

2.2.2. Guiding Principle 2: Three-state hierarchical approach
Prevention is generally far more cost effective and environmentally desirable than measures taken following introduction of an alien invasive species. Priority should be given to prevention of entry of alien invasive species (both between and within States). If entry has already taken place, actions should be undertaken to prevent the establishment and spread of alien species.

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2 Guiding principle 1
3 Guiding principle 2
4 Guiding principle 4
5 Guiding principle 7
6 Guiding principle 8
7 Guiding principle 15
2.2.3. Guiding Principle 4: State responsibility
States should recognize the risk that they may pose to other States as a potential source of alien invasive species and should take appropriate actions to minimize that risk.

2.2.4. Guiding Principle 7: Border Control and Quarantine Measures
States should implement border control and quarantine measures to ensure that:

- Intentional introductions are subject to appropriate authorization;
- Unintentional or unauthorized introductions of alien species are minimized.

Existing appropriate governmental agencies or authorities should be strengthened and broadened as necessary, and staff should be properly trained to implement these measures. Early detection systems and regional coordination may be useful.

2.2.5. Guiding Principle 8: Exchange of information
States should support the development of database(s), such as that currently under development by the Global Invasive Species Programme, for compilation and dissemination of information on alien species that threaten ecosystems, habitats or species, to be used in the context of any prevention, introduction and mitigation activities.

2.2.1. Guiding Principle 9: Cooperation, including capacity-building
Depending on the situation, a State’s response might be purely internal (within the country), or may require a cooperative effort between two or more countries, e.g. where the discharge of ballast water would impact on another state then cooperation needs to be established as to (a) common rules and procedures re the discharge of ballast water or (b) establishing common location for the discharge of ballast water or (c) establishing common methodologies for the treatment of ballast water.

### EXAMPLE

A few examples of databases reporting invasive species:

- Global Invasive Species Database (GSID) [http://www.issg.org/database](http://www.issg.org/database)
- Invasive Species Compendium (ISC) [http://www.cabi.org/isc](http://www.cabi.org/isc)
- Delivering Alien Invasive Species Inventories for Europe (DAISIE) [http://www.europealiens.org](http://www.europealiens.org)
- Nonindigenous Aquatic Species (NAS) [http://nas.er.usgs.gov](http://nas.er.usgs.gov)

2.2.2. Guiding Principle 10: Intentional Introduction
No intentional introduction should take place without proper authorization from the relevant national authority or agency. A risk assessment, including environmental impact assessment, should be carried out as part of the evaluation process before coming to a decision on whether or not to authorize a proposed introduction.

**EXAMPLE**

Involvement of the Food and Agriculture Organization of the United Nations (FAO)

The Food and Agriculture Organization of the United Nations (FAO); Committee on Fisheries (COFI) adopted the Code of Conduct for Responsible Fisheries which contains Guidance and recommendation on the management of intentional introductions of Alien species. Although the CCRF is non-mandatory, countries, as members of FAO, are committed to its implementation to the extent possible. The Code also contains provisions that may be or have already been given binding effect by means of other obligatory legal instruments amongst the parties.

2.2.3. Guiding Principle 11: Unintentional Introduction

All States should have in place provisions to address unintentional introductions (or intentional introductions that have established and become invasive).

Common pathways leading to unintentional introductions need to be identified and appropriate provisions to minimize such introductions should be in place.

2.2.4. Guiding Principle 12: Mitigation of Impacts

Once the establishment of an alien invasive species has been detected, States should take steps such as eradication, containment and control, to mitigate the adverse effects.

Eradication of Carp in Australia
2.2.5. Guiding Principle 13: Eradication
Where it is feasible and cost-effective, eradication should be given priority over other measures to deal with established alien invasive species.

2.2.6. Guiding Principle 14: Containment
When eradication is not appropriate, limitation of spread (containment) is an appropriate strategy only where the range of the invasive species is limited and containment within defined boundaries is possible.

Zebra mussel (*Dreissena polymorpha*)

Native to Eastern Europe (Black Sea), it was introduced to western and northern Europe, including Ireland and the Baltic Sea and to the eastern half of North America (Great Lakes). It is an encrusting species that forms large clumps of individual mussels grouped tightly together fouling all available hard surfaces in mass numbers. It displaces native aquatic life and alters habitat ecosystem and food web. It causes severe fouling problems on infrastructure and vessels and blocks water intake pipes, sluices and irrigation dikes. Economic costs for attempting to clear Zebra mussels from industrial facilities in the USA alone is estimated around US$ 750 million to 1 billion between 1989 and 2000 (O’Neil, 2000).

Photo: S. Olenin       Source: GloBallast Introductory Training Course on BWM

2.2.7. Guiding Principle 15: Control
Control measures should focus on reducing the damage caused rather than on merely reducing the numbers of the alien invasive species. Effective control will often rely on a range of integrated techniques:

- Responses to an ecological problem in the context of an international activity, such as shipping, should be based on an approach that seeks to fulfil international
responsible to protect the global environment, integrates economic and ecological protection concerns and is based on international cooperation to develop rules and technological or other solutions to environmental problems arising out of the globalization of the economic system.

- A precautionary approach should be adopted for both regulatory design and implementation. For example, all regulatory determinations must, as much as possible, be based on scientific research and an analysis of both local and global ecological implications of any actions, with preference given to measures designed to ensure either no, or the least possible, long term negative impact on the environment.

- Minimize risks to the ecosystem by designing and adopting measures that are commercially and practically viable and that encourage compliance rather than avoidance and conflicts.

- Allow for and explicitly encouraging continuous technological and operational improvement to better protect the marine ecosystem.

- Ensure transparency, sustainability and integration of agency responses.

- Encourage the involvement of all parties affected by the issue (and any decisions about regulating the issue), including the regulated sectors and other sectors, in helping to develop a solution.

- Make use of a range of modern regulatory or economic incentives and voluntary compliance agreements to encourage compliance.

- Focus on measures to prevent the uptake of harmful organisms and pathogens at source as well as preventing their introduction.

- Develop local and regional contingency responses and compensation plans for all those negatively affected by the activity, based on a polluter pay model.

- Develop requirements that are environmentally safe, practicable, designed to minimize cost and delays to the shipping industry and as much as possible are based on the internationally accepted standards such as the IMO BWM Convention.

- Ensure that requirements are operated at a national level but also consider ecosystems differences within each country and are applied in a fair uniform and consistent manner in each port.

❖ International efforts to support Compliance and Enforcement
• The International Network for Environmental Compliance and Enforcement (INECE) is a network of government and non-government enforcement and compliance practitioners from over 100 countries. INECE's goals are: raising awareness to compliance and enforcement; developing networks for enforcement cooperation; and strengthening capacity to implement and enforce environmental requirements. You are encouraged to contact INECE for further information on their activities and potential linkages with the network (www.inece.org).

• There are several regional Port State Control MOUs are in place which would harmonize and standardize port state control activities in these regions and can be an important aspect that can be considered in the design of BWM CME approaches. The MOUs also allows for national and international level training.

3. References


Module 4: MEPSEAS Training Course on the Legal Implementation of the Ballast Water Management Convention

1. Introduction to Ballast Water Management

2. The Ballast Water Management Convention and Guidelines

3. Other International Conventions and Principles relevant to Ballast Water Management

4. Implementing the Ballast Water Management Convention

5. Guide to Drafting a Ballast Water Management Act

MODULE 4: OBJECTIVES
- Identify key steps towards the legal implementation of the BWM Convention within the national context.
- Review specific concerns that may exist regarding the implementation of the BWM Convention in the context of the national situation.

