



Guidelines for Development of a National Ballast Water Management Strategy

J. Tamelander, L. Riddering,
F. Haag and J. Matheickal

GloBallast Monograph Series No.18





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The GloBallast Partnerships Programme is a co-operative initiative of the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and the International Maritime Organization (IMO) to assist developing countries to reduce the transfer of harmful aquatic organisms and pathogens in ships' ballast water and sediments and to assist the countries in implementing the International Convention on Ballast Water Management. For more information, please visit <http://globallast.imo.org>

Founded in 1948, IUCN (International Union for Conservation of Nature) brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: over 1,000 members in all, spread across some 160 countries. As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. IUCN builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels. For more information see www.iucn.org

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Preface

This manual has been prepared through collaboration between the GEF-UNDP-IMO GloBallast Partnerships Programme and the International Union for Conservation of Nature (IUCN) Global Marine Programme. It responds to requests from countries for assistance in strengthening and developing national regulatory frameworks related to marine Invasive Alien Species (IAS) in particular with respect to the transfer of potentially harmful aquatic organisms and pathogens in ships' ballast water and sediments.

The manual is directed at national level practitioners as a hands-on guide to the development of national ballast water management strategies. It is intended as a source of basic information and as step-by-step guidance in the development of national ballast water management strategies. As such it can be used as a 'cook book' throughout a process, or as a resource/reference book. Several other, related guidelines are being prepared by the GloBallast Partnerships Programme, together with IUCN and other institutions. These include Guidelines for National Ballast Water Status Assessments, Guidelines for Economic Assessments of the Impacts of Marine Invasive Alien Species, and Guidelines for Legal Reform. All Guidelines will be available from the GloBallast Partnerships website, <http://globallast.imo.org>.

The manual is divided into six sections, the first two containing an introduction to the issue of invasive alien species and the role of shipping and ballast water in their spread. Section 3 provides an overview of international, regional and national policies and legislation related to IAS, section 4 information on why a national ballast water management strategy is needed. Section 5 details procedural guidance for the development of a national ballast water management strategy. References and sources of additional information are provided in section 6. The guidelines further provide a number of annexes, including templates for a national ballast water management strategy and related work plans, guidelines for national task forces and a sample national ballast water management strategy.

This manual is based on numerous sources of information, listed in the references section, and draws heavily on Module 8 "Development of a National Strategic Framework for BWB" of the Introductory Course on Ballast Water Management developed by GloBallast.

1

Introduction

Over two-thirds of the world's surface is covered by water. Open oceans, semi-enclosed or enclosed seas, coastal areas, estuaries, rivers and lakes are host to highly diverse ecosystems that span all of earth's climatologic zones. The productivity of these ecosystems has largely shaped development of human society and led to human settlement along coastal margins. Globally, the number of people living within 100 km of the coast increased from ca 2 billion in 1990 to 2.2 billion in 1995, or 39 percent of the world's population (WRI 2006). The number continues to increase.

Seas and other water bodies have for long connected human populations, serving as a route for transportation of people as well as merchandise, and today more than 90% of all worldwide trade goods are transported on the ocean (IMO 2008). However, the emergence and continued growth of global trade, initially using wooden ships with sails, and later ships made of steel and propelled by engines, also has had side effects. As with many other aspects of human endeavour, the ever-increasing movement of ships between different parts of the world and at ever-increasing speeds has implications for the environment as well as human wellbeing. This includes the spread of species beyond their native range.

The Millennium Ecosystem Assessment (2005) noted that over the past century, the impact of invasive alien species has been particularly high on islands, and predicted that the impact of invasive alien species over the coming decades will grow in intensity especially in inland waters and coastal areas. Invasive alien species (IAS) are now recognized as one of the major direct causes of biodiversity loss, and of changes in ecosystem functioning as well as provisioning and supporting services.

Box 1: Main obstacles to addressing IAS

- inadequate policy and legal frameworks, at national, regional and global levels. While current trends in development of policies and enactment of laws at national and international levels are good, a lot remains to be done in including in relation to further development of strategic frameworks that incorporate all aspects of IAS as well as mainstreaming at national level;
- limitations in implementation and enforcement of existing policies and laws for reducing IAS. Implementation effectiveness of many international agreements varies, and national policies are not always adhered to fully;
- insufficient institutional coordination at national, regional and international levels. IAS is a problem with national, regional and global dimensions and prevention and management need coherent approaches;
- lack of understanding of the severity of the threat posed by IAS at political as well as technical levels, which is in part causative of policy and legal shortcomings;
- insufficient human, technical, institutional and logistical capacity for addressing IAS;
- limited public awareness of IAS, their threats and potential impact;
- insufficient financial support to programmes addressing IAS, whether through policy development, supporting enforcement and building compliance, or building capacity and awareness.

Source: Global Invasive Species Programme, Millennium Ecosystem Assessment

The spread of IAS is a global phenomenon, and the scale of impacts can range from local to trans-boundary or global. The issue thus needs to be addressed through a multitude of approaches, requiring specific and targeted action at national level that is coherent and coordinated on the regional and global levels. However, it is clear that progress in addressing invasive alien species in marine and aquatic environment varies much between countries. Although there is an overall trend towards better regulatory and implementation frameworks for prevention, control and mitigation of IAS impacts both on a national and international level much remains to be done.

1.1 SPECIES DISTRIBUTION AND SPREAD

Habitats with similar conditions in different parts of the world may be populated by very different species of animals, algae and microorganisms. For example, although the depth, salinity and temperature regimes in south-eastern Australia may be similar to those along the US east coast, their native biota shares very few, if any, species.

This difference is due to the presence of “ecological barriers”, including e.g. landmasses, large bodies of water of different temperature or salinity, and ocean currents. The presence of such barriers has allowed areas to evolve in isolation from each other, leading to different ecosystems and different species. While species naturally tend to spread this is a slow process in large part due to the barriers present.

However, ecological barriers are now increasingly broken by human activities, in particular transport and shipping. Organisms are transported much beyond their normal range and into new areas, where they may find suitable environmental conditions and become established. The increasing volumes of shipping as well as the increasing speed is adding to the risk that species are moved as well as the risk that they survive.

Other processes also contribute to lowering the barriers, including e.g. environmental change. For example, changing environmental conditions as a result of climate change, including warming as well as changed currents, can increase transport of species from one area to another, and increase the likelihood of survival. Further, disturbed ecosystems that are not in balance as a result of degradation or over exploitation may be more susceptible to bioinvasions.

1.2 INVASIVE ALIEN SPECIES

Species that as a result of human activity have been moved, intentionally or unintentionally, into areas where they do not occur naturally are called “introduced species” or “alien species”. There are numerous examples of intentional species introductions, including many food crops and organisms used in mariculture, such as tilapia, and some salmon and mollusc species.

While most species introductions result in no or little noticeable change in local ecosystem diversity and productivity, some introduced species may under suitable conditions become established and, in the absence of natural controls such as predators, parasites or disease, drastically change the ecosystem. Such species are called invasive alien species (IAS). Because an introduced species is unlikely to be subjected to the same natural controls that kept its population numbers in an ecological balance in its native range, it tends to increase rapidly, to the point where it can take over their new environment, often to the detriment of both native biodiversity and human livelihoods.

Examples of IAS that have caused significant ecological and economic impact include the zebra mussel (*Dreissena polymorpha*) and the comb jellyfish (*Mnemiopsis leidyi*). The freshwater zebra mussel, native to Europe, has become a prolific invader, spreading to the US in ballast water and now found throughout the waterways of North America. Zebra mussels encrust any solid structures in the water and block water pipes, and the estimated cost of dealing with this may be as high as US\$ 1 billion per decade. The North American comb jellyfish was introduced into the Black Sea through ship ballast water in the early 1980s. By the early 1990s the area’s anchovy fishery had almost disappeared, and annual losses caused by drops in commercial catches of marketable fish were at least US\$ 240 million. There are numerous further examples of marine invasive species that have caused fundamental impacts on

biodiversity, ecosystem resources, fisheries and mariculture, human health, industrial development and infrastructure.

1.3 IMPACTS OF INVASIVE ALIEN SPECIES

Impacts caused by marine invasive species are highly varied and include the following:

Environmental impacts

Environmental impacts include loss of native biodiversity due to preying on or competing with native species, decreased habitat availability for native species, smothering and overgrowth, parasites and disease, as well as hybridisation, causing genetic dilution. For example, the Mediterranean mussel (*Mytilus galloprovincialis*) is dispersed with ballast water and by fouling ship hulls, and is now well established in temperate regions around the globe. It has displaced several South African native mussel species, and appears to out-compete and hybridize with its close relatives on the US west coast.

Changes to ecosystem function

Changes to ecosystem function include changes in nutrient cycles and decreased water quality. In Africa and South East Asia there is a number of problems caused by the IAS of water hyacinth. The dense mats of these plants clog waterways with their ability to take over entire lakes and rivers. The plant causes the lowering of dissolved oxygen levels and thus reducing the amount of fish able to live in the water ways. This has an impact on the fishing and shipping industry. The water hyacinth takes up large quantities of vital nutrients from the water and inhibits the growth of native plants. When the water hyacinth dies it sinks to the bottom of the water body, thus causing the water to become eutrophic due to the release of all the nutrients taken up. The deterioration of the water way threatens clean drinking water and thus has an impact on human health.

Impacts to human health and wellbeing

Impacts to human health and wellbeing include decreased recreational opportunities, and overgrowth of aquifers and smothering of beaches, as well as parasites and disease. The spread of toxic phytoplankton and increasing occurrence of harmful algal blooms are of significant health concern. For example, on the Mexican Pacific coast outbreaks of Paralytic Shellfish Poisoning caused by the introduced dinoflagellate, *Gymnodinium catenatum*, caused over 30 deaths, with close to 500 people hospitalized. Also, cholera (*Vibrio cholera*) is known to mutate into new strains and travel widely in ship ballast water. Ballast water introduction of a virulent strain of cholera from Asia was implicated in a widespread cholera epidemic in Peru 1991, affecting thousands.

Economic impacts

Economic impacts can result from interference with biological resources that support fishing and mariculture (e.g. collapse of fish stocks), interference with fisheries (e.g. fouling of gears), disruption to tourism, damage to infrastructure (e.g. through fouling) and costs of treatment, clean up or control. Examples of economic implications of IAS have been provided above. Another is the European green crab (*Carcinus maenas*), first transported to the US by wooden ships, inside holes in the hulls bored by shipworms. It is believed to be at least partly responsible for the destruction in the 1950s of the soft-shelled clam fisheries – an 85% reduction in catches between 1938 and 1959 affected thousands of people.

Cultural impacts

Cultural impacts from IAS may arise from the demise of native species populations used for subsistence harvesting or degradation of culturally important habitats. Virtually every case where an invasive alien species impacts on a locally harvested resource also has a cultural impact, forcing an abandonment of traditional livelihoods and values.

2

Ballast Water and IAS

2.1 VECTORS AND PATHWAYS FOR SPREAD OF IAS

IAS can be spread in numerous ways. Some introductions are intentional, such as the release into the wild of fish to increase local catches, or plants introduced for mudflat or dune management (e.g. the common cord grass, *Spartina anglica*). Many alien species are also introduced into an area outside its native range but in containment. This may include species for mariculture (e.g. salmon and tilapia), species kept in aquaria, and species traded as live seafood or live bait.

