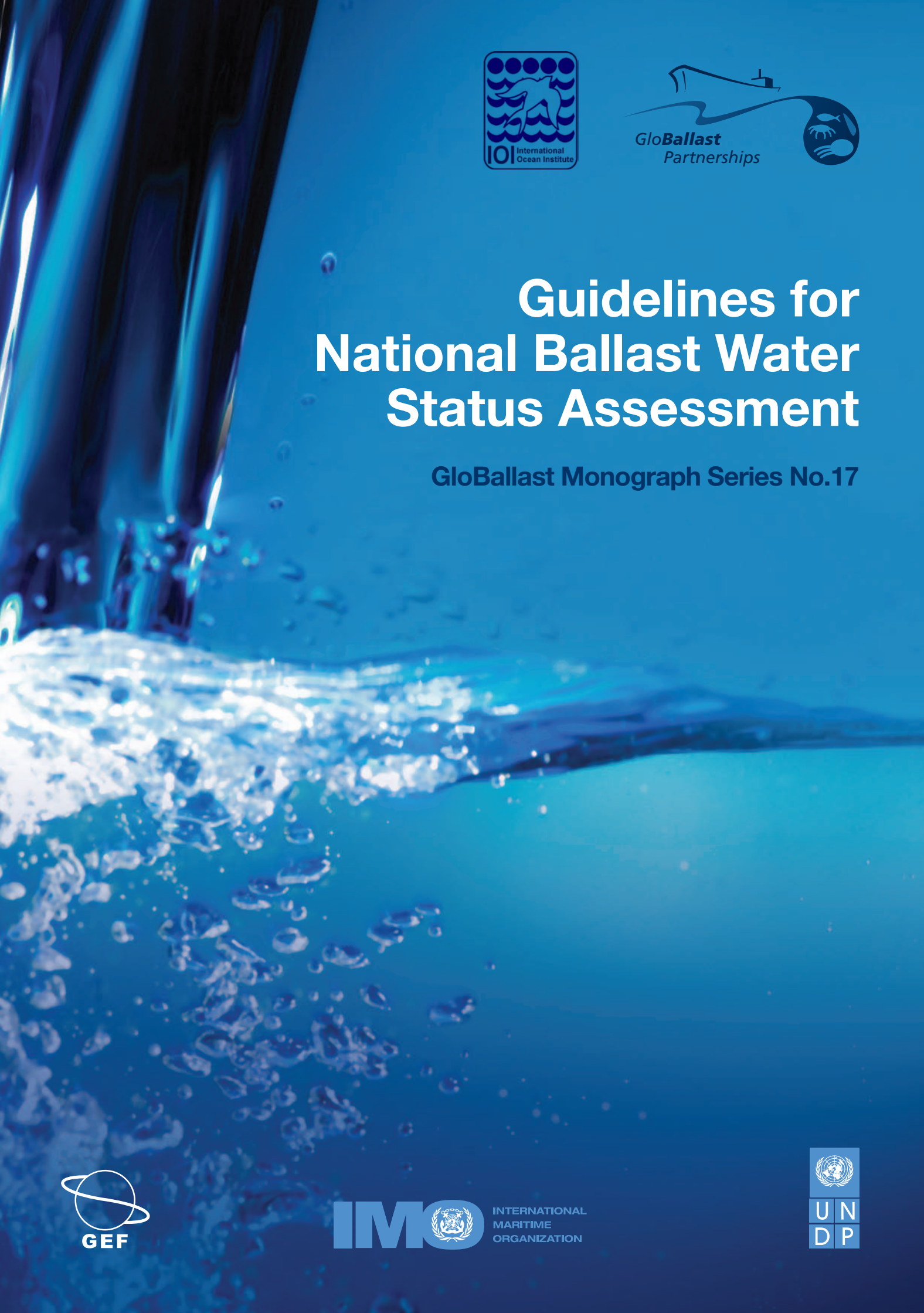

Guidelines for National Ballast Water Status Assessment

GloBallast Monograph Series No.17

GEF

IMO INTERNATIONAL MARITIME ORGANIZATION

UNDP

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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

Contents

Preface

The International Maritime Organization (IMO) is the United Nations' body responsible for the regulation of shipping and matters related thereto. It has therefore been at the forefront of initiatives to regulate and manage the potential introduction of harmful aquatic organisms and pathogens as a result of the discharge of ship's ballast water and sediments. Among these initiatives have been the development of the International Convention for the Control and Management of Ships' Ballast Water and Sediments (2004), and the GloBallast Programme.

The primary objective of the second phase of the GloBallast Programme (Globallast Partnerships (GBP)) is to assist developing countries with the implementation of the Ballast Water Management Convention by supporting the development of appropriate national policies, legislation and institutional arrangements. In part, this support is provided through the development and distribution of relevant technical guidelines – of which these Guidelines for National Ballast Water Status Assessments are one example.

Other more specific guidelines developed through GBP include:

- Guidelines and templates for economic assessments;
- Guidelines for legal, policy and institutional reform at the national level;
- Guidelines for the development of a national BWM strategy.

GBP has also developed a specific training package to support the legal implementation of the BWM Convention at the national level, while Guidelines for Port State Control under the BWM Convention are currently being developed by the IMO Flag State Implementation (FSI) Sub-Committee.

The International Ocean Institute (IOI) is a global knowledge-based, non-profit international organization devoted to the sustainable development of the oceans. As a non-governmental body with consultative status at the United Nations and some of its Specialized Agencies, IOI works to uphold and expand the principles enshrined in the United Nations Convention on the Law of the Sea for the benefit of humankind as a whole, with particular consideration of the poor. Flagship courses in Ocean Governance have allowed IOI to maintain a strong focus on training and capacity building, as demonstrated through the network of 24 operational centres and four focal points around the world.