Based on

Manual  Trainees  Instructor  Case Studies
Module Aims & Objectives of Module 4

This Module aims to provide an overall framework leading to the full implementation of the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM Convention) at the national level. In particular, at the end of the module the participants will be expected to:

- Identify key steps towards the legal implementation of the BWM Convention within the national context; and
- Review specific concerns that may exist regarding the implementation of the BWM Convention in the context of the national situation.

The Module is divided into five parts, namely:

1. Key Steps;
2. Model Legislation;
3. Practical Implementation of Ballast Water Management Convention;
4. Compliance and Enforcement; and
5. Actions/Proposals for Effective Implementation.
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1. Development of National Legislation to Give Effect to the BWM Convention: Background

The Ballast Water Management (BWM) Convention entered into force on 8 September 2017 and must be implemented by their national legislation. Transforming an international legal instrument into national legislation is an exercise involving several steps. The principal steps may vary from country to country, but the general procedure will commence with a political decision made by the Executive arm of the government such the Cabinet followed by the drafting of the legislation and its tabling in the Parliament. The legislation comes into operation when due notice is given to the public in the national gazette.

Several countries have already developed strategies or legislation specific to invasive alien species (IAS). Singapore for example has a suite of legislation that is applicable to the management of IAS. It is important that a comprehensive list of laws, policies and strategies relevant to IAS and the management thereof are compiled at a national level as there might be relevant elements of the management of IAS in various policies and legislation.

2. Key Factors

The national legislative frameworks of countries often differ significantly. This includes the constitutional structure, the system of national laws, various policies and strategies as well as bylaws. It is therefore important to understand the legal system as well as the legislative processes of a country. A number of factors determine the nature of legislative, regulatory, administrative and policy measures necessary to incorporate the BWM Convention into national legislation. These factors include the following:

- whether there is existing national legislation capable of amendment, or whether completely new legislation is required
- whether the country wishes to develop legislation solely for implementation of the BWM Convention or also to cover obligations under other international or regional treaties
- the legal tradition of the country, e.g. common law or civil law, the mode of incorporation of treaties into national law
- whether the country has significant flag, port and coastal interests

8 Animals and Birds Act (Regulates the import, export and transshipment of animals); The Control of Plants Act (Regulates import and export of plants and plant products); The Endangered Species (Import and Export) Act (Regulates trade in endangered species of plants and plant products) Parks and Trees Act (Regulates the planting, maintenance and conservation of trees and plants within national parks, nature reserves, tree conservation areas, heritage road, green buffers and other specified areas. The Act also specifies that release of animal is prohibited in the nature reserve) as well as the Prevention of pollution of the sea Act which regulates the prevention of sea pollution, whether originating from land or from ships (with reference to ballast water).
This module looks at the key factors and steps that must be considered when developing national legislation.

2.1. Legal system

The manner in which treaties are generally incorporated into national law depends on the legal system of a particular country. A country’s legal system is governed by its constitutional or supreme law and two approaches exist that can be used to incorporate international law into national law; the dualistic method and the monistic method.

2.1.1. The dualistic method:
International law and national law are viewed as two separate legal systems. According to the dualistic method treaties do not automatically become part of the law of a country once a country ratified or acceded to it but rather by explicit national legislative action, or re-enactment. This means a country must draft specific domestic legislation that will establish institutional, administrative and penal measures necessary to give effect to the treaty in national law. Cambodia is an example of a country that follows the dualist approach. In fact all the MEPSEAS countries follow a dualistic system and is there need for legislation to implement the requirements of a treaty to which they have become parties.

2.1.2. The monistic method:
International law and national law are viewed as one legal system. According to the monistic method treaties automatically become part of the law of country once a country accedes thereto or signs it and once the treaty has entered into force.

International instruments adopted under the auspices of the IMO are ‘non-self-executing’ treaties since they impose numerous obligations on administrations within a State Party. Consequently, States, when becoming parties to any IMO convention, need to enact domestic legislation to give effect to the provisions of that instrument.

Like most IMO conventions the BWM Convention is not self-executing and therefore requires implementing national legislation and will it be necessary for all States ratifying the BWM Convention to undertake the key steps discussed in this module.

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9 Konrad-Adenauer-Stiftung Cambodian Constitutional Law (2016) at 79
2.2. Is there sufficient existing legislation or is new legislation needed?

Careful consideration should first be given to whether primary legislation is needed to implement the BWM Convention or whether a Cabinet decision or ministerial directive would be sufficient. This may avoid having to engage the limited resources of the department responsible for drafting legislation and the use of Parliament’s time to debate the legislation.

It is possible for the regulation-making authority\(^\text{11}\) to incorporate the provisions of the BWM Convention into existing legislation by adopting a set of regulations dealing with BWM. Otherwise, the national draftsman must determine through proper analysis which provisions of the BWM Convention should be given effect through statutory enactment, and which ones can be incorporated in regulations.

In many common law jurisdictions certain decisions of Cabinet known as Orders-in-Council are legislative instruments which are used to amend or otherwise vary the scope of legislation. They are therefore treated as subsidiary legislation. In other jurisdictions subsidiary legislation may include Orders, Rules or Directions exercisable by a Minister or by the head of the maritime administration, provided that authority for the exercise of that power has been given under primary legislation.

3. Inventory of Existing Legislation

Before new legislation is developed to give effect to the BWM Convention, an inventory or survey must be taken of all existing legislation and relevant regulatory instruments. This could include the following:

- The Constitution of the relevant country
- Environmental Laws
- Shipping Laws
- Laws on ports and harbors
- Protected areas legislation
- Fisheries Laws
- Trade and Customs laws on biological materials

\(^{11}\) Examples include the Department of Environmental Affairs, or any other national department that administers matters relating to environmental issues and/or protection of the marine environment.
• Relevant national regulatory instruments

It must be recognized that the BWM Convention is essentially regulatory in scope. As such, it may be possible to give effect to the BWM Convention entirely through subordinate or subsidiary legislation. In some jurisdictions, however, particularly those that follow the common law system, major provisions pertaining to rights, liabilities and obligations need to be enacted in principal or primary legislation such as an Act; whereas technical requirements and details of standards may be promulgated through subordinate legislation such as regulations.

In this context, it is to be noted that the provisions in the BWM Convention proper contain significant obligations and requirements including requirements pertaining to control of transfer of invasive organisms, reception facilities for sediments, and scientific and technical research and monitoring.

In contrast, the Annex consists of regulations containing technical details of management and control requirements for ships and standards for ballast water management.

4. Examine Deficiencies

A thorough inventory of existing legislation will likely reveal certain deficiencies, shortcomings and inadequacies. It is well known that very few countries presently have legislation governing ballast water management and only a few developing countries have draft BWM legislation. The Republic of Korea is an example of a country with a Ballast Water Management Act.\(^ {12}\) If it is found that regulation-making authority in present legislation is inadequate or simply non-existent, to allow the BWM Convention to be brought into the national legislative domain, then obviously new principal legislation will have to be enacted. But that can be time-consuming and would be an exercise that will have to be carried out through the parliamentary or other legislative process prevailing in the jurisdiction.

Careful thought will have to be given to the decision regarding the legislative vehicle through which the BWM Convention will be effectuated domestically in light of the domestic practice.