Unintentional introductions can be associated with many activities, including transport on fishing or diving gear, pleasure craft or other small boats, and alien pathogens in shellfish and other aquaculture introductions. However, the two main vectors for marine IAS, responsible for the majority of introductions, are hull fouling and ballast water.

Biofouling probably has been the vector for most species introductions to date. Relatively fast moving wooden ships have been in use for centuries, carrying growth on the hulls as well as a multitude of boring organisms and stow-aways, and fouling on ships as well as yachts and smaller crafts still transport large numbers of species. However, wooden hulls have largely been replaced by metallic/steel hulls, and antifouling measures are widely used, thus limiting opportunities for spread of IAS somewhat, although the volume of traffic continues to increase.

Biofouling can occur in or on vessels e.g. vessel hulls; underwater fittings such as propeller, rudder, bow thrusters; as well as damp or wet niche areas such as anchor lockers, sea-chests, bilge etc. Thus it provides a means by which both sessile and mobile organisms can translocate to new areas. It is estimated that biofouling is responsible for the introduction of over two thirds of all non-native algal species globally, about three quarters of all non-native marine invertebrates in Hawaii, and as much as four fifths of the non-native marine species in Port Phillip Bay, Australia.

Another major change in the shipping industry has provided a relatively new vector for spread. The all but complete shift to ballast water rather than solid ballast during the 1950s means that large volumes of water are carried by the world shipping fleet. It is estimated that some 3–5 billion tonnes of ballast water is transferred throughout the world each year with an individual ship carrying anything from several hundred kilograms to more than 130,000 tonnes of ballast water, depending on the size and purpose of the vessel. It has been estimated that 7,000 species are carried around the world in ballast water every day and 10 billion tonnes of ballast water are transferred globally each year. This means that we are now capable of moving more organisms around the world in the ballast water of ships in one month, than we used to in one century. Ballast water transfer associated with large ships is thus commonly believed to be the main vector for the spread of IAS today, and the main pathways for spread of IAS are thus the main shipping routes.

2.2 BALLAST WATER AS A VECTOR

Ships are specifically designed and built to move safely through the water while carrying 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. In the past many solid materials were used for ballast,

Box 2: Summary of Marine IAS pathways and vectors

1. Unintentional introductions can result from trade, travel and transport, including through:
 - ballast water transfer;
 - hull fouling;
 - fouling of fishing gear, buoys, small crafts and boats moved between areas; and
 - alien pathogens in shellfish and other aquaculture introductions.
2. Natural dispersal of organisms such as swimming or floating can also take place through man-made connections between previously separated areas, e.g. canals and water diversion schemes.
3. Intentional introductions are those where the transfer of the organisms was planned.
 - some alien species are introduced into the wild, including fish species released to increase local catches and plants used for mudflat or dune stabilization; and
 - some species are introduced into containment but “escape” or are discarded into the environment, e.g. through mariculture (“farming” of oysters, salmon, tilapia, etc.); Aquarium use; and Live seafood trade.

including e.g. sand, soil and stones. This has been the vector for numerous species introduction, both terrestrial (e.g. seeds transported in soil) and aquatic (e.g. crustaceans or microorganisms living in/moist solid ballast).

However, due to the shift in the mid 19th century, water is used as ballast and since the 1950s has completely replaced solid ballast in ships used to carry heavy loads. Ballast water systems are now an integral part of a ship's design, and contribute to stability and balance as well as structural integrity of the hull. Ballast water is pumped into specially designed tanks distributed throughout the hull as ships are offloaded, and pumped out again on arrival to a port where cargo is to be loaded.

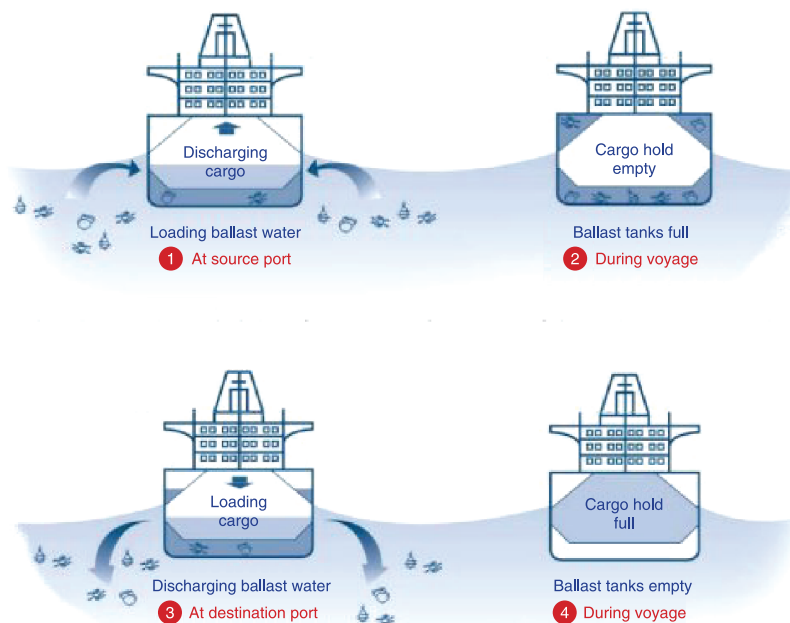


Figure 1 Cross section of a ship showing ballast tanks and ballast water cycle
 Source: GloBallast, International Maritime Organization

Water carried as ballast inevitably contains a large number of organisms of different species and in different life stages (e.g. eggs and larvae; cysts, spores or resting stages; and adults). Thus it constitutes a significant potential vector for spread of IAS. Since ballast water is usually taken up in or near ports,

where productivity is often high due to hydrological conditions and there is an elevated risk of IAS presence, the risk of spread is further exacerbated. Also, as ballast water is mostly taken on board in shallow coastal areas it is often turbid, which leads to build up of sediment in dead spaces of the ballast water tanks. This further increases the risk of transporting IAS in the form of cysts (e.g. dinoflagellates).

It is clear that many organisms that enter ballast water tanks perish – for example, organisms may sustain physical damage, and photosynthesizing species may not survive the absence of light. However, it is also clear that many organisms do survive and can upon discharge, if environmental conditions are favourable, become established and thrive. It is estimated that 10 billion tonnes of ballast water are transferred globally each year, and that 7,000 species are carried around in ballast water every day. Perhaps not surprisingly some of the most damaging and costly IAS introductions have been made through ballast water, including the introduction of the comb jellyfish to the Black Sea, and the introduction of the zebra mussel to the American Great Lakes.

2.3 REDUCING THE RISK OF SPREADING IAS THROUGH BALLAST WATER

Ballast water is increasingly recognized for its role in species translocation and as a potential vector for the spread of IAS, and consequently considerable effort has gone into identifying means to reduce the risks. Several strategies have been developed, often including one or several of the following complementary methods:

- minimizing uptake of organisms into ballast water tanks. Avoiding ballast water uptake in shallow and turbid areas, e.g. where propellers can stir up sediment, and avoiding uptake at night when many organisms migrate vertically to feed, reduces the number of organisms that enter ballast water tanks;
- removing ballast sediment. Routine cleaning of ballast water tanks and removal of sediment in mid-ocean or at specific facilities provided in port reduces the number of organisms that are transported;
- avoiding unnecessary discharge of ballast water. Where cargo handling demands uptake and discharge of ballast water within a port, water taken up in another area should not be discharged if avoidable;
- ballast water exchange. Ballast water can be exchanged between ports, mid-ocean and in deep water, in order to reduce the risk of organisms carried in the water finding a suitable environment on discharge;
- treatment of ballast water. Several methodologies that seek to remove or render harmless organisms in ballast water while in tanks and on ships are in development or being piloted. This includes mechanical treatment (e.g. filter or cyclonic separation), physical treatment (e.g. ultraviolet, ultrasound or heat treatment), chemical treatment (e.g. the use of disinfectants or biocides), biological treatment, or a combination of these;
- discharge to reception facilities. Discharge of ballast water to reception facilities prevents organisms transported in ballast water from release into the wild.

Minimizing the risk of IAS introductions through ballast water requires a combination of multiple approaches and comprehensive and well-designed strategies. This includes operational procedures for ships and ports, monitoring, inspection and certification, training and education as well as clear roles, responsibilities and mandates. Thus there is a need for specific policies, strategies, legal frameworks and institutional arrangements that are appropriate and coherent on a national as well as international level to regulate and guide.

3

Policies and legislative frameworks related to IAS

The GloBallast Legislative Review (McConnell 2002) and the forthcoming GloBallast *Guidelines for legal reform in the context of the Ballast Water Management Convention* provides a comprehensive overview of national legislative frameworks for six pilot countries of Brazil, China, India, Iran, South Africa and the Ukraine as well as an introduction to international policy and law relating to ballast waters and IAS. However, it should be noted that both national and international policy and legislation with respect to IAS is in constant development. The number of national policies on IAS has increased through time as countries acknowledge the IAS problem and commit to responding to this threat. Similarly, both the number of international agreements relevant to controlling IAS, as well as the number of countries party to these agreements have increased (McGeoch et al 2009). The sections below provide a brief overview of relevant national and international legal and policy frameworks.

Further information and guidelines with respect to ballast water management legislation at the national level, will be available in the *Guidelines for legal reform in the context of the Ballast Water Management Convention*, which is being developed by the GloBallast Partnerships Programme. These Guidelines also includes model legislation and an update of the GloBallast Legislative review from 2002. Furthermore, a training course for maritime lawyers has been developed, providing resource for anyone involved in the drafting and implementation of national legislation.

3.1 NATIONAL LEGISLATIVE FRAMEWORKS RELATED TO IAS

National legislative frameworks differ significantly between countries, including constitutional structure, system of national laws, policies and strategies as well as bylaws. Thus comprehensive lists of laws, policies and strategies relevant to IAS management must be compiled country by country.

Several countries have already developed strategies or legislation specific to IAS. This includes e.g. Norway's Strategy on Invasive Alien Species which was produced by ten governmental agencies (see reference section for link). However, in many countries IAS is still covered only under other legislation and policies, such as those related to health, environment management, transport and shipping.

The tables below provide information on various aspects of national IAS legislation:

- national laws and policies that typically or commonly are of relevance to IAS and various aspects of IAS management, including conducting research, preventing spread, containing introductions and undertaking eradication (Table 1);
- examples of countries that have IAS legislation (Table 2) and national IAS strategies (Table 3). These are not all related to ballast water management as a vector and therefore illustrate the variation between countries;
- a summary of how countries that already have a regulatory framework for addressing the problem of IAS transport in ballast water have developed legislation in view of specific needs and pre-existing legal frameworks (Table 4). For more information see the original summary in the The GloBallast legislative review (McConnell 2002) and the original text of the legislation as noted in Appendix II thereof.