IOI has developed a partnership with the IMO/GBP to continue supporting the technical capacity needs related to ballast water management of developing countries around the world. The International Ocean Institute – Southern Africa (IOI-SA) has taken the lead for the IOI network in coordinating initiatives related to marine invasive species. A partnership between IOI-SA and the Global Invasive Species Programme (GISP) has similarly helped support this goal by expanding the range of supporting and technical tools available.

Acknowledgements

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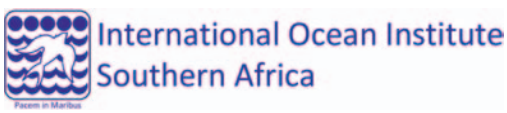

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Background

Shipping is essential to the global economy, providing the most cost-effective means of transporting bulk goods over great distances. Over 90% of all global trade – including everything from food and fuel to construction materials, chemicals and household items – is carried by ships, with some 36,000 merchant ships sailing the world's oceans, with a combined tonnage of over 1 billion dead weight tonnes (dwt) (UNCTAD, 2008).

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

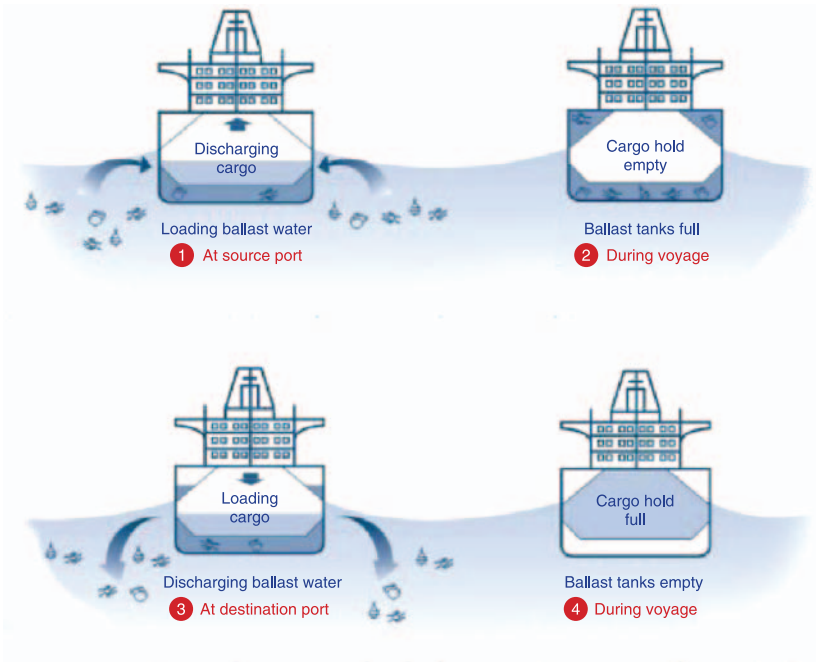


Figure 1 Cross section of ships showing ballast tanks and ballast water cycle
Source: GloBallast Programme 2002)

1.1 THE ISSUE

While ballast water is crucial to the safe operation of ships, studies have shown that when ballast water is taken on board, the organisms living in that water are also drawn in to the ballast tanks. Depending on the

duration of the voyage and other factors, many of these organisms are then able to survive the journey, and are subsequently released live into the waters of the destination port when the ballast water is discharged. Thus, ballast water serves as a vector for the transfer of species from one part of the world to another. Where this new area is outside of its natural geographic range, the species which has been transferred is commonly known as an **alien** species (alternative terms are non-native or non-indigenous). If the environmental conditions in this new geographic area are suitable, the alien species may then not only survive, but may establish and spread, in many cases causing, or with the potential to cause, harm to the local environment, economy, or human health (see Case Study in Box 1). Such species are generally called **invasive alien species**, but other terms used for **marine invasives** include Introduced Marine Pests (IMPs) (Australia and New Zealand), Aquatic Nuisance Species (ANS) (United States), and Harmful Aquatic Organisms and Pathogens (HAOP) (IMO Ballast Water Management Convention). The Ballast Water Management Convention defines the latter as follows:

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

Invasive alien species are now generally recognized as one of the greatest threats to biodiversity globally. They also have serious economic, environmental and health impacts and, as a result, place major constraints on development. In marine and coastal environments, invasive species have been identified as one of the four greatest threats to the world's oceans along with:

- land-based sources of marine pollution,
- over-exploitation of living marine resources,
- physical alteration/destruction of marine habitats.

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

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

Closely associated with ballast water are ballast sediments. When a ship takes on ballast water it also takes on material contained in the water. In turbid or shallow waters this often includes solid material. When this material enters the ballast tank it settles to the bottom as "sediment" and provides a substrate for a variety of marine species, notably dinoflagellates. According to the Ballast Water Management Convention sediments are defined as "Matter settled out of ballast water within a ship".

> "Ballast water is thus recognised as one of the principal vectors of potentially invasive alien species, and is estimated to be responsible for the transfer of between 7,000 and 10,000 different species of marine microbes, plants and animals globally each day."
>
> (Carlton, 1999)

Box 1
Case Study: Comb jelly (*Mnemiopsis leidyi*)

The comb jelly, *Mnemiopsis leidyi*, is endemic to temperate to subtropical estuaries along the North and South American Atlantic coast. It was first recorded in the Black Sea in 1982, where it became well established, occurring in massive numbers. It also spread rapidly to the waters of the Azov, Marmara and the Eastern Mediterranean, and towards the end of 1999 was recorded in the Caspian Sea, where its biomass eventually exceeded levels ever recorded in the Black Sea.