4.1. Deciding the Nature of Proposed Legislation

Once it has been decided that new legislation is needed, the next step is to determine how the legislation is to be packaged. Broadly speaking the following possibilities can be considered:

\(^ {12}\) Available at: [https://elaw.klri.re.kr/eng_service/lawView.do?hseq=43342&lang=ENG](https://elaw.klri.re.kr/eng_service/lawView.do?hseq=43342&lang=ENG)
Some countries may wish to integrate the BWM Convention into existing legislation covering safety of maritime transport or the protection of the environment, for example by amending the Merchant Shipping Act, the Biodiversity Act, Maritime Code etc. In certain instances, various pieces of existing legislation will need to be amended to incorporate the relevant provisions of the BWM Convention and to provide express authority for the publishing of related regulations. Pursuant to that authority, the regulations in the Annex to the BWM Convention can be promulgated as an independent set of domestic regulations, or as amendments to an existing set of related regulations in the marine environmental field. In any case, the Appendices to the BWM Convention Annex can appear as Schedules to the regulations.

In Australia, ballast water is regulated under the Biosecurity Act 2015, which was amended by the Biosecurity Amendment (Ballast Water and Other Measures) Act 2017 (Amendment Act), and the Biosecurity (Ballast Water and Sediment) Determination 2017.

In other countries it will be necessary to draft new stand-alone legislation to incorporate the provisions of the BWM Convention. This legislation should include a provision authorizing the publishing of related regulations when necessary. Regulations can then be drafted to incorporate the Annex to the BWM Convention together with the Appendices as Schedules to those regulations.

Countries are advised to look at how other international maritime conventions have been implemented e.g. SOLAS, MARPOL etc.

In terms of actions to be taken by a State party to the BWM Convention, developing the legislative framework is perhaps the most important and onerous task.

**EXAMPLE**

**MEPSEAS COUNTRIES**

- Indonesia and Malaysia: Existing legislation allows these two countries to implement the BWM Convention and Anti-Fouling Systems Convention as the coverage of these two conventions fall within the general application on marine environment protection.
  - Indonesia: Existing laws and a Presidential Proclamation are sufficient for the implementation of the BWM Convention; thus, they now focus on the drafting of the implementing regulations, i.e. no need to go to the Parliament.
  - Malaysia is looking at an existing legislation, MSO 1952 and the crafting of a n Ocean Policy as the possible basis for implementing the priority conventions.

- Cambodia needs to go to Parliament for the enactment of a law to implement international conventions. There is no maritime law that has been passed in Cambodia.

- Myanmar, Philippines, Thailand and Vietnam need to draft legislation for implementing international conventions.
4.2. Steps in incorporating the BWM Convention into national legislation

Once it has been decided that national legislation must be drafted to incorporate the BWM Convention, the following steps can be used as guidance:

1. Determine which provisions in the BWM Convention require legislative action and which do not need to be included in the legislation:

   - Not all the provisions of the BWM are technical in nature. It is therefore necessary to determine which provisions would not need to be addressed in legislation and those that may be left to policies and internal procedures having regard to the nature of the obligations posed by the particular provision.

   - For instance, while the general obligations of the BWM are crucial it is not necessary to list all of the obligations in national legislation. It will be sufficient to include that the purpose of the BWM legislation is to meet the obligations of the BWM Convention.

   - In certain instances, obligations pertaining to “Parties”, “the Organization” etc. do not have to be included in national legislation.

   - In Article 1 of the BWM Convention these would be the definitions of “Administration”, “Organization” and “Secretary-General”. The articles dealing with dispute settlement (Art 15), signature, ratification, acceptance, approval and accession (Art 17) the entry into force (Art 18) amendments (Art 19) denunciation (Art 20) depositary (Art 21), languages (Art 22) will not require any national legislative action. A close and thorough review of the articles is likely to reveal other administrative provisions that need not be cast in national legislation.

   - The Annex of the BWM Convention which contains the main substance, namely the regulations, will in all likelihood need to be incorporated in national legislation in its totality, although where an obligation is imposed on “Parties”, there is no need to provide for it in legislation; the government will simply have to carry it out. Examples of these are in Regulations C-1 and C-2. Notably Regulation C-3 is an obligation imposed on the IMO and would therefore have no place in national legislation. Similarly, Regulation D-5 is a task imposed on the Marine Environment Protection Committee (MEPC). This provision also has no place in national legislation.

2. Change the BWM Convention language to national legislation language:

   - In essence international conventions place obligations on State parties and the BWM Convention therefore “speaks” to States, while national legislation places obligations on those that the legislation apply to, for instance the authority, the administration and ships. For example, in cases where the BWM Convention reads: “Each Party shall” the particular obligation must be drafted in such a manner that it places an obligation on the relevant authority.
5. Action Plan to draft national BWM legislation

The first step will be to develop a policy and a strategy to either accede to the BWM Convention, or where a country is already a party to the BWM Convention, to implement it and its amendments.

5.1.1. Determine the relevant national department responsible for the implementation of the BWM Convention.

In South Africa, the Department of Transport is responsible for the implementation of the BWM Convention.

In Brazil, there are seven major institutions that are involved in the Port State control activities, and that will have responsibility for some aspects of the implementation of BWM, these institutions are: the Port Authority from each port, the Brazilian Federal Police, the Internal Revenue Service, the National Agency for Waterway Transportation (Antaq), the National Health Surveillance Agency (ANVISA), the Agricultural Surveillance, and the Maritime Authority, primarily responsible for navigation safety and ships pollution control.\textsuperscript{13}

5.1.2. Establish a National Task Force with a National Lead Agency

It is advisable to establish a National Task Force with a National Lead Agency, for example the maritime authority of the country, with the responsibility for implementing the BWM Convention. In this regard it is important to determine the main institutions that will have responsibility for certain aspects of ballast water and management or for activities that impinge on the subject. Other relevant ministries/departments could include ports, shipping and environment.

- The national taskforce will assist with the national drafting process of the legislation.
- This national taskforce can consist out of the responsible maritime authority, other national departments, legal and technical experts. It is further advisable that the national task force meets regularly to report on the drafting process and to present the work to be undertaken to all interested stakeholders. This provides stakeholders to give input to drafting process from the beginning.
- The Port Authority as well as other relevant departments and agencies should form part of the task force.

• Establishing a roster of experts is useful, with particular focus on experts with technical expertise as well as legal drafting experts, who can form part of the task force.

5.1.3. Allocate specific tasks to the task force members
Once established the task force can allocate specific tasks to its members. For instance, technical experts can be mandated to draft a national strategy for the implementation of the BWM Convention, while the legal expert can conduct an inventory of existing legislation.

5.1.4. Plan regular meetings
It is advisable for the task force to meet regularly to update on the progress made and to get input from all relevant stakeholders. The next step will be to draft the legislation, either by means of amendment to existing legislation or the drafting of new legislation.

5.1.5. Make use of model legislation that has been prepared for implementing BMW Convention into national law.

In some jurisdictions, the decision to ratify or accede to a convention depends on whether draft implementing legislation has been prepared to enable the ratification process to go ahead. In other instances, the decision to ratify or accede is impeded by the low priority given to preparation of the necessary legislation in the national legislative agenda. Sometimes the low priority is attributable to a lack of drafting expertise, particularly if the subject matter is technical or scientific as is the case with the vast majority of IMO instruments, including the BWM Convention.

The availability of model legislation is of immense benefit and could provide a major impetus to States that are uncertain about entering into the BWM Convention. The model legislation could be used as a global template which would not only encourage states to actively develop legislation along the lines of the model but will also go a long way towards the harmonization of legislation among different State parties.