Table 1: National laws and policies with relevance to IAS

Law/Policy	How it may relate to IAS (examples, not an exhaustive list)
Environment management / protection	Protection of native ecosystems and biota; biodiversity conservation; restrictions on introduction or relocation of biota; may include specific provisions related to IAS
Wildlife	Protection of native ecosystems and species; restrictions on introduction or relocation of biota; may specifically address IAS
Health	Introduction and spread of pathogens
Food	Introduction and spread of human pathogens, as well as plant and animal disease and pests
Aquaculture	Provisions for regulating use of specific species in aquaculture, including different life history stages; may also include provisions for release into the wild
Trade, import and export	Provisions for trade in specific species, legal authority for implementing e.g. CITES
Customs	Provisions for ensuring compliance with national legislation when carrying goods to and from the country
Fisheries	May include prohibitions of release of species; removal of gear fouling
Maritime safety	Seaworthiness of ships; may include provisions for regulating IAS prevention measures

Table 2: Examples of countries with specific IAS legislation

Country	Summary	URL
Vietnam	2008/L-CTN on the promulgation of the Law on Biodiversity. This law provides for the conservation and sustainable development of biodiversity. Among others the provisions include: control of invasive alien species.	http://faolex.fao.org/docs/pdf/vie88471.pdf
United Kingdom	Natural Environment and Rural Communities Act 2006 The Act makes provision in respect of biodiversity, pesticides harmful to wildlife and the protection of birds, and in respect of invasive non-native species.	http://faolex.fao.org/docs/pdf/uk75243.pdf www.opsi.gov.uk
Samoa	Quarantine (Biosecurity) Act (No. 22 of 2005). An Act to consolidate the law relating to the importation of regulated articles and associated biorisks, and the control of pests and diseases of animals, plants and the wider environment.	http://faolex.fao.org/docs/pdf/sam78879.pdf http://www.parliament.gov.ws www.paclii.org
Japan	Invasive Alien Species Act (No. 78 of 2004) is an act that prohibits the raising, planting, storing or carrying, importing, etc. of invasive alien species (IAS) in order to prevent adverse effects on ecosystems, human safety, agriculture, forestry and fisheries. The Act consists of 6 Chapters divided into 36 articles.	http://faolex.fao.org/docs/pdf/jap65793.pdf http://www.env.go.jp/
South Africa	National Environmental Management Biodiversity Act, 2004 (No. 10 of 2004) is an Act to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998. Chapter 6 provides for restriction of activities involving alien species or invasive species and control and destruction of invasive species.	http://faolex.fao.org/docs/pdf/saf45083.pdf http://www.polity.org.za/

Country	Summary	URL
Malta	Trees and Woodlands (Protection) Regulations, 2001 (L.N. No. 12 of 2001) says that the species of trees listed in Schedules I, II, and III and trees indicated in areas listed in Schedule IV are protected. The Director may stop the importation of trees that in his opinion can endanger the biological identity (defined in regulation 4) of Malta and the Minister may draw up a list of “alien invasive species” that may not be propagated, sown, planted, imported or sold in Malta (reg. 10).	http://faolex.fao.org/docs/pdf/mlt25480.pdf

Table 3: Examples of countries with national IAS strategies

Country	Strategy summary	URL
Canada	In September 2004, the federal government and its provincial and territorial counterparts introduced An Invasive Alien Species Strategy for Canada to reduce the risk of invasive alien species and conserve our ecosystems. This strategy helps prevent new invasions; detect and respond rapidly to new invasive alien species; and manage established invasive alien species through eradication, containment, and control. The strategy also includes measures to help prevent introductions of invasive alien species from other countries, or from species which have moved from one ecosystem to another within Canada.	http://www.ec.gc.ca/eee-ias/98DB3ACF-94FE-4573-AE0F-95133A03C5E9/Final_IAS_Strategic_Plan_smaller_e.pdf http://www.ec.gc.ca/eee-ias/default.asp?lang=En&n=98DB3ACF-1
Norway	The Norwegian Strategy on Invasive Alien Species is a cross-sectoral approach to halt biodiversity loss. It is based on the precautionary principle with a main focus on efforts to prevent IAS from being introduced to Norway. Additionally, it addresses efforts to control, contain and eradicate IAS that are a threat to Norwegian biodiversity or to commercial activities based on natural resources and the environment.	http://www.regjeringen.no/Upload/MD/Vedlegg/Planer/T-1460_eng.pdf
Bahamas	The National Invasive Species Strategy facilitates the assessment of the current mechanisms existing in The Bahamas to address the invasive species issue while enabling increased public awareness and involvement in the process. There have been numerous stakeholder and public exercises during the project over the past few months. The project has resulted in the development of awareness materials that will hopefully be of benefit, not only to The Bahamas, but also to other Small Island Developing States (SIDS). This project builds on initial work completed under the Inter-American Biodiversity Information Network (IABIN) Invasives Information Network Project in which databases on invasives species, expertise and programmes were developed and made accessible on the Worldwide Web.	http://www.best.bs/publications.html http://www.best.bs/Documents/bahamas_nationalstrategy.doc
United States	In 1999, Executive Order (EO) 13112 established the National Invasive Species Council (NISC), co-chaired by the Secretaries of the Interior, Agriculture, and Commerce. NISC members include the Secretaries of Transportation, State, Defense, Homeland Security, Treasury, and Health and Human Services; the Administrators of the Environmental Protection Agency and the National Aeronautics and Space Administration; as well as the Director of the U.S. Agency for International Development and the U.S. Trade Representative. NISC was charged with providing coordination, planning and overall leadership for	http://www.invasivespeciesinfo.gov/council/nmp.shtml http://www.invasivespeciesinfo.gov/council/mp2008.pdf

Country	Strategy summary	URL
	federal invasive species programs and reaching out to state, tribal, local and private partners. The 2008 Plan is focused upon five “Strategic Goals”: Prevention; Early Detection and Rapid Response; Control and Management; Restoration; and Organizational Collaboration. To accomplish these strategic goals, critical support for efforts such as research, data and information management, education and outreach, and international cooperation elements are included in pertinent sections of the 2008 Plan.	http://www.invasivespeciesinfo.gov/council/mp2008.pdf

Table 4: Examples of countries with regulatory framework for addressing ballast water issues

Country	Level of Regulation	Regulatory Category	Legislative responsibility	Administrative Responsibility	Legislative objectives
Australia	National for international shipping and complementary subnational (State and Territory) level legislation for coastal shipping	Pest control – quarantine	Department of Agriculture, Fisheries and Forestry- Australia	National level. Australian Quarantine Inspection Service (within the department) as an aspect of the Australian Ballast Water Management Strategy	Avoid adverse economic, environmental and public health impacts of unwanted marine organisms by reducing the risk of introduction from international ships’ ballast water without unduly impeding trade or compromising ship safety
Canada	National. Although there is power to make regulations non have been adopted yet. The Canadian Guidelines 2000 are not a regulation.	Not yet a regulation, however some sanctions exist for non compliance. Currently treated as a ship source marine pollution and ship safety issue	Transport Canada with Coast Guard cooperation (Department of Fisheries and Oceans)	Not fully settled – currently Transport Canada and the Department of Fisheries and Oceans (Coast Guard)	Protection of waters under Canadian jurisdiction from non-indigenous aquatic organisms and pathogens that can be harmful to existing ecosystems, minimize the probability of future introductions of harmful aquatic organisms and pathogens from ships’ ballast water while protecting the safety of ships
USA	National and State level	Under U.S.C – Conservation- Nuisance control and prevention. Later as unintentional introduction of IAS. Mixture of pest control and fisheries, biodiversity protection	Fisheries and Transport (also a Task Force- integrated management approach)	At national level, USCG. At state level varies for example: in Washington – Fish and Wildlife, in California – State Lands Commission	Prevent unintentional introduction and spread of IAS; co-ordinate federal research; develop and encourage environmentally sound methods to prevent, monitor and control introductions, minimize economic and ecological impacts, establish research and technology and assist state governments, international cooperation NAFTA partners and IMO

For a detailed, updated synopsis of the legal arrangements for countries involved in the GloBallast Partnerships programme, please refer to the GloBallast *Guidelines for legal reform in the context of the Ballast Water Management Convention* which will be available from the GloBallast website.

3.2 INTERNATIONAL/MULTILATERAL AGREEMENTS, PROTOCOLS AND CODES RELATED TO IAS

There are many international legal and policy instruments with relevance to IAS, reflecting the multi-faceted impacts and implications of their spread. While some are very specific to the issue, such as the International Convention for the Control and Management of Ships' Ballast Water and Sediments, others are more general.

For example, the Convention on Biological Diversity, which sets the overall framework for conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits from the use of genetic resources, calls in Article 8h on parties to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species. Several Plans of Work under the CBD specifically mention invasive species. Others yet again, notably conventions on protection of specific species or habitats, recognize the threat posed by IAS to those species and habitats. In 1995, the Contracting Parties to the CBD adopted the *Jakarta Mandate on Marine and Coastal Biological Diversity*, which included IAS as a thematic issue with a goal "to prevent the introduction of invasive alien species into the marine and coastal environment, and to eradicate to the extent possible those alien species that have already been introduced."

The United Nations Convention on the Law of the Seas (UNCLOS) it defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources. UNCLOS decrees that "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". Further, as there are many potential health aspects of species introductions, especially from human pathogens and those that cause poisonings, international health regulations and regulations on trade and transport also apply.

International agreements relevant to IAS are summarized in the table below. Information on signatories and ratification status are usually available on the relevant websites.

Table 5: Summary of international agreements relevant to IAS

Agreements, legal obligations, codes	Date of inception (spec. resolution)
International Plant Protection Convention	1951
Convention on the Facilitation of International Maritime Traffic (FAL) as amended	1965
International Health Regulations (IHR) and plant and animal health agreements	1969
The Ramsar Convention on Wetlands	1971 (1999)
International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)	1973/78
Convention on International Trade in Endangered Species	1973
International Convention for Safety of Life at Sea (SOLAS) as amended including the ISM Code	1974
International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention) and the Seafarer's Training, Certification and Watchkeeping Code (STCW Code)	1978/95/97
Convention on the Conservation of Migratory Species	1979
United Nations Convention on the Law of the Sea	1982
Protocol on Environmental Protection to the Antarctic Treaty	1991
Convention on Biological Diversity	1992
The Rio Declaration and Agenda 21	1992
General Agreement on Trade and Tariffs and related Agreements	1994
The ICES Code of Practice on the Introduction and Transfer of Marine Organisms	1994
World Trade Organisation Agreements	1994
Convention on International Civil Aviation	1994 (2001)

Agreements, legal obligations, codes	Date of inception (spec. resolution)
FAO Code of Conduct for Responsible Fisheries and subsequent Technical Guidelines	1995
Guidelines for the control and management of ships' ballast water	1997
Cartagena Protocol on Biosafety	2000
International Convention on the Control of Harmful Anti-fouling Systems on Ships (Anti-Fouling Convention)	2001
International Convention for the Control and Management of Ships' Ballast Water and Sediments	2004

3.3 REGIONAL IAS AGREEMENTS AND STRATEGIES

Recognizing that addressing IAS requires coordinated responses between nations and especially between nations closely connected geographically and/or through trade and travel, regional IAS strategies and plans have also been developed. Under the GloBallast Partnerships Programme, Regional Strategies and Action Plans for BWM are being developed in all affiliated regions, through the establishment of Regional Task Forces. To ensure a regional harmonization, it will be important to take this Regional Strategy into account when developing the National BWM Strategy.

Other relevant examples include the European Strategy on Invasive Alien Species (see <http://www.jncc.gov.uk/page-4013>), developed under the Convention on the Conservation of European Wildlife and Natural Habitats. The Strategy promotes the development and implementation of coordinated measures and cooperative efforts throughout Europe to prevent or minimise adverse impacts of invasive alien species (IAS) on Europe's biodiversity, as well as their consequences for the economy and human health and well-being.