Mnemiopsis feeds on the same zooplankton as many of the commercial fish species in the area, and had a devastating impact of the fisheries. Landings of anchovy in the Black Sea, for example, dropped to one-third on their previous levels, causing losses of around $500 million per year. Similar reductions in the biomass of another commercial fish species – kilka – were experienced in the Caspian. The decrease in zooplankton caused by *Mnemiopsis* also had impacts on the food web, causing an increase in phytoplankton, and a decline in predatory fish species and seals.

More recently, the accidental introduction into the Black Sea of another comb jelly – *Beroe* cf *ovata* – which is a predator of *Mnemiopsis,* has resulted in a major decline of *Mnemiopsis* there, and a substantial recovery of the ecosystem.

Photo: CSIRO *Sources*: GloBallast 2002, Shiganova et al, 2004.

1.2 THE INTERNATIONAL RESPONSE

Growing recognition of the impact of invasive species generally has seen a widespread response to the issue in the form of legal instruments, as well as programmes aimed at developing practical, technical solutions. The **Convention on Biological Diversity** (CBD) (1992), for example, provides a comprehensive basis for measures to protect all components of biodiversity against invasive alien species. Moreover, in 1995, Contracting Parties to the CBD adopted the "Jakarta Mandate on Marine and Coastal Biological Diversity", which included alien species as a thematic issue. The goal of the programme of work under the Jakarta Mandate is: "to prevent the introduction of invasive alien species into the marine and coastal environment, and to eradicate to the extent possible those invasive alien species that have already been introduced." This is being implemented through the UNEP Regional Seas Programme.

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

IMO has been working through its Member States to tackle the problem of ballast water since 1973 when, at the conference to adopt the MARPOL Convention, the ballast water problem was raised. The conference adopted a Resolution which noted that "ballast water taken in waters which may contain bacteria of epidemic diseases, may, when discharged, cause a danger of spreading of the epidemic diseases to other countries", and requested the IMO and the World Health Organization (WHO) to "initiate studies on that problem on the basis of any evidence and proposals which may be submitted by governments".

IMO then established a Ballast Water Working Group under the Marine Environment Protection Committee (MEPC) and has been actively engaged in seeking a solution to the ballast water problem. Activities have included:

- the development of a preliminary set of Guidelines in 1991 – subsequently replaced in 1997 by an updated version: the "Guidelines for control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens" (Assembly Resolution A.868(20));
- the development of an international legal instrument – the **International Convention for the Control and Management of Ships' Ballast Water and Sediments** – which was adopted by consensus at a Diplomatic Conference at IMO Headquarters in London on 13 February 2004;
- the development of guidelines for the implementation of the Convention;
- since March 2000, implementation of the GloBallast Programme, a GEF-UNDP –IMO programme providing technical assistance in this area.

The Ballast Water Management Convention and the GloBallast Programme are discussed in more detail in sections 1.3 and 1.4 below.

1.3 THE BALLAST WATER MANAGEMENT CONVENTION

The Ballast Water Management Convention sets out the general rights and responsibilities of Contracting Parties in its preamble and articles, with regulations on more specific technical matters in the Annex – for example, the application and exceptions to the Convention, treatment standards, Ballast Water Management Plans (BWMP), recording requirements, and the designation of special areas with differing requirements.

Under the **Articles**, Contracting Parties:

- have a general obligation to give full and complete effect to the provisions of the Ballast Water Management Convention and the Annex through the control and management of ships' ballast water and sediments;
- have the right to take, individually or jointly with other Parties, more stringent measures than those in the Ballast Water Management Convention provided that they are consistent with international law;
- must ensure that ballast water management practices do not cause greater harm than they prevent to the environment, human health, property or resources, or those of other States;
- undertake to ensure that ports and terminals where cleaning or repair of ballast tanks occurs have adequate reception facilities for the reception of sediments;
- should promote and facilitate scientific and technical research on ballast water management and monitor the effects of ballast water management in waters under their jurisdiction;
- must require ships carrying their flag to be surveyed and certified;
- may inspect ships visiting their ports to verify that the ship has a valid certificate; they may also inspect the Ballast Water Record Book and/or sample the ballast water, provided they avoid unduly detaining or delaying the ship;
- should provide technical assistance, as appropriate, with a view to promoting the effective implementation of the Ballast Water Management Convention and related guidance.

The **Annex** comprises five sections related to applicability, technical requirements, additional measures, standards and certification.

Section A includes definitions, application and exemptions and, under Regulation A-2, states that except where expressly provided otherwise, the discharge of Ballast Water shall only be conducted through Ballast Water Management, in accordance with the provisions of this Annex.

Section B covers the management and control requirements for ships obliging them to have a Ballast Water Management Plan and a Ballast Water Record Book. It also details (i) the required standards for ballast water management according to capacity and date of construction; and (ii) the requirements for ballast water exchange.

Section C provides for – under certain conditions – the establishment of additional measures.

Section D sets out the standards for ballast water exchange and discharge, a procedure for their review, and

the requirements for ballast water management technologies. It also allows for the testing of the prototypes of such technologies.

Section E details the survey and certification requirements and provides the standardized formats for the Ballast Water Management Certificate and Record Book.

Entry into force: The Convention will enter into force 12 months after ratification by 30 States, representing 35 per cent of world merchant shipping tonnage. As at 30th September, 2009, there are 18 Contracting Parties, representing 15.36% of the world tonnage.

Benefits of the BWM Convention

Parties to the BWM Convention will benefit in many ways:

- enhanced protection of the marine environment and biodiversity through minimization and ultimately elimination of the devastating effects of invasive species;
- standardized enforcement of a full range of ballast water management requirements on foreign ships that enter the ports, or offshore terminals under their jurisdiction;
- participating in the process of proposing amendments to the BWM Convention and its requirements through an established mechanism; and
- the exchange of new research and development information, best practices and practical experiences in the management of ballast water and invasive aquatic species.