☞ The model legislation, of course, will need to be modified to be consistent with national drafting practices, and also to consider regional conventions on the subject to which the state in question may be a party.

5.1.6. Important documents to consider during this process:

• The BWM Convention
• All IMO guidelines
• All MEPC resolutions
• All relevant IMO publications
• The draft BWM Act
• The MEPSEAS Training Course modules
NORWAY
Ship Safety and Security Act of 2007
Chapter 5 of the Act of 16 February 2007 No. 9 on ship safety and security (Ship Safety and Security Act) provides rules on environmental safety, and pursuant to section 33 first paragraph the operation of a ship shall be so arranged and carried out that pollution of the external environment from the ship does not occur. The second paragraph provides the legal basis for the Ministry to issue regulations on, among other things, ballast water management. The Ministry of Climate and Environment has delegated the regulatory authority to the Norwegian Maritime Authority.

6. Practical Implementation of BWM Convention

6.1. Ballast Water Management Strategy

It is recommended to have a ballast water management strategy to assist in the compliance of the BWM Convention obligations. The strategy essentially involves three perspectives:

- the flag State
- the coastal State and
- the port State.

Here, it must be recognized that the same state party is required to implement the BWM Convention in three different capacities involving three different but complementary outlooks. If a strategy is already in place, it would have to be reviewed to determine whether it follows the requirements of the BWM Convention. If there is no strategy in place, one will have to be develop.

It may be that the State in question is primarily a flag State and has already instituted shipboard ballast management procedures with which all its ships must comply. However, these procedures may be deficient or inadequate when compared with the requirements of the BWM Convention. The procedures may be only those that pertain to ballast water exchange and no provision is made for onboard treatment of the ballast. If the State is landlocked or its coastal interests are of relatively less importance, it may not have taken the steps required under the BWM Convention to designate places within the waters under its jurisdiction where ballast water exchange or tank cleaning can or cannot take place or establish special requirements.

It may have failed to take those steps even if it has significant coastal state interests. The same could be true of its port State status. The State may not have many ports and port State inspection levels may be conducted at a relatively low level. On the other hand, there may be several ports quite large in size, yet the State is deficient in the way it carries out its port State control responsibilities. The State may not have adequate reception facilities for sediments as required by the BWM Convention.
6.2. Implications

6.2.1. Flag States
As a flag State, appropriate action needs to be taken pursuant to Article 4.1 to ensure that ships operating under the flag apply the standards and requirements set out in the Annex to the BWM Convention. In particular, under Regulations B-1 and B-2, each ship must carry a Ballast Water Management Plan and a Ballast Water Record Book. Pursuant to Regulation B-3 ships must conduct Ballast Water management as prescribed in Section D and as per Regulation B-4 must conduct Ballast Water Exchange in accordance with the standards prescribed in Regulation D-1. Under Regulation B-5 ships must remove and dispose of sediments in accordance with the Ballast Water Management Plan, and under Regulation B-6 ships’ officers and crew must be familiar with their duties in relation to Ballast Water Management. Ships must be surveyed and certified in accordance with Article 7 and the corresponding regulations in Section E of the Annex. Surveys may be carried out by officers of the flag State administration or by nominated surveyors or recognized organizations. The flag State administration must ensure that ships carry out these obligations. As provided in Article 8, alleged violations must be investigated and punished through appropriate sanctions provided for in the implementing legislation.

6.2.2. Coastal States
In the capacity of a coastal State, the administration must, under Article 4.2, develop policies, strategies and programmes for Ballast Water management in its ports and waters under its jurisdiction. Pursuant to Article 5, coastal states must provide adequate reception facilities for receiving sediments and must designate places where tank cleaning operations and repairs can take place. Pursuant to Regulation C-1 coastal states may establish special requirements for ballasting or deballasting in certain areas. Pursuant to Regulation C-2 coastal state administrations must warn mariners navigating in waters under their jurisdiction where ships should not uptake ballast water and must notify IMO of water areas containing outbreaks and infestations or where there are known populations of harmful organisms and pathogens.

6.2.3. Port State
Port state control is essential for monitoring and enforcement of the BWM Convention. It is advisable for national legislation to include an entire chapter on Port State Control with various sections dealing with the relevant provisions of the BWM Convention (Inspection of ships, Article 9; Detection of violations and control of ships, Article 10; Notification of control actions, Article 11; Undue delay of ships, Article 12.) It must be reemphasized that the guidelines also contain elements of port state control. The port state may for instance request all vessels arriving from international waters and intending to discharge ballast water to submit a completed Ballast Water Reporting Form (BWRF) to the applicable national authority prior to its arrival. The 2017 Guidelines for ballast water exchange (G6) deals with this reporting in more detail and includes a reporting form template that can be used. Australia for example is requesting a BWRF with information on the area of uptake of water, the type of management used, the quantity to be discharged while in Australia. Singapore has used a different approach and is not require the submission of a BWRF however, the Pre-Arrival Notification contains questions about ballast water management, for example whether the ship is to comply with D-1 or D-2 standards, whether the BWMS is functional and whether the ship intends to discharge water in Singapore.

In accordance with Article 9, inspection of ships, a ship to which the BWM Convention applies may, in any port or offshore terminal of another Party, be subject to the inspection by officers
duly authorized by that Party for the purpose of determining whether the ship complies with the BWM Convention. This inspection is limited to:

- verifying that there is on board a valid Certificate, which, if valid, shall be accepted; and (Art 9.1.a)

- inspection of the ballast water record book; and/or (Art 9.1.b)

- a sampling of the ships’ ballast water carried out in accordance with the relevant guidelines. (Art 9.1.c)

Port States can do a more detailed inspection when:
- The ship does not carry a valid Certificate (Art 9.2);
- There are clear grounds for believing that the condition of the ship or its equipment does not correspond substantially with the particulars of the Certificate (Art 9.2.a); or
- There are clear grounds for believing that the master or the crew are not familiar with essential shipboard procedures relating to BWM, or have not implemented such procedures (Art 9.2.b)

However, Port State may decide to sample ballast water even before verifying the presence of certificates. However, the tasks that Port State Control officer may carry when verifying certificates is similar to what is done for the application of other conventions while sampling may imply that understanding of biology and ecology is necessary. Therefore, Port State may train their officers, may use other departments (department of agriculture and fisheries, department of food security, universities, or hire the services of experts to carry out the sampling and biological inspections).

In the capacity of a port State, the administration must, under Article 9, carry out port state inspections by duly authorized officers to determine compliance by visiting ships, and under Article 11 notify the flag State of an offending or deficient ship. It must also notify the port State authority of the ship’s next port of call and provide information relevant to any violation committed by the ship.

Pursuant to Article 6, all State parties in whatever capacity must promote and facilitate scientific and technical research and monitoring in relation to Ballast Water Management. Similarly, under Articles 8 and 10, respectively, all States must punish violations of the BWM Convention through appropriate sanctions and cooperate in the detection of violations and in enforcement of the BWM Convention provisions.

There are two key areas for practical implementation by States:

- Develop a policy framework and guidelines; and

- Finalize a ballast water management strategy.
In Australia, the PSC is generally carried out by the Australian Maritime and Safety Authorities (AMSA). However, the control of ballast water under the responsibility of Biosecurity in the Department of Agriculture and Water Resources (DAWR). Deficiencies noted would be reported to AMSA which manages the communication of all deficiencies with Classes, Flag States etc. (Figure 14)

Setting up Deficiency codes and enforcing the regulations.