In 2003 the Asia Pacific Economic Cooperation (APEC) forum also discussed the development of a regional strategy to combat invasive alien species. A regional strategy/action plan on marine invasive species is envisaged for South East Asia through member states of the Coordinating Body on the Seas of East Asia United Nations Environment (COBSEA) Programme. A Cooperative Initiative on Invasive Alien Species (IAS) on Islands has also been proposed through IUCN's Invasive Species Specialist Group, to facilitate cooperation in key areas of invasive alien species management on islands.

Table 6: Examples of regional strategies for BWM

Region	Coordinating Body	Countries	Status
Black Sea	Black Sea Environment Programme	Bulgaria, Georgia, Romania, Russia, Turkey, Ukraine	Held two regional conferences to develop and adopt a Regional Strategic Action Plan. Established a Regional Task Force (RTF) and its Terms of Reference.
Caspian Sea	Caspian Environment Programme (CEP)	Azerbaijan, Iran, Kazakhstan, Russia, Turkmenistan	A regional strategy and roadmap was drafted during a series of regional meetings in 2006 and 2007. A feasibility study was completed to identify BWM management options for the region.
East Asian Seas	Coordinating Body for the Seas of East Asia (COBSEA)	Indonesia, Malaysia, Philippines, Singapore, Thailand, Australia, Cambodia, People's Republic of China, Republic of Korea, Vietnam	Held two regional conferences to develop and adopt a Regional Strategic Action Plan. Established a Regional Task Force (RTF) and its Terms of Reference.

Region	Coordinating Body	Countries	Status
Guinea Current Large Marine Ecosystem	Interim Guinea Current Commission (IGCC)	Angola, Benin, Cameroon, Cote d'Ivoire, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sao Tome and Principe, Sierra Leone, Togo	Held two regional conferences to develop and adopt a Regional Strategic Action Plan, finalized in July 2009. Established RTF and its Terms of Reference.
Mediterranean	Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC)	Albania, Algeria, Bosnia & Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Malta, Monaco, Morocco, Serbia, Montenegro, Slovenia, Spain, Syrian Arab Republic, Tunisia, Turkey	A Regional Strategy and Action Plan drafted in the first meeting of the Regional Task Force in September 2008. Focus Working groups established with the aim of finalizing the Strategy by 2010. Strategy to be expected to be adopted by the Conference of Parties to the Barcelona Convention.
Red Sea and Gulf of Aden	The Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA)	Egypt, Jordan, Kingdom of Saudi Arabia, Sudan, Yemen	First meeting to draft a Regional Strategic Action Plan held in June 2009. Established RTF and its Terms of Reference.
ROPME Region	Regional Organization for the Protection of the Marine Environment (ROPME)	Kingdom of Bahrain, Islamic Republic of Iran, State of Kuwait, Sultanate of Oman, State of Qatar, Kingdom of Saudi Arabia, United Arab Emirates	A ROPME Regional Strategy for Ballast Water Management adopted at the 2nd Regional Conference on Ballast Water Management in the ROPME Sea Area. A regional action plan was approved. The regional strategy and action plan was endorsed by the ROPME Council in 2008. A ballast water exchange regime was established and is implemented from November 2009.
South East Pacific	Permanent Commission for the South Pacific (CPPS)	Argentina, Chile, Colombia, Ecuador, Panama, Peru	Held two regional conferences (2008 and 2009) to develop and adopt a Regional Strategic Action Plan. Established RTF and its Terms of Reference.
South Pacific	South Pacific Regional Environment Programme (SPREP)	American Samoa, Niue, Australia, Northern Mariana Islands, Cook Islands, Palau, Federated States of Micronesia, Papua New Guinea, Fiji, Samoa, France, Solomon Islands, French Polynesia, Tokelau, Guam, Tonga, Kiribati, Tuvalu, Marshall Islands, United States of America, Nauru, Vanuatu, New Caledonia, Wallis and Futuna, New Zealand	A Regional Strategy on Shipping Related Invasive Marine Pests in the Pacific (SRIMP-PAC) was approved at the 2006 SPREP Meeting in Noumea. The SRIMP-PAC is part of the regions' responsibility under the Ballast Water Management Convention.
Wider Caribbean Region	RAC/REMPEITC-Caribe	Antigua & Barbuda, Bahamas, Belize, Barbados, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, France, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Netherlands, Nicaragua, Panama, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Suriname, Trinidad and Tobago, USA, Venezuela	First meeting to draft a Regional Strategic Action Plan held in December 2009. Established RTF and its Terms of Reference.

Table 7: Examples of regional IAS agreements

Region	Summary	Link
Framework Convention for the Protection of the Marine Environment of the Caspian Sea	Objectives: To protect the Caspian environment from all sources of pollution including the protection, preservation, restoration and sustainable and rational use of the biological resources of the Caspian Sea. Contains many provisions, one of which is the provision concerning the prevention of introduction, control and combating of invasive alien species (art. 12)	http://www.ecolex.org/server2.php/libcat/docs/multilateral/en/TRE001396.doc http://www.caspianenvironment.org/
European Strategy on Invasive Alien Species	The strategy aims to facilitate implementation of international commitments and best practice and to support development of realistic policies, measures and targets. Many European States face similar constraints in their Invasive Alien Species efforts. Depending on the country, these may include: low public awareness and opposition to government intervention; shortage and inaccessibility of scientific information (for species identification, risk analysis, detection and mitigation techniques etc.); absence of clear and agreed priorities for action; ease of introduction and movement (e.g. through the post), inadequate inspection and quarantine; inadequate monitoring capacity; lack of effective emergency response measures; outdated or inadequate legislation; poor coordination between government agencies, States and other stakeholders. The strategy addresses these constraints. It aims to facilitate implementation of international commitments and best practice and to support development of realistic policies, measures and targets. Priority actions are proposed that are key in terms of time and feasibility of implementation. The Strategy recognizes that Parties' existing legal obligations may constrain or influence the measures which can be taken, particularly with regard to regulation of trade-related activities.	http://www.jncc.gov.uk/page-4013 http://www.jncc.gov.uk/pdf/BRAG_NNS_Genovesi&Shine-EuropeanStrategyonInvasiveAlienSpecies.pdf
Invasive Species in the Pacific: A Regional Strategy and Shipping-related Introduce Marine Pests In the Pacific Islands: A regional strategy	It aims to assist PICTs to protect their marine environments from shipping related marine bio-invasions. The two key vectors that are being targeted are ships' ballast water and vessel fouling, with particular emphasis on cruising yachts, which visit the region in significant numbers. The transboundary nature of shipping and the interconnectedness of the seas and oceans dictate that no one port or country can effectively control the spread of IMPs via shipping. In order to be effective, countries must work cooperatively with both their neighbours and the broader global community to implement harmonized measures. The SRIMP-PAC Strategy provides a regional framework for cooperation between Pacific Island countries and territories and also with Pacific-Rim countries, including through APEC.	http://www.sprep.org/solid_waste/marine.htm http://www.sprep.org/att/IRC/eCOPIES/Pacific_Region/105.pdf

3.4 THE IMO BALLAST WATER MANAGEMENT CONVENTION

The International Convention for the Control and Management of Ships' Ballast Water & Sediments was adopted by consensus in London on Friday 13 February 2004. The Convention will enter into force 12 months after ratification by 30 States, representing 35 per cent of world merchant shipping tonnage. (As of January 2010 there were 21 countries that have ratified the convention: (Argentina, Australia, Barbados, Brazil, Egypt, Finland, Kenya, Kiribati, Maldives, Marshall Islands, Netherlands, Nigeria, Norway, Republic of Korea, Saint Kitts and Nevis, Spain, Sweden, Syrian Arab Republic, Tuvalu)

The convention includes the following main provisions (from GloBallast website):

General Obligations:

Under Article 2 General Obligations, 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.

Parties are given the right to take, individually or jointly with other Parties, more stringent measures with respect to the prevention, reduction or elimination of the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments, consistent with international law. Parties should ensure that ballast water management practices do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.

Reception facilities

Under Article 5 Sediment Reception Facilities, Parties undertake to ensure that ports and terminals where cleaning or repair of ballast tanks occurs, have adequate reception facilities for the reception of sediments.

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.

Survey, certification and inspection

Ships are required to be surveyed and certified (Article 7 Survey and certification) and may be inspected by port State control officers (Article 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 (Article 12 Undue Delay to Ships).

Technical assistance

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 ships' 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 this Convention and of guidance developed by the Organization related thereto.

Annex – Section A General Provisions

This includes definitions, application and exemptions. Under Regulation A-2 General Applicability: "Except where expressly provided otherwise, the discharge of Ballast Water shall only be conducted through Ballast Water Management, in accordance with the provisions of this Annex."

Annex – Section B Management and Control Requirements for Ships

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 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.

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. The specific requirements for ballast water management are contained in regulation B-3 Ballast Water Management for Ships are synthesized in Table 8 below:

Table 8: Specific requirements for ballast water management under regulation B-3

Construction Date	BW Capacity (m3)	Standard
Before 2009	<1500 or > 5000	Must at least meet Exchange Standard From 2016, must meet Performance Standard
Before 2009	1500 -5000	Must at least meet Exchange Standard From 2014, must meet Performance Standard
In/after 2009*	<5000	Must meet Performance Standard
In/after 2009 but before 2012	≥5000	Must at least meet Exchange Standard From 2016, must meet Performance Standard
In/after 2012	≥5000	Must meet Performance Standard

* Note that as outlined in IMO Assembly Resolution A.1005(25), the ships constructed in or after 2009 will not have to comply with Regulation D-2 of the Convention until its second annual survey, but no later than 31 December 2011. This provision was introduced to ensure that a sufficient supply of treatment technologies would be available before enforcing the Convention in full.

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).

Under Regulation B-4 Ballast Water Exchange, all ships using ballast water exchange should, whenever possible, conduct ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth, taking into account Guidelines developed by IMO. In cases where the 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 at least 200 metres in depth.

When these requirements cannot be met areas may be designated where ships can conduct ballast water exchange. All ships shall remove and dispose of sediments from spaces designated to carry ballast water in accordance with the provisions of the ships' ballast water management plan (Regulation B-4).

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.

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 measure(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.

Annex – Section D Standards for Ballast Water Management

There is a ballast water exchange standard and a ballast water performance standard. Ballast water exchange could be used to meet the performance standard:

Regulation D-1 Ballast Water Exchange Standard – 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 described. Pumping through less than three times the

volume may be accepted provided the ship can demonstrate that at least 95 percent volumetric exchange is met.

Regulation D-2 Ballast Water Performance Standard – Ships conducting ballast water management shall discharge less than 10 viable organisms per cubic metre greater than or equal to 50 micrometers in minimum dimension and less than 10 viable organisms per milliliter less than 50 micrometres 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:

- 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;
- *escherichia coli*, less than 250 cfu per 100 milliliters;
- intestinal *Enterococci*, less than 100 cfu per 100 milliliters.

Ballast Water Management systems must be approved in accordance with IMO Guidelines. For further information, see IMO and GloBallast websites. These include systems which make use of chemicals or biocides; make use of organisms or biological mechanisms; or which alter the chemical or physical characteristics of the Ballast Water.