For the shipping industry, there will also be a range of benefits, for example:

- a uniform international regime regarding the ballast water management requirements as opposed to a plethora of unilateral actions by individual countries;
- the incentive offered by a standardized regime to the research and development sector towards finding new and cost-effective solutions to use; and
- development of innovative ballast water management solutions that are safe to crew, effective and environmentally safe.

1.4 THE GLOBALLAST INITIATIVE

In 2000, the IMO, the Global Environment Facility (GEF), and the United Nations Development Programme (UNDP) initiated the Global Ballast Water Management Programme for the Removal of Barriers to the Effective Implementation of Ballast Water Control and Management Measures in Developing Countries – (the GloBallast Programme) – a global technical cooperation program to assist developing countries to:

- reduce the transfer of harmful organisms via ships' ballast water and sediments;
- implement the IMO ballast water guidelines; and
- prepare for implementation of the IMO Ballast Water Convention (still under negotiation at that stage).

1.4.1 GloBallast Phase I

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

Activities included:

- communication, education and awareness-raising
- risk assessment and port surveys for each of the demonstration ports
- review of existing ballast water management legislation.
- compliance, enforcement and monitoring.
- regional cooperation and replication.

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

1.4.2 GloBallast Partnerships

The second phase of the Programme (GloBallast Partnerships (GBP)) was initiated in late 2007 and is intended to build on the progress made in the original project. It is focussed on national policy, legal and institutional reforms in targeted developing countries with an emphasis on integrated management. The approach encompasses:

- building on the achievements and momentum, and utilising the capacity and skills generated by the pilot phase;
- replication of best-practices and technical activities in the beneficiary countries with a view to stimulating policy reforms at national level;
- supporting specially vulnerable and/or environmentally highly sensitive countries in their efforts to effect legal reforms to implement the Ballast Water Management Convention;
- working towards advanced integration through other interested structures, mechanisms and programs, including for example, GEF-IW LME projects and UNEP Regional Seas; and
- promoting collabration with industry to facilitate the successful transfer of new technologies from developed to developing countries.

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

2

The purpose of the guidelines

One of the primary objectives of the GloBallast Partnerships Programme is to promote legal and institutional reforms including ratification of the Ballast Water Convention, and the development of national policies, legislation and strategies for ballast water management – particularly in the Lead Countries of the project, but also more broadly. 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 (see Fig. 2 below).

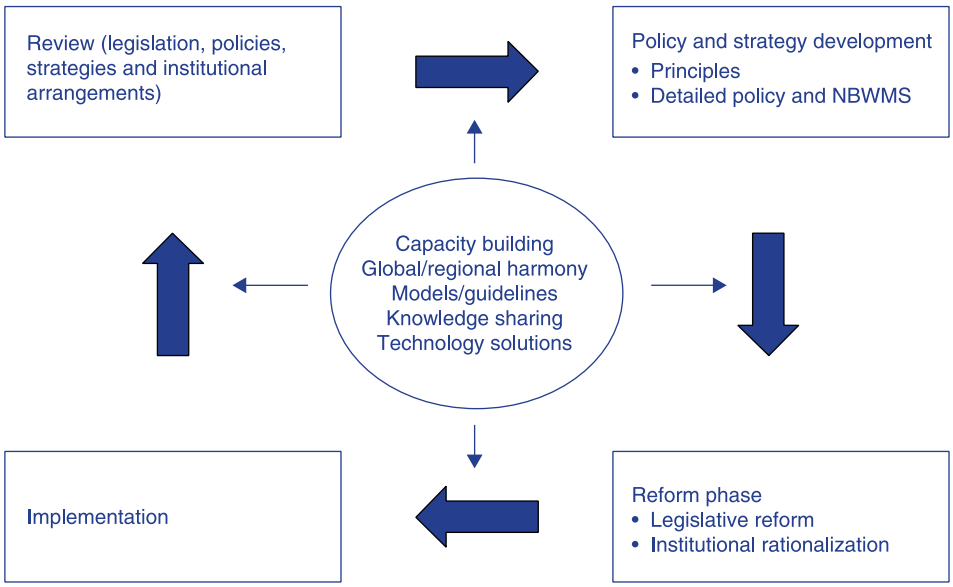


Figure 2 The review cycle for policy, strategy, legal and institutional reforms.

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, GBP advocates the use of **rapid status assessments** based on existing data, and which can generally provide sufficient information for initiation of the reform process. At the same time, a rapid status assessment can be used to identify specific gaps in the information base which might need to be addressed in the initial stages of such reform.

The purpose of these Guidelines is to assist countries to undertake appropriate rapid status assessments by detailing the categories and potential sources of information required for a national status assessment.

3

Building the Information Base

Ballast water is a complex and multi-faceted problem and introducing relevant policy, legal and institutional reforms will have cost implications. In embarking on such a process, it is therefore necessary to give appropriate consideration to both the socio-political and technical aspects.

An overview of the various categories of information which need to be taken into account is provided below, while additional detail on exactly what is required, and potential sources of such information, is given in Appendix 1 which is also a Template for the National Status Assessment.