Paris MoU and the Tokyo MoU have included codes for deficiencies in its list of deficiencies and this includes a full list of deficiencies related to ballast water management. Helps the follow up from one PSC inspection to another between countries. A ship found one or more deficiencies in one port may be targeted for sampling and analyses in the port of call. Communication between Port State is essential to ensure that enforcement is optimal and that the BWM Convention is implemented properly.

- 14801 Ballast Water Management Plan
- 14802 Ballast Water Record Book
- 14803 Construction dates applicable for BWM
- 14804 Ballast Water Exchange
- 14805 Sediment removal and disposal
- 14806 Crew Training and familiarization
- 14809 Conditions for exemptions
- 14810 Ballast Water Discharge violation in port
- 14811 Ballast Water Management System
- 14899 Other (BWM)
- 14103 Segregation of oil and water ballast
- 01136 Ballast Water Management Certificate

In 2018, the MoU of Paris reported the following deficiencies:

- 13 deficiencies for Ballast water discharge violation
- 128 deficiencies for wrong/no ballast water exchange
- 78 deficiencies for issues with the certificate
- 98 deficiencies on the BWMP
- 2 deficiencies on the BWMS
- 272 deficiencies on recording of the BWRB

7. Compliance and Enforcement
7.1. Internal and External Institutional Framework

The institutional framework needed to administer the legal regime for controlling invasive species carried in ballast water is multi-dimensional. It is at once a framework that involves internal and external institutions and both public and private sector participation. The institutional framework must be adequate to exact compliance with the BWM Convention and to enforce its requirements both *ex ante* as preventive measures as well as *ex post* to punish violations.

7.2. Determine Administrative Aspects

As part of the review process the first task is to determine where the responsibilities for administering the legislation giving effect to the BWM Convention are or should be situated within government. The *status quo* of portfolio responsibilities must be examined in terms of the broad subject matters allocated to relevant Ministries or Departments.

- The subject of ballast water management for the control of harmful marine species straddles two principal areas of government administration, namely, shipping and marine environmental protection. The Ministry or Department responsible for public health may also have a significant interest.

Responsibilities for these two subjects are rarely the sole mandate of a Ministry or Department although either could be the main mandate among others allocated to it. Shipping could be a part of the portfolio of transportation, i.e. land, sea and air, or public utilities, or communications. Alternatively, it could be a part of or connected to port administration, customs, coast guard or national defence. In certain rare cases, it could be associated with the portfolio of finance or tourism.

- In Australia the Department of Agriculture is responsible for Port State Control while reporting is the responsibility of the Australian Maritime Safety Authority.

- As of January 2019, the China Maritime Safety Administration (China MSA) will enforce its ballast water legislation for all foreign vessels entering Chinese waters.

- In the Republic of Korea, it is the Minister of Oceans and Fisheries who enforces the BWM Act.

- In South Africa both the Minister of Environment and the Minister of Health have obligations to support the Minister of Transport, who is the main authority responsible for the implementation of the BWM Convention.

7.3. Identification of deficiencies and barriers

Where more than one portfolio justifiably claims administrative competence over ballast water management, conflict is likely to arise. Ministries and Departments as well as their constituent units at lower echelons are inherently territorial and protective of their powers and mandates. This may well turn out to be the principal barrier to achieving success in the implementation of a ballast water programme pursuant to the BWM Convention. Another barrier may be that a
particular unit of government has the mandate to administer the programme but lacks resident expertise, i.e., the scientific, technical and legal capability to fulfil the BWM Convention requirements. Establishing a ballast water management steering committee or a ministerial committee is an example of creating an opportunity for different Ministries and Departments to work together on implementing the BWM Convention. The draft Ballast Water Act of South Africa makes provision for an advisory committee, appointed by the Minister of Transport to advise him/her in regard to any particular matter dealt with by the Act.

The IMO consider that the analyses of samples during Port State Control should not be more stringent that what was applied during the type approval of BWMS. Yet, the methods to be used during type approval are limited and sometimes difficult to develop/implement. This creates a situation where government may be pushed to use some of the competent organizations to do the testing for compliance while these may also be the ones who have been involved directly in the approval the BWMS, creating a real conflict of interest. Yet, laboratories around the world are learning from these organizations and new organization specialized in compliance testing are taking the responsibility to test ballast water for compliance in total independence. The Global TestNet has agreed to have additional activities for organizations involved in compliance testing.

The role and interests of the private sector may be significant in more ways than one. From a coastal and port State perspective, private sector interests such as the fishing and related industries may be at stake if government fails to adequately prevent the detrimental effects of invasive species in local waters. This is particularly crucial in Asia where 90% of the world aquaculture production is taking place. From a flag State perspective, the interests and pitfalls may be quite different. Flag State policy is often heavily influenced by the wishes of the shipowners. It would not be in their interest to support a policy that would translate into exorbitant costs for shipowners in terms of surveys, outfitting of vessels with on-board ballast water treatment plants and other facilities. Shipowners will look for ways and means to minimize the costs relating to shipboard Convention requirements which could be more onerous than the shoreside requirements imposed on port and coastal states. Flag States may be tempted to be lax in aligning their regulatory responsibilities under the BWM Convention with the interests of their main constituency, the shipowners. These potential conflicts of interest must be identified. Serious discussion on commissioning of BWMS took place lately at IMO because it was noticed that the installation of BWMS may render them inefficient. Earlier commissioning was carried out by the vendors and Classes in accordance to the paragraph 8 of the Code for Ballast Water Management System Type Approval. However, this did not include the biological efficiency evaluation and therefore the IMO has recently set a guidance document on commissioning to ensure that the exercise includes the representative sampling of treated water and biological analyses against the three (3) size classes of the D-2 Standard.

In its last communications, the Global TestNet took position to support the appropriate level of biological testing during commissioning as far as possible:

“Global TestNet Position Statement on BWMS Commissioning February 2019
The members of Global TestNet, during their 10th Annual meeting in London 14th & 15th Feb 2019 have discussed the commissioning of ballast water management systems (BWMS) on ships and the approach recommended by the International Maritime Organization (IMO) through the guidance documents (IMO BWM.2/Circ.70 and the Code for approval of BWMS). Having tested BWMS for more than 10 years, the members see these documents as an important aspect of the implementation of the convention because this commissioning should provide ship owners with the certainty that the BWMS, after their installation, meet the D-2 ballast water performance standard of the convention. Yet, the group would like to add the following recommendations which should, if possible, be used:
1. The members of Global TestNet recommend the use of detailed sample analyses whenever possible to ensure high reliability and relevance of compliance data for the ship owner. The additional costs associated with detailed sample analyses is considered minor compared to the cost of representative sampling. Further, the time required for detailed sample analyses is comparable to that of indicative methods.
2. The members of Global TestNet have also raised concerns that the sampling of water during the intake of ballast water may not be possible because ships may not be fitted with sampling facilities on the intake lines and therefore a representative intake sample cannot be taken. Global TestNet recommends the installation of an intake sampling port enabling representative sampling.
3. The members of Global TestNet have raised further concerns regarding potential insufficient concentrations of organisms in the intake water to ensure that the commissioning test can confirm proper BWMS installation. Therefore, the organism concentration in the intake water should be higher than on discharge.”

It is expected that the number of failure and deficiencies during the implementation of the convention is going to change because all stakeholders are going to learn; the ship-owners / ship-operators; the administration / Port State Control officers and the technology developers (Figure 15).
8. Actions/Proposals for Effective Implementation

Ballast water management as a subject matter is a typical candidate for integrated management within government. First of all, the same government in its capacity as a flag State, a port State and a coastal State, will view the subject matter from different perspectives.