Prototype technologies

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.

Review of standards

Under Regulation D-5 Review of Standards by the Organization, 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.

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

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

3.11 IMO BALLAST WATER MANAGEMENT GUIDELINES

In relation to the BWM Convention, a set of 14 guidelines have been developed through the IMO Marine Environment Protection Committee (MEPC), with another two guidelines awaiting finalization. The objective of the guidelines is to assist governments and other authorities, ship masters, operators and owners, and port authorities in minimizing the risk of introducing harmful aquatic organisms and pathogens from ship's ballast water and associated sediments while protecting ships' safety. The guidelines, listed in Table 9 below, are available on the GloBallast website.

Table 9: Technical guidelines for the implementation of the ballast water convention

Guidelines for sediments reception facilities (G1)
Guidelines for Ballast Water Sampling (G2)
Guidelines for BWM equivalent compliance (G3)
Guidelines for BWM and Development of BWM Plans (G4)
Guidelines for Ballast Water reception facilities (G5)
Guidelines for Ballast Water Exchange (G6)
Guidelines for Risk Assessment under Regulation A-4 (G 7)
Guidelines for approval of BWM Systems (G8)
Guidelines for approval of BWM systems that make use of active substances (G9)
Guidelines for approval and oversight of prototype ballast water treatment technology programmes (G10)
Guidelines for Ballast Water Exchange Design and Construction Standards (G11)
Guidelines for sediment control on ships (G12)
Guidelines for additional measures including emergency situations (G13)
Guidelines on designation of areas for ballast water exchange (G14)
Survey Guidelines for the purpose of BWM Convention
Guidelines on Port State Control under the 2004 BWM Convention

4

Why a national strategy?

In order for a country to manage the risk of species introductions through ballast water effectively, a supportive policy environment underpinned by scientific and technical baseline information is necessary. The National Ballast Water Management Strategy (NBWMS) is an integral part of the national regulatory framework, along with relevant policies, legislation and institutional arrangements as well as more specific programmes of work and action plans. It should translate national policies into effective and efficient ballast water management practices that are consistent with national as well as international obligations and legal requirements. As such it is a prerequisite for effective implementation, and can serve as an important tool for legislative and institutional development and/or reform. As mentioned previously, guidelines for legal reform related to ballast water management will be available through the GloBallast Partnerships Programme. Much useful information can also be found in the GISP Toolkit for developing legal and institutional frameworks for invasive alien species (Shine 2008).

While international policies and laws exist (as synthesized above), these are by their nature often generic, in the sense that they are designed to apply as broadly as possible. They thus need to be further operationalized through national means, including by giving due consideration to a number of local, national and regional issues, whether environmental, legal, institutional or otherwise.

Box 3: Reasons for development of a national ballast water management strategy – Summary

- ballast water is the main vector for the spread of marine IAS;
- international agreements related to ballast water management and IAS are to some extent generic and often not operationalized on a national level;
- ballast water management and IAS are not commonly covered in national legislation that is comprehensive, inclusive and specific enough; and
- institutional mandates and responsibilities as they relate to ballast water management and IAS are often not clear.

4.1 NATIONAL BALLAST WATER LEGISLATION AND POLICIES

Many countries as well as local port authorities already have specific requirements regarding ballast water management for protection and maintenance of native ecosystems, and as part of their commitments to global conventions. This includes e.g. Australia (see Box 4), USA and New Zealand. The International Association of Independent Tanker Owners (INTERANKO) has worked with the International Chamber of Shipping to gather information on countries with known ballast water reporting and management requirements. They have kept a database since 1990 that records 17 places as having “quarantine requirements for ballast water management”. These are Argentina, Australia, Brazil, Canada, Chile, Israel, New Zealand, Orkney Islands (UK), USA, California, Port of Oakland (USA), the Great Lakes (USA) and the Port of Vancouver (Canada).

Existing national ballast water management strategies differ from each other in several ways, in terms of structure as well as in terms of technical content and overall approach. This reflects the different legal and institutional environments as well as national bio-geographical characteristics and interests. Most national ballast water management strategies do, however, share many aspects of both content and procedure of development.

However, in spite of a recent increase in national legislative framework related to IAS, most countries still lack specific laws, policies or strategies for ballast water regulation and management. These guidelines seek to address this gap. In the following sections a detailed step-by-step approach to developing a national ballast water management strategy is laid out, with practical hints and concrete examples/templates. Box 5 provides an overview of important principles that should influence and underpin efforts to address marine IAS.

Box 4: Ballast water management in Australia

Australia is reliant on the shipping industry for trade both internationally and domestically, with approximately 95% of Australia's commodities being transported by sea. Each year around 150 million tonnes of ship's ballast water is discharged into Australian ports by 10,000 ship visits from some 600 overseas ports. (Australian National System for the Prevention and Management of Marine Pest Incursions, 2001)

The ecosystem of Australia is unique with many rare species and important coral reefs. The concern about IAS in ballast water is due to the impact on the country's aquaculture industry and the human health risks. Australia first implemented guidelines on Ballast Water Management in 1990. In 1994, Australia adopted a coordinated national approach ballast water management.

The guidelines are unique because they include support for research into management techniques and a computer based decision support system (DSS) for targeting high risk vessels. Vessels intending to discharge ballast water in Australian water are able to manage their ballast water en-route with the DSS. The system performs a tank-by-tank assessment based on the information supplied by the ship's master, and allows international vessels to determine before they arrive in Australia if their ballast water poses a risk of introducing IAS. Ships identified as carrying low-risk ballast water may be exempted from carrying out any particular management measures, for that specific voyage.

Tanks identified as carrying high-risk ballast water will require treatment and/or management by a method acceptable to the Australian Quarantine and Inspection Service. The acceptable methods are:

- exchange of ballast water at sea through sequential exchange, flow-through or dilution;
- non-discharge of high risk ballast tanks;
- tank-to-tank transfer; or
- comparable treatment options as developed.

Box 5: Key principles in addressing marine IAS through national strategies

In view of the difficulties associated with eradication or long-term control, neither of which may be effective and both of which are expensive, prevention is recognised as the most appropriate and cheapest policy intervention in stemming the rise of marine bioinvasions and their consequences. Further principles or approaches recognised at international level that should inform and influence national strategies and work programmes related to addressing marine IAS include the following:

The precautionary principle: Enshrined in the 1992 Rio Declaration of the Conference on the Environment and Development, principle 15 states that: "in order to protect the environment, the precautionary approach shall be widely applied by States according to their capability. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for

postponing cost-effective measures to prevent environmental degradation. The precautionary approach indicates that lack of scientific certainty is no reason to postpone action to avoid potentially serious or irreversible harm to the environment. Central to principle 15 is the element of anticipation, reflecting a requirement that effective environmental measures need to be based upon actions which take a long-term approach and which might anticipate changes on the basis of scientific knowledge.” Since then, this principle has applied in various environmental legislations including the United Nations Framework on Climate Change (UNFCCC), the Convention on Biodiversity (CBD) and by the European Commission.

Rio Declaration:

<http://www.un.org/esa/documents/ecosoc/cn17/1997/ecn171997-8.htm>

European Environment Bureau definition and explanation of precautionary principle:

http://www.eeb.org/publication/1999/eeb_position_on_the_precautionar.html

Communication from the European Commission on the precautionary principle:

http://ec.europa.eu/environment/docum/20001_en.htm

The ecosystem approach: The phrase ‘Ecosystem Approach’ was first coined in the early 1980s, and found formal acceptance at the Earth Summit in Rio in 1992, becoming one of the fundamental concepts of the Convention on Biological Diversity. It is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable, equitable use. An ecosystem approach is based on the application of appropriate scientific methodologies, which encompasses the essential structures, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems.

Background information on the ecosystem approach:

<http://www.cbd.int/ecosystem/background.shtml?tit=syn>

Malawi Principles of Ecosystem Approach (CBD COP 4):

<http://www.cbd.int/doc/meetings/cop/cop-04/information/cop-04-inf-09-en.pdf>

The polluter/user-pays principle was initially developed for national application by the Organisation for Economic Cooperation and Development (OECD) in an effort to ensure that companies paid the costs of controlling pollution without being subsidized by the State. It was inscribed in Principle 16 of the Rio Declaration, which states that “National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.” It thus recognizes that it is important for the environmental costs of economic activities, including the cost of preventing potential harm, to be internalized rather than imposed upon society at large.

Rio Declaration:

<http://www.un.org/esa/documents/ecosoc/cn17/1997/ecn171997-8.htm>

Cross-sectoral integration: Agenda 21 identifies integration and participation as key building blocks for sustainable development. Cross-sectoral cooperation and integration are essential to comprehensively address environmental, economic and social concerns. Broad participation in complex issues uses the competences from all sectors to solve integrated problems.

Agenda 21:

http://www.un.org/esa/dsd/agenda21/res_agenda21_00.shtml

Regional and international cooperation: Information sharing across sectors nationally is just as important as sharing resources and information across regionally and internationally. Environmental problems do not stop at borders and thus must be worked on and solved in cooperation.

5

How to develop a National Ballast Water Management Strategy

Development of national responses to IAS requires a significant degree of inter-agency coordination, including across sectors. Several already existing laws and policies are likely to have relevance, often spread out over a range of ministries (e.g. environment and transport), line agencies (e.g. environment protection agencies,) and implementing institutions (e.g. port authorities) as well as civil society (e.g. shipping companies, associations and interest groups).

Further, a country's constitution and governance structures also matters. In a federal system, legal as well as implementation responsibility may rest in part with the central government and in part with the state government. A more centralized system will still require coordination and integration, both vertically and horizontally.

The establishment of sound coordinating mechanisms is thus critical to national IAS planning and ballast water management strategy development, and needs to be addressed early in the process. This is commonly carried out through the identification of a Lead Agency and the appointment of a Task Force.

The following sections outline key steps in the process of developing a National Ballast Water Management Strategy. Key recommendations are provided in separate boxes at the end of each section.

The national ballast water management strategy details: the responsibilities and roles in addressing IAS of relevant stakeholders, such as port authorities, shipping companies, etc. Furthermore, it prioritizes and sets standards for implementation; and is also instrumental in securing resources, institutional, human and financial, for its implementation.

The process to complete this could be lengthy and complicated. The following steps are written sequentially, but in practice they frequently take place in parallel, or in a more haphazard way.

Normally the first step in the development of a national ballast water management strategy is a political decision, recognition that ballast water is a vector for the spread of IAS poses a significant threat, and that this requires government guidance and intervention. Such a decision may or may not be formulated as a coherent policy. Perhaps more often than not a national policy position becomes clearly formulated through the process of development of a national ballast water management strategy. The purpose of the policy is to provide guidance to planners, decision-makers and law-makers. It should contain the goals and objectives of ballast water management – based on the policy choices – and, in broad terms, how they should be met. The National Policy document may include a strategy and action plan, or these may be prepared as separate documents.

Following a political decision that there is a need to regulate ballast water, there are three steps in the establishing of the National Strategic framework:

- development and endorsement of a National Policy on ballast water management and IAS;
- formulation of a National Strategy on Ballast Water Management (NBWMS);
- finalise how the National Strategy will be put into practice and managed by developing a National Ballast Water Management Action Plan (NBWMAP).