3.1 SOCIO-POLITICAL CONSIDERATIONS

3.1.1 Costs and benefits of ballast water management

Ratification of the International Convention for the Control and Management of Ships' Ballast Water and Sediments has – in addition to introducing national legislation to give effect to the Convention – a number of more specific implications for Flag and Port states, as follows:

- Flag state obligations:
  - Article 4, *Control of the Transfer of HAOP Through Ship's Ballast Water and Sediments*: requires each Party to ensure that ships flying its flag or operating under its authority comply with the requirements of the BWM Convention and the Annex thereto, including the applicable standards;
  - Article 7 of the Convention, *Survey and certification* requires each Party to ensure that ships flying its flag or operating under its authority and subject to survey and certification are so surveyed and certified in accordance with the regulations in the Annex of the Convention.
- Port State rights and obligations, in addition to more general obligations (Article 2 and others): Parties
  - are required to develop national policies, strategies or programmes for ballast water management in its ports and waters under its jurisdiction;
  - are required to provide sediment reception facilities where cleaning or repair of ballast tanks occurs and should also notify ships with details of the availability, location, capacities of and applicable fees relevant to reception facilities that are being provided for the environmentally safe disposal of sediments;
  - have the right to inspect ships entering their ports to determine whether they are in compliance with the relevant requirements of the Convention.

Implementation of these measures has **costs** for the State, ports and the shipping sector. It is therefore important to have an understanding of the importance of shipping and ports to the national economy. If possible, this should include projections of how this may change in the future, (see section 1 of the Template).

On the other hand, invasive species can have major negative socio-economic impacts. These include both losses as a consequence of reduced productivity, and costs incurred for the prevention and management of

invasive species. For example, it is estimated that the economic costs of just a selection of invasive species in the USA alone exceeds 137 billon dollars annually (Pimental *et al.* 2000).

More specific examples of economic impacts include:

- reductions in fisheries production (including potential collapse of the fishery) due to competition, predation and/or displacement of the fishery species by the invading species, and/or through habitat/environmental changes caused by the invading species, e.g. the comb jelly (see Box 1);
- impacts on aquaculture (including closure of local facilities), especially from introduced harmful algal blooms and diseases of cultured species (e.g. white spot disease on shrimp);
- physical impacts on coastal infrastructure, facilities and industry, especially by fouling species, e.g. the zebra mussel;
- impacts or even closure of recreational and tourism beaches and other coastal amenity sites due to invasive species (e.g. physical fouling of beaches and severe odours or health impacts from algae blooms);
- secondary economic impacts from human health issues associated with introduced pathogens and toxic species, including increased monitoring, testing, diagnostic and treatment costs, and loss of social productivity due to illness and even death in affected persons;
- the costs of responding to the problem, including research and development, monitoring, education, communication, regulation, compliance, management mitigation and control.

Thus, while measures to prevent the introduction of invasive species – via ballast water or other pathways – can be substantial, numerous studies show that such costs are far less than those incurred as a consequence of invasions. This type of information is crucial to convincing decision-makers of the **benefits** to invest in appropriate prevention measures, and while international examples can be used, the impact of a national cost assessment – or even a few case studies – is invaluable.

3.1.2 Stakeholder involvement

Given its complexity, an effective ballast water policy must necessarily involve a wide range of stakeholders. It is therefore also important to identify all relevant stakeholders so that they can be involved in – and support – the reform process. Without their support, ballast water management measures are unlikely to be successful.

While the situation will obviously vary from country to country, likely stakeholders are listed in Table 1.

3.2 TECHNICAL CONSIDERATIONS

In developing an appropriate response to the ballast water issue, the following technical aspects must be taken into account:

- the source and extent of the ballast water problem in the country;
- the nature and value of resources at risk;
- the existing regulatory and institutional frameworks.

3.2.1 Evaluating the risk posed by ballast water

The risk posed by ballast water to a particular country depends on a variety of factors, including:

- the volume of ballast water discharges;
- the frequency of discharges;
- the environmental similarity between the ports of origin (source ports) and the national ports (destination ports).

The **volume** of ballast water being discharged into a particular location contributes to the risk of invasions in as much as the greater the volume, the higher the potential number of organisms being introduced. One

Table 1: Stakeholders support

Institution	Relevant areas of responsibility
Maritime authority (Ministry of Transport or other agency eg. Navy, Coast Guard etc)	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 legislation.
Port authority	Responsible for the elaboration and implementation of port ballast water management plans (consistent with national strategy) and provision of relevant infrastructure, e.g. port reception facilities.
Public health authority	Supervision and evaluation of sanitary control activities in ports
Shipowners and agencies	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 regulations.
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 responsible for possible introduction vectors)
Universities and Research Institutes	Where there are specialists in taxonomy (used to correctly identify species), marine ecology and monitoring methods.
Environmental NGOs, recreational bodies and the general public	Play a watchdog role and may assist in monitoring for the early detection of introduced species.

cubic metre of ballast water may contain up to 50,000 zooplankton specimens and/or 10 million phytoplankton cells. Thus, the greater the volume, the higher the number of individual organisms introduced, and the higher the "propagule pressure"[1] or likelihood that one or more individuals will survive in the new environment. However, some of the most spectacular aquatic bioinvasions have occurred at ports that receive relatively small volumes of ballast water, while some major ports that receive huge volumes have not been invaded. This has lead to the conclusion that other factors such as **frequency of ship visits** and the **environmental similarity** of the ports of origin (source port) and discharge (destination port) are generally more important. Nevertheless, it is important to have an understanding of all these factors.

To a large extent, the characteristics of ballast water discharges are determined by the **trading patterns** of the country concerned. Thus, the nature of the **cargo** and the **type of vessel** in which it is carried play a role in determining the volumes and patterns of ballast water uptake and discharge. For example, cargoes such as crude oil, iron ore, coal and grain, which are carried in bulk are generally transported in tankers or bulk carriers. Such vessels generally load or discharge the entire cargo at a single port so that, although they can carry substantial volumes of ballast water, each load of ballast water is likely to come from a single source port, thereby simplifying the process of determining the risk it poses.