8.1. Establish National Task Force or Inter-Ministerial Committees

An integrated management action plan can be effectuated through a National Task Force or an Inter-Ministerial Committee where all interested parties within government would be represented. It should be possible for such a body to invite representation from the private sector as well. The BWM Task Force or Committee will obviously have to consider the Government’s multi-faceted role in giving effect to the BWM Convention, and in so doing, should accommodate private sector interests such as the shipping and fishing industries, classification societies, and insurers. Cooperation from entities external to the Government such as scientific laboratories, universities and Maritime Education and Training (MET) institutions should be sought, and liaison with organizations such as the Regional seas programmes of the United Nations Environment Programme (UNEP), the various Regional Memoranda of Understanding on Port State Control and the Marine Environment Protection Committee (MEPC) of the IMO should be established by the Task Force. In this exercise, the involvement of non-governmental entities will probably be higher in respect of the government’s coastal state role than its flag and port state roles.

Figure 15: Number of ships expected to be in non-compliance against the D-2 Standard during the implementation of the convention. (Drillet et al 2018)
8.1.1. Flag States
In terms of carrying out their flag State responsibilities, governments should call upon their shipowners to comply with the BWM Convention requirements in a spirit of cooperation. Maritime administrations should not neglect their enforcement responsibilities if shipowners and shipboard personnel fail to comply. Where surveys required under the BWM Convention are delegated to classification societies or other recognized organizations, it is incumbent upon the Administration to monitor and oversee the delegated work as the ultimate responsibility for ensuring compliance rests with the Administration.

8.1.2. Port States
In carrying out port State responsibilities, the maritime administration should ensure that port State inspectors are well versed in all matters pertaining to the BWM Convention and are properly trained to execute the specific inspection tasks required to be performed under the BWM Convention. In some countries, ship surveyors who perform flag State surveys are also entrusted with carrying out port state inspections. In others, port State inspectors are not necessarily surveyors, but simply have the requisite training and background to carry out the inspection requirements of conventions. In either case, the individuals concerned must be fully conversant with their port state inspection duties as enforcers of the law. Where inspection tasks are carried out by officials of the port authority rather than the maritime administration, the lines of authority and responsibility must be clearly drawn and there should be full cooperation and coordination between the two agencies.

8.1.3. Coastal States
The coastal State responsibilities of enforcing compliance by visiting ships through monitoring and surveillance will usually be carried out by the Coast Guard or Navy or other enforcement agency designated for the purpose. However, the agency with this enforcement power must coordinate its efforts with the maritime administration, the Ministry of Environment or the BWM Task Force, whichever is the responsible entity in Government, to ensure that actions taken are consistent, properly authorized, and in accordance with the law dictated by the BWM Convention. All enforcement agencies whether acting in a port State or coastal State capacity must be cognizant of the fact that any improper action taken by them such as unduly delaying or detaining a ship may lead to civil liability. Under Article 12 of the BWM Convention, in such circumstances a ship will be entitled to compensation for loss or damage suffered.

8.2. Capacity Building
Capacity building can be achieved in a number of ways; through training, consultative assistance, technical cooperation and strategic partnerships. Proper training of enforcement and administrative personnel and ships’ masters and crew is crucial to the success of a rational integrated ballast water management plan. The shipboard requirements under the BWM Convention should be included in the STCW Convention. Review training opportunities with:
- International Maritime Academy;
- World Maritime University;
- UNEP; and
- IMO
8.3. Judicial Enforcement

The judicial enforcement aspect should be taken into consideration as well. Often in developing countries, the judiciary is woefully unfamiliar with maritime law and legal processes especially under scientific and technical conventions. Judicial orientation in terms of how convention violations are to be transformed into domestic offences, their characterization, and the appropriateness of sanctions in accordance with international law, are important aspects of capacity building.

9. References

Module 5: MEPSEAS Training Course on the Legal Implementation of the Ballast Water Management Convention

1. Introduction to Ballast Water Management

2. The Ballast Water Management Convention and Guidelines

3. Other International Conventions and Principles relevant to Ballast Water Management

4. Implementing the Ballast Water Management Convention

5. Guide to Drafting a Ballast Water Management Act

Module 5: Objectives
- Understand the drafting requirements to implement the Ballast Water Management Convention
- Utilize the Model Act provisions as a basis of drafting the national legislation.
Module Aims & Objectives of Module 5

This Module provides a comprehensive framework for incorporating the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM Convention) into national legislation. At the end of the module the participants will be able to:

- Understand the drafting requirements to implement the BWM Convention; and
- Utilize the Model Act provisions as a basis of drafting the national legislation.

The Module is divided into three parts, namely:

1. Background;
2. Elements of Drafting National Legislation for the Control and Management of Ships’ Ballast Water and Sediments in the context of the Model Act; and

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1. Background

This module serves as a basis for countries that need to incorporate the BWM Convention by way of re-enactment and it sets out specifics that must be considered during the drafting process. Countries who follow the monist approach but who may wish to give effect to the BWM Convention by way of a specific law can also use this module as guidance.

- **Under Article 2 of the Ballast Water Management Convention, Parties undertake to give full and complete effect to the provisions of the Convention and the Annex in order to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships’ ballast water and sediments.**

A Ballast Water Management Act would achieve the following objectives:

- incorporate the relevant provisions of the BWM Convention into national law;
- provide a legal framework to enable the proper implementation and enforcement of the BWM Convention by the relevant national authorities;
- establish a legal regime within the country dealing with ballast water;
- fix significant fines and sanctions for violation of the provisions of the Act; and
- provide standard reporting forms and documentation.

- **The Model Ballast Water Management Act sets out a comprehensive framework for the legal implementation of the Convention.**

Some of the factors to be considered in implementing the legislation include the following:

- a Ballast Water Management Act is designed to create an ability on the part of the State to exercise control and to assess risks to its marine environment and prevent risks to other marine environments from harmful aquatic organisms and pathogens that may be carried in ship’s ballast water and sediment;
- legislation should ensure that, irrespective of the primary legal responsibility, the agency identified for port-ship interaction for purposes of document filing and other communication is in a position to do so efficiently with a minimum of delay or other administrative burden on ships. In particular reporting to multiple agencies should be avoided. For example, consolidated or comprehensive reporting, ideally electronically, for quarantine, ballast water and other entry documents is recommended;
- legislation should ensure that the agency designated to carry out or to supervise the administration of inspections and other enforcement activities seek as much as possible to do so on a whole ship basis with multi-skilled inspectors to check for quarantine,
ballast water, MARPOL and SOLAS related inspections, anti-fouling system monitoring and other related inspections; and

• states that are part of regional arrangements should work co-operatively to develop a regionally agreed upon approach, perhaps on a first port of call basis, to protect the marine environment. Any regionally adopted approach should seek to ensure consistency with the Guidelines and the BMW Convention.

2. Elements of Drafting National Legislation for the Control and Management of Ships’ Ballast Water and Sediments in the Context of the Model Act

This section includes a non-exhaustive “list of elements” for policymakers and legislative drafters to consider when drafting legislation to implement the BWM Convention nationally.