These three steps have different levels of impact. Whereas the National Policy provides broad aims, for example “prevent the unintentional introduction of alien invasive species and prevent intentional introductions from having negative impacts through legislative review, a programme of measures, information sharing and cross-sectoral cooperation”, the National Strategy identifies action requirements such as

“development of a monitoring programme”. The Action Plan then specifies the detailed practical activities to be implemented at specific sites with a specified timeframe, for example “carry out baseline surveys in all major ports within 5 years.”

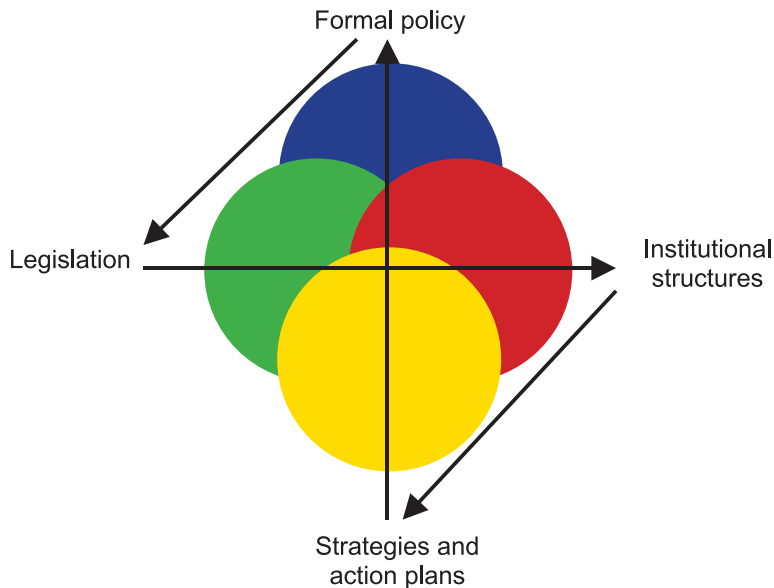


Figure 2 Development of policies, strategies and action plans flow chart

Once a policy position has been operationalized as a strategy, the next steps are to:

- Draft and enact legislation that provides the basis for implementation of policy and strategy, as well as make necessary institutional arrangements with provisions for implementation.
- Implement the strategy and action plan.
- Oversee, monitor and evaluate the implementation.

However, it should be noted that since a national ballast water management strategy is often developed in a legal, institutional and policy framework that at least to some extent identifies mandates and roles, the development process does not follow step-by-step the development of a national strategic framework as illustrated below. It is, however, indicative of the process, even though several of the steps are taking place at least in part concurrently.

5.1 INFORMATION NEEDS

Before or after the political decision is made to implement a National Strategy on Ballast Water Management, vast quantities of information need to be gathered to adequately inform the development process. The starting point for such a reform process is an assessment of the current status of ballast water issues in the country concerned – from the point of view of both environmental impacts and management measures. While ultimately it would be useful to have an in-depth understanding of all ballast-water related issues, a detailed assessment could take years, thereby delaying the initiation of the relevant reforms. Instead it is suggested to use rapid status assessments, as outlined in the guidelines developed by GloBallast and International Ocean Institute (IOI) (synthesized in Box 6 below).

Rapid status assessments for the development of a NBWMS can be based on existing data, including information on shipping, marine and coastal environments, case studies of IAS, existing policies and laws (domestic, regional and international), stakeholder analyses, and national sources of information. It generally provides sufficient information for the reform process, and can be used to identify specific gaps in the information base that need to be addressed in the initial stages of reform. Useful background information can also be collected using the forthcoming Guideline on Economic Assessments developed by GloBallast and IUCN.

Because the information required for the development of a NBWMS is spread out over many institutions, and because many agencies are engaged in generating relevant data and information, the national task

force has a key role in ensuring all information needs are met. In order to ensure that all relevant information is gathered it may be necessary to commission studies, including e.g. port baseline surveys such as those piloted by the GloBallast Programme.

Box 6: Key Information required for a Rapid Status Assessment

- shipping:
 - the role of shipping in the national economy;
 - ports and harbours;
 - ballast water uptake and discharge;
 - ecological characteristics of source and destination ports.
- the marine and coastal environment:
 - marine and coastal ecology;
 - resources of economic importance.
- case studies of marine bioinvasions:
 - economic impact;
 - health impacts;
 - biodiversity impacts.
- legal, policy and institutional aspects:
 - international and regional obligations;
 - national policies and legislation;
 - national institutions;
 - port state control.
- stakeholders;
- national sources of information.

For further guidance see Guidelines for National Ballast Water Status Assessment developed by GloBallast and IOI, available from the GloBallast website.

5.2 INSTITUTIONAL NEEDS

Developing a National Ballast Water Management Strategy is a complex endeavour; a wide range of stakeholders must be involved to ensure a successful outcome. Each country and region has to determine what is necessary depending on the national and state policies, structure of the government agencies and regional context. As shown in the examples from the GloBallast Legislative Review, in part four above, there is not one solution for how to structure and implement a National Strategy. It is therefore suggested to establish a **Lead Agency** and a **Task Force**.

This approach, which has been adopted by several countries already, has been most successful because it is an inclusive and cooperative process, bringing together the many key stakeholders, and utilizing their combined expertise to devise a National Policy Strategy that best suit their country. First and foremost, it is an inclusive process that instills ownership and thus ultimately strengthens implementation and compliance. It is also a tool for utilizing the skill sets spread out over a large number of institutions and sectors, including civil society.

The implementation of an effective and efficient National Strategy is dependent on agreement on the roles and responsibilities of all agencies and levels of government. Since the management of ballast water and IAS management is a relatively new issue, with many agencies working on different parts of the problem. Therefore there could be agencies that will have to take on new responsibilities to take on the task of

managing the system once it is set up. There is no single agency in any country which is the ideal agency for ballast water management. The key issue is to select the most suitable agency in the country in question, and establish a structure which will facilitate co-operation between the Lead Agency and the Task Force.

There are three options to initiate this process:

- the government assigns responsibility to a particular agency to drive the process and be the Lead Agency;
- the government establishes a task force, with the lead agency being selected from a task force member; or
- a coordinating entity establishes a task force and the Lead Agency is discussed in the process.

Box 7: Key steps in initiating the development of a NBWMS

1. Identify the Lead Agency – The Lead Agency is commonly either:

- the agency with overall responsibility for invasive alien species and/or biosecurity; or
- the agency with overall responsibility for ballast water management;
- If neither exists, the Task Force may recommend a suitable Lead Agency.

2. Establish the Task Force can be formed through different procedures e.g.

- the Lead Agency establishes the Task Force; or
- the national institution for ballast water management takes the lead in developing the task force; or
- the national institution for invasive alien species/biosecurity takes the lead in developing the task force.

3. Plan Task Force Meeting

- identify all relevant stakeholders;
- call inaugural meeting;
- at meeting: Identify Lead Agency (if not done before), Chair of the Task Force;
- determine the Task force's method of operation, timetable, work program, reporting obligations, etc.

The Lead Agency

The Lead Agency has the principal responsibility for developing and implementing the National Ballast Water Management Strategy. It is normally an institution operating on a national level while interacting regionally as well as internationally. While coordinating and overseeing implementation of the NBWMS, the Lead Agency is frequently directly engaged in carrying out some aspects of the NBWMS, in addition to delegating various aspects or components of the NBWMS to other institutions. The Agency will perform some tasks involved in implementing the strategy, but it will not carry out all of them. Rather, it delegates components to other agencies with particular competence in the field. For example the competences of the Port Authority and the Environmental Ministry are different and thus the Port Authority should be tasked with advising inbound ships of the new port state requirements or carrying out port surveys.

Where a Lead Agency for invasive species has already been designated by the government, one option would be to expand the mandate to include ballast water. The national Lead Agency on invasive alien species is commonly an institution within the Ministry of Environment or Agriculture, in some instances an agency established specifically for the purpose of dealing with prevention and management of invasive alien species, such as Biosecurity New Zealand in the Ministry of Agriculture and Forestry. Where this is the case the mandate of such an agency may be expanded specifically to also cover ballast water. However, because much of the international regulatory framework on marine invasive alien species relates to transport and shipping, the Ministry of Transport, Ports Authority or similar may be tasked with the development of a specific National Ballast Water Management Strategy that fits within the overall invasive species regulatory framework.

Whatever the case is, it is essential that a clear coordinating responsibility is assigned for the development of a national ballast water management strategy, including the convening of a Task Force. The critical issue is to select the most suitable agency for the country concerned, bearing in mind the broad range of expertise required, including the specifics associated with IAS and the shipping industries.

Responsibilities of the Lead Agency

The overall responsibility is to oversee implementation of the national strategy. To this end, the Lead Agency addresses the following:

- integration of the National Strategy into pertinent national policies/strategies and ensuring that necessary legislation is in place;
- devising and ensuring implementation of necessary scientific, operational and administrative arrangements for all ships visiting the country's ports;
- ensuring that all key stakeholders are fully conversant with the National Strategy, appropriately trained and properly authorized to act on its behalf, where required;
- monitoring and reviewing on an ongoing basis how effectively the National Strategy is being implemented and introducing changes, as necessary;
- ensuring effective enforcement of national laws and regulations;
- administration of relevant international instruments related to ballast water management;
- incorporating into the National Strategy improved measures that become possible due to experience gained in operating the National Strategy and/or through developments in research or technology, or changed international requirements or 'best practice';
- ensuring the ongoing liaison and cooperation of all key stakeholders; and
- participating in international, regional and national matters relating to BWM.

Task Force

A Task Force should be established for the purpose of advising and supporting the process of developing a national ballast water management strategy. Such a task force must encompass all stakeholders. This includes representation from all relevant sectors, as well as interest groups, and should ensure the engagement of appropriate competencies. The Task Force should be established through a transparent process at the earliest possible stage of the development of a national ballast water management strategy, in order to ensure ownership by all relevant stakeholders as well as transparency of the process.

Where a lead agency for invasive alien species or ballast water management already exists the process of establishing a task force for development of a national ballast water management strategy may be initiated by that agency. However, because in many instances there is no designated lead agency, the Task Force may be established before a lead agency is known, and as one of its first and most important undertakings, it will provide recommendations with respect to lead agency identification.

While the task force for developing the national ballast water management strategy has primarily or even solely an advisory role, it may with time become a permanent structure for overseeing and reviewing implementation of the strategy. In such cases its terms of reference as well as operational procedures and membership may be revised.

Composition of a Task Force is usually dynamic, evolving with the process of developing the national ballast water management strategy and later implementing it, at which time the Task Force is commonly reconstituted as an advisory group. The chart on Stakeholder Groups below show the representatives that could be involved in the process. Not all countries will have the same Task Force members, but it is critical to involve representatives from all sectors.

Task Force recommended membership

- chair of the Task Force – usually a representative of the Lead Agency on Ballast Water Management where this has already been established;

- A representative of the Lead Agency (where this differs from the above).
- A Task Force Secretary (from the Lead Agency).
- Representatives from the selected stakeholder groups (see chart on stakeholder Involvement).