In contrast, vessels carrying more general cargo and containers tend to stop at numerous ports on any particular voyage, with partial loading or offloading of cargo at each one. As a result, while the volumes of ballast water are lower, the species composition in the ballast water is likely to be far more complex, making the risk assessment process more complicated.

Since the IMO has for many years recommended a ballast water reporting requirement, it is possible that some countries may already have data on ballast water discharges. However, in the absence of such reporting, or specific studies, data on the types of cargo and vessels going through any particular port can be used to provide an initial, if somewhat rough, estimate of the volumes of ballast water being discharged (see Table 2). Similarly, the trading partners will determine both the array of alien species which may

1 **Propagules** are the dispersal agents of organisms, including spores, zygotes, cysts, seeds, larvae and self-generative tissue fragments. The more frequently these are introduced, the more likely it is they will survive, hence the higher the propagule pressure.

Table 2 *Representative ballast capacities*

		Ballast condition			
Vessel type	dwt	*Normal (tonnes)*	*% of dwt*	*Heavy (tonnes)*	*% of dwt*
Bulk carrier	250,000	75,000	30	113,000	45
Bulk carrier	150,000	45,000	30	67,000	45
Bulk carrier	70,000	25,000	36	40,000	57
Bulk carrier	35,000	10,000	30	17,000	49
Tanker	100,000	40,000	40	45,000	45
Tanker	40,000	12,000	30	15,000	38
Container	40,000	12,000	30	15,000	38
Container	15,000	5,000	30	n/a	
General cargo	17,000	6,000	35	n/a	n/a
General cargo	8,000	3,000	38	n/a	n/a
Passenger/RORO	3,000	1,000	33	n/a	n/a

Source: Australian Quarantine & Inspection Service 1993. *Ballast Water Management*. Ballast Water Research Series Report No. 4, AGPS Canberra.

potentially be introduced, and the likelihood of those species becoming invasive (based on the **environmental similarity** between the ports where the ballast water was originally loaded (source ports or ports of origin) and those where it is discharged (destination ports)).

The principal environmental factors that determine the survival – and subsequent establishment and spread – of any alien organism discharged along with the ballast water are:

- the upper and lower limits of its temperature and salinity tolerance in relation to those of the port;
- the time period in which the ambient temperature is favourable for reproduction; and
- the presence of other suitable ecological conditions, for example habitat, predators and food sources.

It is therefore also important not only to know the exact source and destination ports, but also to have information on their ecological characteristics. This information may not be readily available or of great quality (temporal/spatial resolution). However, even approximations or low-resolution data will still be valuable for the assessment process. One source of information may be the GloBallast Port Environmental Database, containing environmental data from more than 400 ports around the world. This is available on request from the GloBallast Partnerships Programme Coordination Unit.

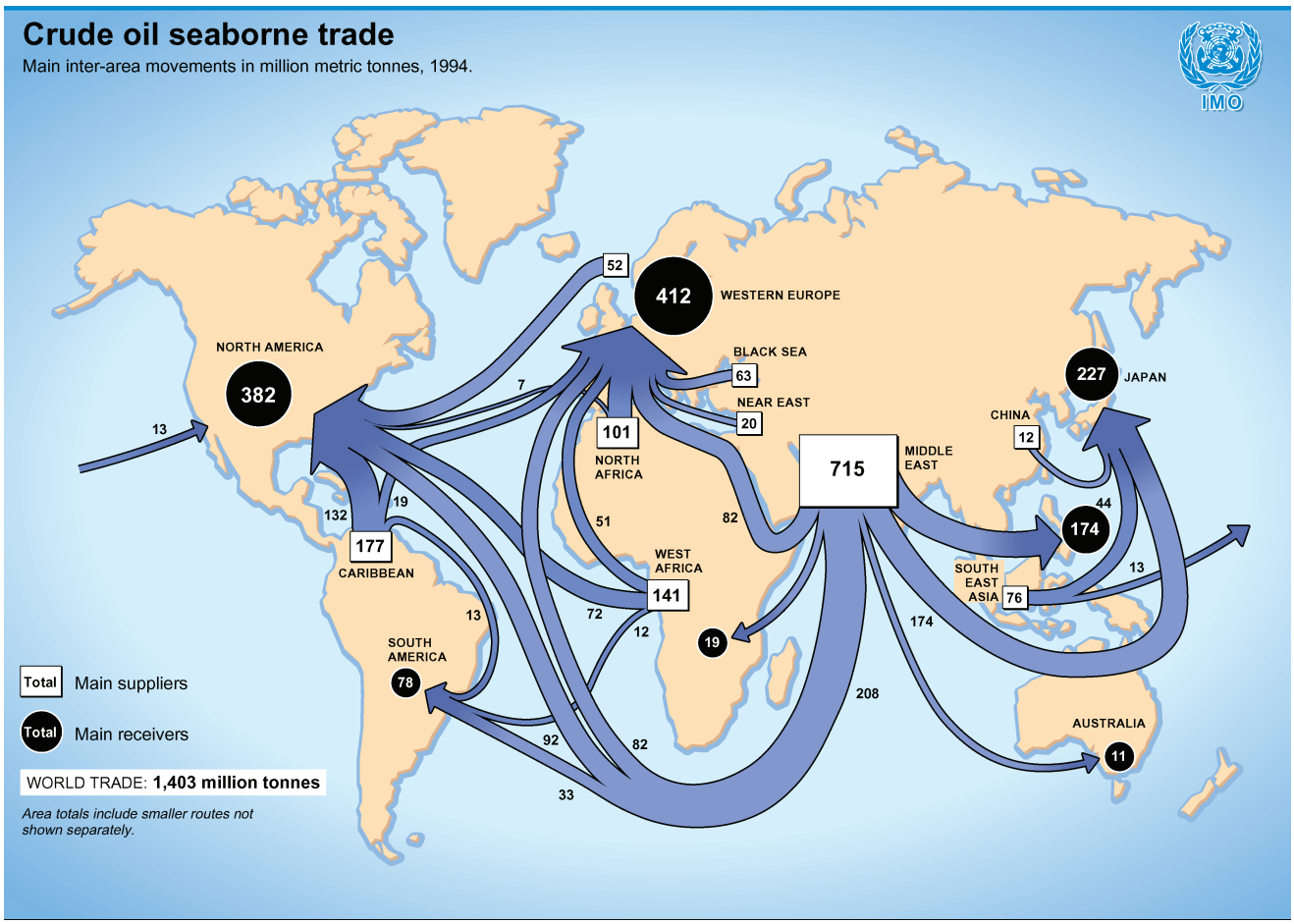
The major **source ports** and routes of those vessels most frequently visiting its ports will depend both on the commodities being exported and the primary buyers of those commodities. Thus, for example, a port in Central West Africa which exports oil to Europe, North America and Latin America, will likely be receiving ballast water discharges from those three regions. Australia, on the other hand, which supplies grain to China and the Middle East, will have ballast water discharges emanating from China and Middle Eastern countries.