The following is a list of components typically found in a Common Law Act:

• The title, the name by which the Act is known, usually referred to as the “short title.” Reference to the date of commencement may be included with the short title;

• The first page of the Act usually includes the date of promulgation (publication); who assented to (approved) the legislation; which language was signed (in multilingual countries/jurisdictions); and what the date of commencement is;

• The long title, which briefly explains the purpose of the Act;

• A Table of Contents;

• Subdivisions, usually called Chapters or Parts, that are used to arrange the information in the Act;

• Within the subdivisions a number of sections or regulations, depending on the nature of the legislation which include:

  o Definitions

  o Objectives

  o Application of the Act

  o Various sections that deal with specific elements

• Schedule(s); and

• Tables and diagrams.
2.1. Short Title

The title of legislation will vary depending on the form of the regulatory instrument chosen, e.g., whether it is stand-alone legislation or an amendment to, or regulation affiliated with, existing legislation. The title will also depend on legislative drafting protocols in each country. A title for legislation that is not part of existing legislation should indicate the general scope, that is, what is covered, by the legislation, for example the Ballast Water Management Act of Country X, or the Country X Ballast Water Management Act.

2.2. Long Title

The long title of an Act almost reads like a short description of the Act and it explains the purpose of the Act. For example, “to provide for the prevention of the introduction of alien and invasive species via ships’ ballast water and sediment, the implementation of the International Convention for the Control and Management of Ships’ Ballast Water and Sediment 2004, and matters related thereto.

In France the long title is: La loi no. 2016 – 1087 de 8 aout 2016 pour la reconquete de la biodiversite, de la nature et des paysages avec les texte d’application associes.
The unofficial translation is: The law nr. 2016 – 1087 of 8 August 2016 for the recovery of biodiversity, nature and scenery and the implementation texts associated.

In Germany the long title of the national legislation and regulations are: Gesetz zu dem Internationalen Übereinkommen von 2004 zur Kontrolle und Behandlung von Ballastwasser und Sedimenten von Schiffen (Ballastwasser-Gesetz). The unofficial translation is the ‘Law to the International Convention of 2004 to the control and treatment of ballast water and sediments from ships (ballast water law)’. The regulations are titled: Verordnung über das umweltgerechte Verhalten in der Seeschifffahrt with the unofficial title as the ‘Regulation on environmentally sound behavior in the maritime sector.

2.3. Definitions

Definitions are an important part of legislation because they precisely define the scope of the legislation and terminology within the legislation, e.g., who does it apply to and what object or activity does it apply to. Article 3 of the BWM Convention contains a number of definitions. Some of them are standard definitions found in most IMO conventions. Some are particular to the BWM Convention. A country can also chose to include or exclude terminology that is specific to national circumstances, the list of definitions contained in the BWM Convention is therefore not exhaustive.

2.4. Objectives
This part of the Act clearly stipulates the objectives of the Act and should include reference to the country’s obligations in terms of the BWM Convention.

### 2.5. Application

An application provision clearly sets out who the Act shall apply to and whom it shall not apply to. The application section typically follows the definition and objectives section of the legislation. The BWM Convention has an Application section (Art 3) and the domestic legislation should be consistent with the provisions of Article 3 of the BWM Convention.

According to Article 3 of the BWM Convention, the Convention requirements apply to all ships that are entitled to fly the flag of a Party and ships that are not entitled to fly the flag of a Party, but which operate under the authority of a Party. (Art 3.1) The BWM Convention also applies indirectly to ships of countries that do not become a party to the BWM Convention. States party to the BWM Convention are required to apply the BWM Convention in a way that ensures that ships of non-party States are not given more favorable treatment than ships of State that have ratified the BWM Convention (non-discrimination). (Art 3.3)

In accordance with Art 3.2 the BWM Convention does not apply to:
- ships not designed or constructed to carry ballast water;
- ships of a Party which only operate in waters under the jurisdiction of that Party, unless the Party determines that the discharge of ballast water from such ships would impair or damage their environment, human health, property or resources, or those of adjacent or other States;
- ships of a Party which only operate in waters under the jurisdiction of another Party, subject to the authorization of the latter Party for such exclusion. No Party shall grant such authorization if doing so would impair or damage their environment, human health, property or resources, or those of adjacent or other States. Any Party not granting such authorization shall notify the Administration of the ship concerned that the BWM Convention applies to such ship;
- ships which only operate in waters under the jurisdiction of one Party and on the high seas, except for ships not granted an authorization pursuant to subparagraph (c) of the BWM Convention, as described above, unless such Party determines that the discharge of ballast water from such ships would impair or damage their environment, human health, property, or resources, or those of adjacent or other Sates;
- any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on Government non-commercial service. However, each Party shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such ships owned or operated by it, that such ships act in a manner consistent, so far as is reasonable and practicable, with the BWM Convention; and
- permanent ballast water in sealed tanks on ships, that is not subject to discharge.

It can be seen then that the BWM Convention sets a “floor” or minimum standards for flag State responsibilities for implementing the BWM Convention, when the country becomes party to it. With respect to ships for which it has flag State administrative responsibilities a country can adopt standards that are broader or more stringent than the BWM Convention minimum.
The following points are suggestions for issues specific to national legislation that would apply to both flag/national ships (if the country is a flag State) and foreign flag ships (i.e., it covers both flag State and port/coastal State responsibilities):

a) This legislation (or applicable name) applies to all ships that have ballast tanks entering national (or insert country’s name) waters.

The BWM Convention refers to “all ships” but does not apply to ships “not designated or constructed to carry ballast water.”

b) This legislation (or applicable name) applies to all national (or insert country’s name) ships that have ballast tanks.

Although the BWM Convention only applies to international shipping, concerns about containment and preventing the transfer of organism and pathogens between ports in a country suggests that vessels engaged in coastal journeys within a country could also be regulated at a domestic level. A suggestion such as this one, which relates to a country’s flag State jurisdiction, will help to better protect the environment even if the country does not formally adopt the BWM Convention when it comes into force.

c) This legislation applies (or, does not apply) to national warships, naval auxiliary ships, and government non-commercial service ships.

Under international law a coastal State’s legal requirements that apply in its territory (including territorial waters) are applicable to foreign flag military and governmental non-commercial vessels (subject to the normal rules regarding Innocent Passage). However, because of customary international law (as reflected in UNCLOS, Art 236) regarding sovereign immunity, the legislation is not considered enforceable against these ships. The coastal State has some remedial powers in that a foreign flag military or government non-commercial ship that does not comply can be required to leave the territorial waters.

2.6. Administration

This section of the legislation identifies the authority responsible for the administration of the Act. It also gives certain powers to the authority and it describes the duty and powers of the officers in charge of compliance of the Act. Further provision can be made for advisory committees and communication of information to the IMO.

The responsible administration will have the greatest administrative task in the implementation of the BWM Convention. It is likely that this body will provide advice to the legal branch and the Government as well as the shipping industry and port authorities. The administration is also responsible for the approval of BWMS, BWMP, and survey and certification requirements in accordance with relevant guidelines.

In South Africa, for example, the draft Ballast Water Management Act includes an entire chapter dedicated to “Administration”. In terms of the South African draft

Act the Authority, in this instance the South African Maritime Administration (SAMSA) is responsible for the administration of the Act. The draft Act also clearly stipulates the powers of the authority in that it may appoint officers as it considers necessary for the administration of the Act including officers as identified in other relevant maritime legislation. The draft Act further sets out the duty as well as powers of such officers. The draft Act also enables the Minister to appoint an advisory committee to advise the Minister in regard to any particular matter dealt with by the Act. Its composition and functions of this Advisory Committee is at the discretion of the Minister.