Table 10: Suggested Stakeholder Groups to Involve in Developing NBWMS

Institution	Areas of expertise and responsibility
Maritime authority (Ministry of Transport or delegated agency)	Coordination and control of shipping including maritime safety and environmental aspects. Flag and Port state control. Implementation of shipping-related conventions and legislation.
Ministry of Environment	Overall coordination and management of invasive species problems, including monitoring and response plans. Implementation of biodiversity and environmental conventions and facilities.
Port Authority or Port Administration	Responsible for the elaboration and implementation of port ballast water management plans (consistent with national strategy) and provision of relevant infrastructure eg. Port reception facilities.
Fisheries Administration	Regulates and oversees fisheries and aquaculture, both of which may provide pathways for species introductions. NBWMS may have implications for fisheries.
Public health authority Quarantine Authority	Supervision and evaluation of sanitary control activities in ports Where present, makes and enforces regulations to prevent introduction and transmission of disease and pathogens
Local Governments/ Administration	Have jurisdiction over areas surrounding ports and may have jurisdiction over ports and port activities.
Ship owners, agencies and other port users	Responsible for the procedures and activities on board ships. Must inform ship masters about the requirements of the ports to be visited, including port, maritime, health, immigration and customs authority
Shipyards, ship builders, naval architects, etc	Adaptation of ships and the building of new ships, according to the principles internationally adopted for dealing with ballast water.
Fishing and aquaculture industry	Affected by negative environmental conditions brought about by ballast water (but also possible introduction vectors)
Mining or Oil Industry	Activities of the oil, gas and mining industry may provide vectors for species introduction. NBWMS has implications for the industry.
Universities and Research Institutes	Where there are specialists in taxonomy (used to correctly identify species), marine ecology and adequate monitoring methods.
Environmental NGOs and General Public	Play a watchdog role and may assist in monitoring for the early detection of introduced species.

Responsibilities of the Task Force

The primary responsibilities of the national ballast water management Task Force are:

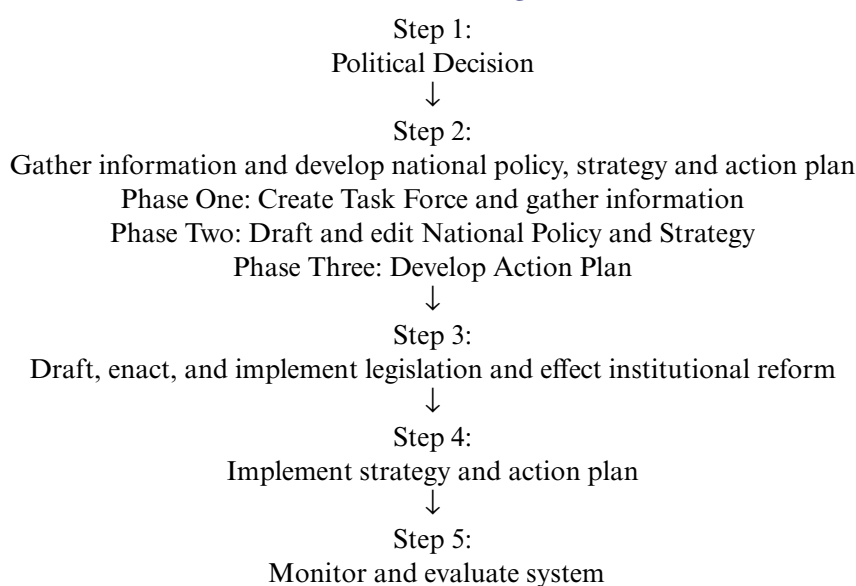
- advise/decide on who should be the Lead Agency (where not already established);
- gather all data, opinions, and information suggested in the questionnaire above;
- consider all the relevant facts concerning ships that visit the ports and all other related matters and be able to realistically balance the competing interests and propose the optimal National Policy and Strategy;
- make recommendations on suitable policies practices, legislation, operational procedures and responsibilities;
- edit and revise draft of National Strategy;
- implement arrangements of National Strategy;
- develop and implement of a review/evaluation plan;
- potentially continue to work together after the development of the National Strategy to provide guidance, oversight, and advice on matters relating to harmful aquatic organisms and pathogens, while the Lead Agency is primarily responsible for administering the operational arrangements (or if the Lead Agency is an expert in IAS, then the Task Force could stay on to provide guidance on ballast water management).

For further guidance, refer to the information synthesized in Annexes 1–3 and the GloBallast Guidelines for National Task Forces.

5.3 PRACTICAL/PROCEDURAL NOTES

As mentioned there are five steps to develop a comprehensive national strategic framework, from political decision to implementation and monitoring, outlined in the box below. These procedural notes detail the steps that need to be accomplished to finish step two, development of a national strategy. Where a political decision has been taken a country can embark on development of such a strategy. If such a decision has not been formally taken, the information found in section two of this guideline can be used to raise awareness about IAS and create an enabling environment for actions addressing IAS.

Box 8: Steps in the development of a national strategic framework for ballast water management



Once a Task Force has been formed and a Lead Agency identified, a detailed timeline will need to be developed for the development of the National Ballast Water Management Strategy, and later also for the implementation of the strategy. Box 9 below provides some information on specific actions require. These need to be modified to reflect the needs of a given country and/or region, depending on what may already be in place, and specific timelines decided for activities and outputs. Delegation of tasks and responsibilities by the Task Force to relevant agencies, expert committees or consultants, corresponding to their qualifications and capacities, will help ensure a timely and efficient process.

Box 9: Development of a national policy, strategy and action plan – key tasks

Phase 1: Development of Task Force

Communication and consultation with stakeholders re institutional mandates and involvement in development of national BW strategy and policy

Establishment of Task Force, membership designation

Identification of gaps in knowledge or expertise among Task Force members and filling such gaps through hiring services of consultants or specialists

Discussions in the Task Force regarding process and procedures for development of a NBWMS

Identification of a Lead Agency (if not identified previously)

Phase 2: Development of National Strategy*Information gathering*

Gather information on international agreements, strategies and codes of conduct in relation to IAS and ballast water management

Gather information on national legislation and policies as they relate to IAS and ballast water management, identify complementarities, and possible

Gather information on national institutional mandates and roles as they relate to IAS and ballast water management

Create checklist of obligations, priorities and principles backed by international instruments

Gather information on shipping patterns, volumes and trends, including goods transported, routes used and ports frequented

Gather information on port capacities, including capacity to handle different ship types, traffic volumes and especially ballast water

Gather information on present environmental status and biological/ecological baselines

Gather information on status and trends of IAS, e.g. as outlined in the Guidelines for National Ballast Water Status Assessment

Developing the strategy

Develop a comprehensive BW management regime and accompanying operational arrangements for the management of ships ballast water, based on IMO guidelines and including details on responsibilities of all key stakeholders

Develop a Compliance Monitoring and Enforcement (CME) system, as per IMO guidelines

Develop a review/evaluation mechanism to ensure efficient and effective operation of the National Strategy

Draft National Strategy

Estimate costs and potential sources of funds for implementation of National Strategy

Review and amendment of draft National Strategy by Task Force and consultants

Produce final draft for review and comments by stakeholders

Finalize National Strategy, amended as necessary based on expert review and stakeholder consultations

Phase 3: Development of Implementation Plan

Determine the legislative requirements for implementation of the strategy

Establish port ballast water management programmes

Ensure that ships flying the countries flag meet the requirements of the Convention

Institute Port State control, including inspections of visiting ships

Undertake comprehensive education, awareness and training programmes

Integrate ballast water management within national and sub-national activities including broader invasive species management and integrated coastal zone management

Foster intentional links and cooperation

Develop communication strategy to raise awareness on IAS, the strategy and possible legislative change, within the maritime community and the general public

Trial and review proposed operational arrangements before broad-scale implementation

Conduct training of inspectors, managers and relevant stakeholders as necessary

Establish relevant R&D programmes to assist in development of effective technologies and practices (check the R&D Register on the GloBallast website for updates on progress)

Keep arrangements under review and modify them to accommodate new findings as appropriate

Develop reporting requirements and an inspection regime for visiting ships

Ratify and implement the IMO ballast water convention

5.4 KEY COMPONENTS

National ballast water management strategies are never identical, reflecting the different institutional and legal frameworks in which they have been developed. However, there are a number of essential issues that should be considered, including the following:

- the extent of the threat posed by the introduction of harmful aquatic organisms and pathogens in ships ballast water to the country concerned;
- international and regional obligations;
- preferred options for effectively managing the problem in a cost effective manner, including a compliance monitoring and enforcement system;
- the most appropriate government body to be designated as the Lead Agency;
- agencies and organizations that may be responsible for specific components of the National Strategy and the actions required of each of them;
- any legislative requirements to support the proposed regime;
- an estimate of the costs of implementation and options for funding arrangements; and
- a suggested implementation plan, including ongoing monitoring arrangements and an evaluation plan to assess the effectiveness of the Strategy.

A template outline for a National Ballast Water Management Strategy is provided in Annex 4, and examples of existing National Ballast Water Management Strategies are provided in Annex 5. Annex 6 provides a template for an implementation work plan and budget.

5.5 HARMONIZATION OF NBWMS

While national ballast water management strategies are first and foremost a tool for national level implementation of activities that reduce the risk of spreading invasive alien species through ballast water, it is important to note that a certain degree of international collaboration and coordination will strengthen their efficiency. This is because the spread of invasive alien species is largely an international issue, and both introduction of a species to a region and spread within a region can be reduced through coordinated and coherent responses.

It is thus important to fostering regional collaboration in combating invasive alien species, including through the harmonization of national ballast water management strategies. There are many ways in which such regional collaboration can be fostered, including through representation as observers of task force chairs or focal agency representatives on the task forces of other countries in the region, and establishment of regional fora for coordination and exchange of information.

As mentioned briefly in section 3.3, Regional Strategies and Action Plans for BWM are being developed in all GloBallast regions. The approach advocated is the establishment of Regional Task Forces (RTFs), similar to the National Task Forces. These RTFs consists of the national focal points on ballast water management, usually affiliated with the Lead Agency in each country. This approach promotes harmonization in each region, but also globally, as experiences is shared through the GloBallast Partnerships Programme.

At all times it is important to define strategies so that they meet with the minimum requirements as indicated above and most importantly so that they are in line with the BWM Convention and the guidelines issued by IMO.

Box 10: Regional Harmonization of NBWMS

Regional Harmonization of NBWMS is important because it can:

- improve the effectiveness of the strategies, reducing risk of introduction to a region or spread within a region of an invasive alien species;
- facilitate the transfer of best practice between countries and make possible joint studies, thus saving effort as well as money in development of strategies; and
- foster greater collaboration in tackling invasive alien species more broadly.

6

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ANNEX 1

Guidelines for National Task Forces

From *Ballast Water Management: Guidelines for National Task Forces* as adopted by the first GloBallast Partnerships Project Task Force meeting, March 2008

1. Introduction and background

The introduction of invasive marine species into new environments by ships' ballast water, attached to ships' hulls and via other vectors has been identified by the Global Environment Facility (GEF) as one of the four greatest threats to the World's oceans. The other three are land-based sources of marine pollution, overexploitation of living marine resources and physical alteration and destruction of marine habitat.