Based on this knowledge, and information on potential invasive species in the waters of the source ports in the importing countries, the exporting country can:

(i) Compare the ecological characteristics of the port receiving their goods with those of the port from which they are exporting to evaluate the chances of survival of introduced alien species (high risk if the ports are similar).

(ii) Determine the frequency of discharges from any particular source port (noting that the more frequently a particular species is introduced, the higher the risk there is of it establishing and becoming invasive – provided also that it has the right species characteristics; this is known as propagule pressure).

(iii) Identify priority species from among those which are likely to be in incoming ballast water – and



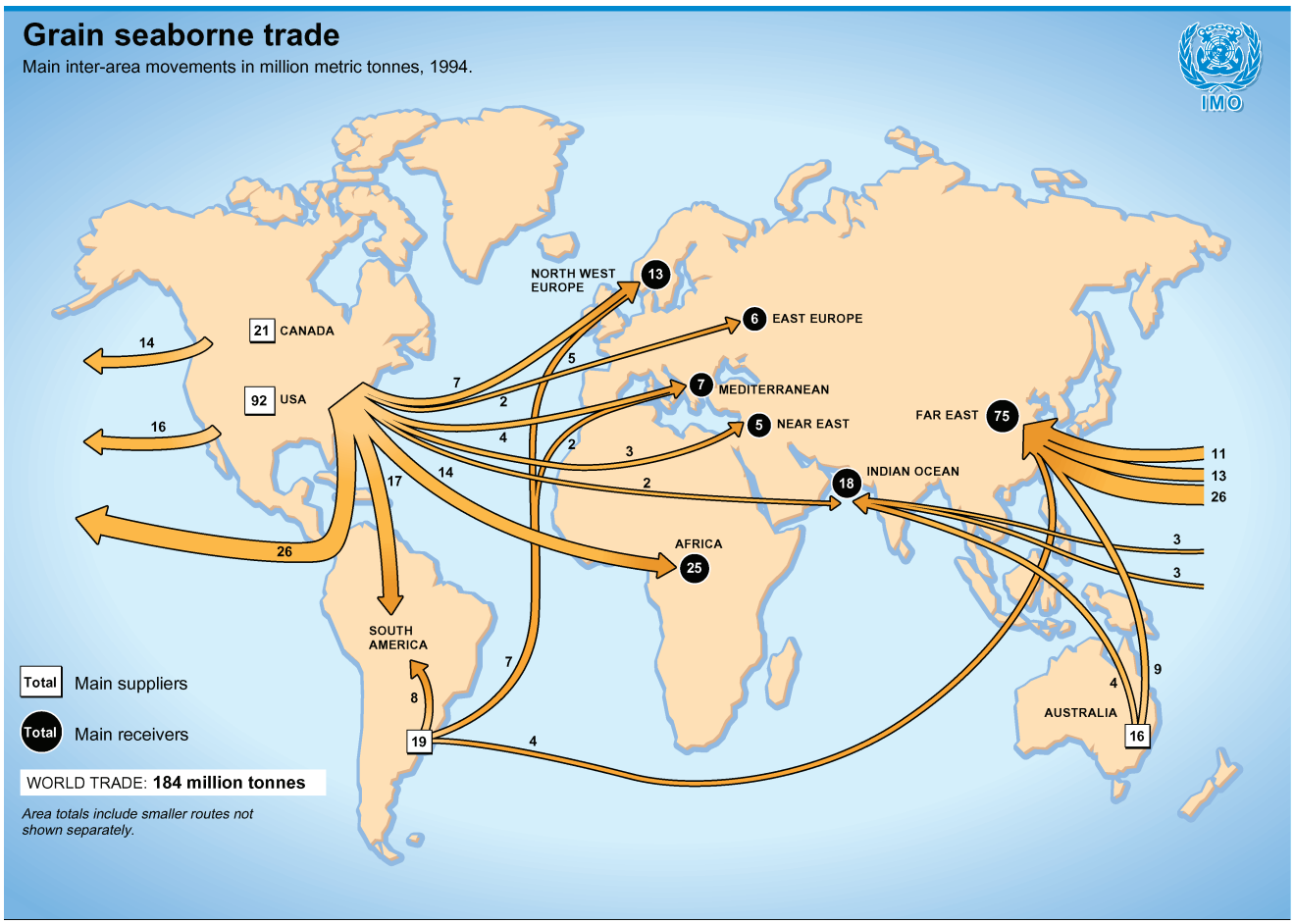


Figure 3 Major source ports and routes (IMO website).

which have high invasive potential – and include them in early detection monitoring and response programmes.