2.7. Control and Management of Ships’ ballast water and sediments

Article 4 of the BWM Convention deals with the control and transfer of harmful organisms and pathogens through ships’ ballast water and sediments. The following are elements that can be included in national legislation

- control of the discharge of ballast water;
- exceptions from control (based on Regulation A-3 of the Annex to the BWM Convention);
- exemptions (based on Regulation A-4 of the Annex to the BWM Convention);
- ballast water management plan;
- ballast water record book;
- ballast water exchange;
- ballast water management standards;
- ballast water management options;
- sediment management for ships;
- sediment reception facilities;
- duties of officers and crew;
- equivalent compliance;
- additional measures;
- warnings concerning Ballast Water uptake in certain areas; and
- Port Ballast Water Management Plans
2.8. Survey, Certification and Inspection

Ships are required to be surveyed and certified (Art 7 Survey and Certification) and may be inspected by port State control officers (Art 9 Inspection of Ships) who can:
- verify that the ship has a valid certificate;
- inspect the Ballast Water Record Book;
- and/or sample the ballast water.

If there are concerns, then a detailed inspection may be carried out and “the party carrying out the inspection shall take such steps as will ensure that the ship shall not discharge Ballast Water until it can do so without presenting a threat of harm to the environment, human health, property or resources.” All possible efforts shall be made to avoid a ship being unduly detained or delayed (Art 12 Undue Delay to Ships).

Specific sections that can be included are:
- Surveys;
- Nominated surveyors and recognized organizations;
- Issuance of Certificate;
- Issuance of Certificate upon request by another Party;
- Issuance or Endorsement of a Certificate by Another Party;
- Form of Certificate;
- Duration and validity of certificate;
- Corrective actions;
- Reports of accidents and defects;
- Maintenance requirements;
- Transfer of flag.

2.9. Responsibilities of the Administration

This element relates to a country’s flag State responsibilities under the IMO Guidelines and the BWM Convention. The following outlines the main areas of responsibility.
- The Administration must ensure that all national (or country name) ships that have ballast tanks also have on board an approved Ballast Water Management Plan and crew and officers competent to apply the Plan and carry out the specified ballast water management practices and the related recording and reporting functions.
- The Administration is responsible for issuing an International Ballast Water Certificates to all ships over 400 gross tones entitled to fly its flag have ballast tanks and ensure that the surveys required under the BWM Convention take place.
• The Administration will develop appropriate sanctions for ships entitled to fly its flag that are the subject of a complaint from another Administration.

• The Administration will ensure that all relevant crew, officers and the ship’s master on all national ships (or country’s name) are competent to safely conduct ballast water management, as specified in the ship’s Ballast Water Management Plan.

2.10. Procedural Matters

The issue as to whether procedural matters should be included in the legislation may vary greatly depending on the legislative framework for individual countries. For some countries the following matters may also be dealt with in the Act:

• Inspection

• Enforcement officers and Powers

• Legal Proceedings

Some of these matters may already be dealt with in national shipping legislation or some other statutory framework in the national legislative framework. Where these provisions already exist then one option would be to cross-reference the relevant statutory provisions. However, another option will be to incorporate all the provisions of the Model Act into the national legislation. For some countries the legislation should not refer at all to procedural matters as these may best be left to Regulations.

2.11. Violations and sanctions

Parties shall prohibit any violation of the requirements of the BWM Convention and parties shall establish sanctions under their national laws and take procedures against offenders (Art 8). This applies for the administration of the ship wherever the violations occur, in other words Flag state control (Art. 8.1) and any violation within the jurisdiction of any Party, in other words Port state control (Art. 8.2).

• National legislation implementing the BWM Convention should reflect these requirements and a maritime Administration is required to fulfil these obligations.\(^\text{16}\)

Whenever a violation occurs, proceedings shall either be taken in accordance with the national laws of the party where the violation occurs, or the Party shall inform the Administration of the ship, who violated the requirements of the BWM Convention, and furnish the Administration of the ship such information and evidence as may be in its possession that a violation has occurred. (Art 8.2.b)

It is recommended that the level of the penalty or the type of sanctions (Art 8.3) is severe enough given the serious impact of harmful aquatic organisms and pathogens ballast water. Again, sanctions may already have been dealt with in the national shipping legislation, or under some legal systems they could be dealt with in Regulations. For example, the Prevention of Pollution of the Sea Act of Singapore, as amended, prohibits the discharge of ballast water and sediment from ships and subject to the subsections of the relevant section of the Act, if any discharge of ballast water or sediments occurs from any ship into Singapore waters, or from a Singapore ship into any part of the sea, the master, the owner and the agent of the ship shall each be guilty of an offence and shall each be liable on conviction to a fine not exceeding $20,000 or to imprisonment for a term not exceeding 6 months.\footnote{Available at \url{https://www.mpa.gov.sg/web/portal/home/port-of-singapore/maritime-legislation-of-singapore/prevention-of-pollution-of%20the-sea-act}}

Parties will need to implement a range of monitoring, compliance and enforcement mechanisms. Enforcement of the BWM Convention should primarily focus on preventing the transfer of harmful aquatic organisms and pathogens and not just on apprehending and punishing violators.

- \textit{In order to support the legislation, adequate and coordinated administrative infrastructure and programs such as, inspector training, seafarer education, biological surveys of ports and nearby coastal waters and the development of environmentally, safe sediment disposal in reception facilities, are essential.}

\section*{3. Incorporating the Annex to the Ballast Water Management Convention into national legislation}

The Annex to the BWM Convention forms an integral part of the convention, unless expressly provided otherwise, a reference to the BWM Convention constitutes at the same time a reference to the Annex (Art 2.2). Therefore, when drafting the Act provisions should be made for the incorporation of the various regulations of the Annex into the legislation. They were extensively explained in Module 2. A summary is presented below.

This includes definitions, application and exemptions.

3.2. Annex – Section B Management and Control Requirements for Ships

Under Regulation B-1 ships are required to have on board and implement a Ballast Water Management Plan approved by the Administration. Under Regulation B-2, ships must have a Ballast Water Record Book. Regulation B-4 deals with Ballast Water Exchange and sediments removal.

3.3. Annex – Section C Additional Measures

A Party individually or jointly with other Parties, may impose on ships additional measures to prevent, reduce, or eliminate the transfer of Harmful Aquatic Organisms and pathogens through ships’ Ballast Water and Sediments.

3.4. Annex – Section D Standards for Ballast Water Management

There is a ballast water exchange standard (D-1) and a ballast water performance standard (D-2). Ballast water exchange could be used to meet the performance standard. Regulation D-4 covers Prototype Ballast Water Treatment Technologies. Under Regulation D-5, IMO is required to review the Ballast Water Performance Standard.

3.5. Annex – Section E Survey and Certification Requirements for Ballast Water Management

This section gives requirements for initial renewal, intermediate, annual and additional surveys and certification requirements. Appendices give the form for Ballast Water Management Certificate and the form of Ballast Water Record Book.

There are three options for incorporating these provisions in the Act:

   a) incorporating by reference to the BWM Convention. In this case the Act would refer to the Annexes of the BWM Convention;
   b) setting out the relevant Annexes as a Schedule to the Act;
   c) incorporating the Annexes as separate Regulations made pursuant to the Act.

It is for each country to decide what the preferred option is, each with its own pros and cons: for example incorporating by reference means that there is less legal text to be drafted and submitted for publication and comments whereas options b and c make it easier for policymakers to use one legal document but it might be more time consuming to draft and include the various annexes.
4. References