In response to this threat, the International Maritime Organization (IMO) has taken a number of initiatives. As a specialized agency of the United Nations responsible for the international regulation of ship safety and the prevention of ship-sourced marine pollution, IMO is the most appropriate forum through which to address this issue. The member countries of IMO have developed voluntary guidelines for the control and management of ships' ballast water, to minimize the transfer of harmful aquatic organisms and pathogens and, in February 2004, adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

2. Lead Agencies, Contact Points and National Task Forces

Previous experience suggested that information about the dangers of ballast water transfers was poor to non-existent in many countries, and constituted a major barrier to action. Furthermore, it was found that where information did exist, no country's single agency had been given or had assumed lead responsibility for work related to the ballast water issue. This combination of poor information and no delegation or assumption of leadership on the part of any specific agency makes it impossible to address the issue effectively or at all, and is seen as the single most important, early priority to address ballast-water related issues.

A first step in this national endeavour is the designation of a Lead Agency. Since the ballast water issue is clearly associated with maritime transport, the Lead Agency should ideally be the national maritime administration, although some countries may elect to designate a different agency. The Lead Agency will have overall responsibility for development of the port-specific and country-specific strategies that are the principal objective of any attempt to address ballast water management related issues.

The Lead Agency, through a designated Contact Point (CP), is responsible for the creation and convening of the necessary National Task Force (NTF) and the development and implementation of the necessary country-level information, education and participation activities that are key to success.

3. Purpose of these guidelines

The purpose of these Guidelines is to provide assistance, advice and guidance to the Contact Points of the Lead Agencies in each country on the establishment and running of a NTF, as an inter-ministerial and cross-sectoral forum for the effective implementation of ballast-water related activities at the country level.

The Guidelines provide simple advice on:

- how to set up a NTF;
- what the NTF membership should comprise;

- what the roles, responsibilities and tasks of the NTF should be;
- how to run NTF meetings; and
- how to develop and implement National Workplans to address the ballast water related issues.

4. Roles, responsibilities and tasks of the Lead Agency and NTF

It is not possible for the Lead Agency and CP alone to effectively address the ballast water issue in each country. Each Lead Agency must be supported by an inter-ministerial and cross-sectoral NTF.

The roles, responsibilities and tasks of the LA/CP, supported by the NTF, are as follows:

- develop the National Workplan for the implementation of a ballast water management strategy at the port and country level;
- provide free access to information required for the implementation of the ballast water management strategy;
- authorize, facilitate and assist, subject to adequate prior notification and formal clearance, site visits by technical experts to support the implementation of the strategy;
- provide for the in-country application of IMO Convention and associated guidelines by shipping companies and port authorities;
- provide in-country co-ordination between different government agencies, industry sectors and other groups with interest in the ballast water issue (environment, transport, fisheries, etc.);
- provide a forum for inter-ministerial and cross-sectoral communication and consultation on the ballast water issue;
- provide financial, logistical and other support to the activities of the programme; and
- communicate the strategy at regional level in an effort to find synergies, opportunities for regional co-operation and harmonization of national strategies and regulatory framework.

5. NTF membership

It is recommended that NTF membership should comprise the following:

- the CP from the Lead Agency (Task Force Chairman);
- the CP Assistant (Task Force Secretary).
- representatives from the equivalent of the:
 - national maritime administration (if not the Lead Agency);
 - port administration;
 - environmental administration;
 - fisheries/marine resources administration;
 - health/quarantine administration;
 - local government;
 - marine science community/academia;
 - shipping industry;
 - port users;
 - non-government environmental organization(s), as appropriate;
 - national maritime training organizations Each country may elect to invite additional groups to be represented on their NTF.

6. NTF meetings

Annex 2 contains a suggested agenda for holding the first NTF meeting. A current status report, in accordance with Annex 3, will need to be developed by the Lead Agency, for presentation at the 1st NTF meeting. Thereafter, NTF meetings should be held as frequently as deemed necessary by the Lead Agency.

These meetings should be chaired by the CP, and the CP Assistant should act as Secretary. All documents relating to NTF meetings, including agendas and minutes, should be filed and progress records maintained for information and programme co-ordination purposes. Each NTF should develop its own Rules of Procedure for the conduct of its business, in accordance with the general guidelines above and relevant national legislation.

7. National Workplans

One of the main tasks of the NTF will be to develop, as a co-operative group, the National Workplan for the implementation of a ballast water management strategy at the port and country level.

The National Workplan should outline the different components of the strategy that need to be implemented. How these tasks are approached may differ from country to country, and it is up to the NTF to develop this. Technical support and assistance would be available from IMO on request.

ANNEX 2

Suggested agenda outline for first NTF Meeting

From *Ballast Water Management: Guidelines for National Task Forces*, adopted by the first GloBallast Partnerships Project Task Force meeting, March 2008

1. Open meeting.
2. Adoption of Agenda.
3. Introduction of Chairman (LA-CP).
4. Introduction of Secretary (LA-CP Assistant).
5. Introduction of each NTF member.
6. Overview of roles, responsibilities and tasks of the NTF (refer to section 4 of *Ballast Water Management: Guidelines for National Task Forces*).
7. Overview of components to be developed for National Workplan.
8. Allocation of National Workplan development tasks to NTF members.
9. Other business.
10. Close meeting.

Notes:

Any documents required for each agenda item should be prepared and circulated in advance to all participants by the Secretary.

Should the meeting require the expenditure of programme funds, the estimated budget with a break-down of costs for specific activities shall be prepared before the meeting and necessary funds identified in advance.

The minutes of the NTF meeting shall be prepared by the Secretary and circulated to all participants and to the CP.

ANNEX 3

Template for Country Status Report for first NTF Meeting

From *Ballast Water Management: Guidelines for National Task Forces*, adopted by the first GloBallast Partnerships Project Task Force meeting, March 2008

Country/Port: _____ Date: _____

Completed by: _____ Contact: _____

Ballast Water Management – Country Status Report

1. Lead Agency designated? | Yes | | No |
Details:

2. Contact Point designated | Yes | | No |
Details:

3. CP Assistant appointed? | Yes | | No |
Details:

4. Any known aquatic invasive species introduction? | Yes | | No |
Summary:

5. Volume of ballast discharged per year:

6. Number ship movements (>200GRT) per year?

7. Are IMO recommended measures currently applied?
Details:

8. Any relevant domestic legislation/regulations?
Act and Year: _

9. Please attach contact details for all NTF members as follows:
Name, position, organization, phone, fax, e-mail address, post address, street address, website address

10. National Workplan – Please attach two-page summary of current status

ANNEX 4

Template National Ballast Water Management Strategy

- 1 Executive Summary
 - Short, one page summary of the issue and policy
- 2 Glossary
 - Terms and acronyms used in the document
- 3 Introduction
 - 3.1 Background to the issue of IAS
 - 3.1.1 Internationally and regionally
 - 3.1.2 Nationally
 - 3.2 Background to the issue of Ballast Water Management
 - 3.2.1 Internationally and regionally
 - 3.2.2 Nationally
 - 3.3 International, regional, national obligations
 - 3.3.1 Agreements or treaties
 - 3.3.2 Conventions
 - 3.4 Relevance of Ballast Water as a vector of IAS to the country
 - 3.4.1 History of shipping industry, economic impact,
 - 3.4.2 Environmental effects
 - 3.4.3 Public health issues
 - 3.5 Scope
 - 3.5.1 Geographical scope (national or regional)
 - 3.5.2 Technical scope
 - 3.5.2.1 Addressing only ballast water as a vector for IAS and not all other problems
- 4 Purpose of the strategy
 - 4.1 Why the strategy has been written
 - 4.1.1 e.g. The purpose is to minimise the risks of IAS by seeking to avoid adverse economic, environmental and public health impacts, whilst not unduly impeding trade; and taking a practical approach to ballast water management.
 - 4.2 Guiding principles
- 5 Objectives
 - 5.1 What the strategy is seeking to achieve
 - 5.2 What is the desired outcome
 - 5.2.1 Institutional targets

- 5.2.2 Environmental targets
 - 5.2.3 Social or economic targets
- 6 Invasive Alien Species
 - 6.1 Results of study on the magnitude of ballast water as an IAS vector
 - 6.1.1 Integration of ballast water management into broader IAS management and coastal management process
 - 6.2 International obligations
 - 6.3 Agency or Department that is responsible
 - 6.3.1 Division of labour
 - 6.3.2 New legislation and the requirements to implement
 - 6.4 Evaluation and Monitoring of Ports
- 7 Ballast Water Management
 - 7.1 Agency or Department that is responsible
 - 7.1.1 Division of labour
 - 7.1.2 New legislation and the requirements to implement
 - 7.2 Ballast Water Management Plan
 - 7.2.1 BWM Certificate
 - 7.2.2 BWM Plan
 - 7.2.3 BWM Record Book
 - 7.2.4 Ensuring compliance among ships flying the countries flag
 - 7.2.5 Inspection of Ships
 - 7.2.6 Enforcement and Penalties
- 8 Implementation Plan
 - 8.1 Institutional Arrangements
 - 8.1.1 Regional or National responsibilities
 - 8.1.2 Lead Agency
 - 8.1.3 Advisory groups or Task Force
 - 8.1.4 Cross-sectoral collaboration
 - 8.2 Information Gathering
 - 8.2.1 Risk Assessment, Survey and Monitoring of IAS
 - 8.2.2 Research and Development of Ballast Water Management Schemes
 - 8.2.3 Monitoring of National Strategy implementation
 - 8.2.4 Evaluation & Review of Strategy
 - 8.3 Legislation and Regulation
 - 8.3.1 Policy
 - 8.3.2 Compliance and Enforcement
 - 8.3.3 Cross Jurisdictional Coordination
 - 8.3.4 Fostering international links and cooperation
 - 8.4 Communication, Awareness Raising and Training
 - 8.4.1 National Governmental Agencies
 - 8.4.2 Industry

8.4.3 International Conventions**8.4.4 Public****9 Funding****9.1 Implementation Funding (Initial 2 – 5 years)****9.1.1 Staffing****9.1.2 Gathering information, inspections, studies****9.1.3 Supporting costs (communication, training, monitoring and evaluating)****9.2 Ongoing Funding****9.2.1 Staffing****9.2.2 Gathering information, inspections, studies (5 years and beyond)****9.2.3 Supporting costs (communication, training, monitoring and evaluating)**

Annex 1: Summary of National Ballast Water Status Assessment findings

Annex 2: Ballast Water Management Plan

Annex 3: Ballast Water Record Book

Annex 4: Annex 4: Communication, awareness raising and training strategy

Annex 5: Chart of Implementation Plan: Work plan and Budget

ANNEX 5

Implementation Work Plan and Budget – Template Chart

Project Area	Project Code and Title	Description	Models/ Expertise Sources	Potential Funding Sources	Time line (number of years funding needed)	Total Budget Required
Institutional Arrangements (IA)	IA1: Regional or National responsibilities					
	IA2: Lead Agency					
	IA3: Advisory groups or Task Force					
	IA4: Cross-sectoral collaboration					
Legislation and Regulation (LR)	LR1: Policy Development					
	LR2: Compliance and Enforcement					
	LR3: Cross Jurisdictional Coordination					
	LR4: Fostering international links and cooperation					
Data Collection and Monitoring (DCM)	DCM1: Data collection for National BW Status Assessment					
	DCM2: Development of Ballast Water Management options, including monitoring options					
	DCM3: Monitoring of National Strategy implementation					
	DCM4: Evaluation & Review of Strategy Implementation					
Communication, Awareness Raising and Training (CART)	CART1: National Governmental Agencies					
	CART2: Industry					
	CART3: Internationally including conventions					
	CART4: Public					

More Information?

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