3.2.2 Resources at risk

Examples of invasive species can be found in all habitats and from all different taxonomic groups, from plants to invertebrates, vertebrates and even microbes. Considerable effort has therefore been put into trying to get a better understanding of the factors which contribute to successful invasions with a view to improving the predictability of invasions and thereby, the prevention and management thereof. It is important to note though, that while predictions have a role to play in management strategies, there are still many uncertainties. For example, although it has been shown that the number of marine invasive species increases with latitude, there is still no clear reason why temperate regions may be more prone to marine bioinvasions than tropical and polar coasts.

Nevertheless, in addition to the characteristics of the species itself, factors which are known to influence the success of invasions include the ecological similarities between the natural distribution range of the introduced species and the new area, and the pollution status of the receiving environment. The development of national measures for ballast water management should therefore include a description of the ecological characteristics of the local marine and coastal environments. In particular, it should identify areas which are especially sensitive and/or vulnerable to invasion.

Marine and coastal environments also provide important socio-economic resources from fisheries to recreational opportunities, all of which can be negatively impacted by invasive species. The value of these resources can be utilised as motivation for the finances required to put appropriate management measures in place.

3.2.2.1 *Marine and coastal ecology*

As previously indicated, one of the factors affecting the survival of an introduced species is the ecology of the new area, including the physical, chemical and biological characteristics. A general description of these should therefore be provided for the entire coastline, with more detail for areas in and around the major ports. This should cover:

- oceanographic conditions; and
- habitats and biological communities.

3.2.2.2 *Sensitive and vulnerable coastal environments*

Certain parts of the coastline may be particularly vulnerable to invasions, and should be highlighted in the assessment so that the management strategy addresses them adequately. For example, ballast water discharges should be avoided in vulnerable areas, and they should be specifically targeted in early detection/monitoring programmes. These include:

ISOLATED BIOGEOGRAPHIC AREAS

Biogeographic classification systems are commonly used for marine conservation purposes, for example in the development of ecologically representative systems of marine protected areas. While there are a number of such classification systems – for example, the Large Marine Ecosystem (LME) scheme – based on varying criteria, such regions can be broadly defined as areas characterized by a relatively distinct species composition resulting primarily from the oceanographic and/or topographic features.

Of importance in terms of sensitivity to invasion is the extent of biogeographic isolation of any particular area. Marine environments with biota which are isolated from other similar areas tend to have high numbers of endemic species which are severely threatened by invasions because of their restricted ranges. Examples of such areas include the Ponto-Caspian, Eastern Mediterranean, Laurentian Great Lakes, southern Australia, New Zealand, Hawaii and parts of the American Pacific coast.

At the same time, biogeographically isolated regions which also have relatively low native marine biodiversity, such as the Hawaiian Islands, Eastern Mediterranean and Baltic Sea, are considered to provide vacant niche space that facilitates successful marine introductions.

DEGRADED ENVIRONMENTS

The highest numbers of recorded marine invasions are typically associated with estuaries, harbours or bays which are usually dominated by artificial, disturbed and/or eutrophic habitats. Such degraded environments tend to favour opportunistic species – alien or native – which have greater tolerance to, for example, low oxygen, low salinity and temperature fluctuations. Reduced native biodiversity and increased vacant niche space due to eutrophication, over-fishing, land reclamation/ urbanization, river damming, etc. have been linked to the invasion 'hot-spots' reported from a range of areas such as the north-west Black Sea, San Francisco Bay (USA), Port Phillip Bay (Australia) and various Mediterranean localities (e.g. the Venice lagoon).

This has given rise to the concept of 'invader friendly' receiving environments – typically degraded areas which, again, should be specifically identified for purposes of the strategy.

3.2.2.3 *Coastal and marine resources of economic importance*

The ecological impacts of invasive species are significant not only in terms of biodiversity, but because of the consequential socio-economic impacts on both living and non-living resources. The yield of fisheries, for example, may be reduced as a result of the introduction of alien invasive species which compete with the commercial species for food (see the example in Box 1). Similarly, harmful algal blooms can result in severe odours or health impacts from toxic blooms and in the closure of recreational beaches due to physical fouling.

It is therefore important to have an overview of the resources of economic importance – consumptive and non-consumptive – so that the ballast water management strategy can afford the resources appropriate protection, and include them in monitoring programmes. Resources to be listed include:

- fisheries;
- coastal aquaculture;
- other living resources;
- tourism-related resources.

Living marine resources also have a variety of non-consumptive uses, most of which are linked to the recreation and tourism industries. Coral reefs, for example, make popular diving sites, wetlands and other areas (e.g. small offshore islands) may be used for birdwatching, and whale-watching and shark cage-diving are becoming increasingly popular attractions. All are dependent on the maintenance of the ecological integrity of the area concerned.

Coastal tourism and recreation also make use of the physical features of these areas, such as beaches, estuaries, wetlands, etc. for bathing, surfing, boating, hiking and other recreational activities.

3.2.3 Recorded marine bio-invasions

Invasive species are still an issue about which many people are sceptical. In order to convince both the general public – and especially decision-makers – of the need for the development and implementation of a national strategy on ballast water, it is very helpful to be able to provide case study examples. While **national** examples are preferred, if they are not available, **regional** ones would suffice given that marine species are easily able to move across boundaries.

3.2.4 Legal, policy and institutional aspects

The objectives of the GloBallast Programme are, amongst others, to improve the regulation of ballast water globally by:

- promoting ratification of the International Convention for the Control and Management of Ships' Ballast Water and Sediments (2004) with a view to early entry into force;
- assisting countries – especially developing countries – to prepare for implementation of the Convention; this includes putting in place an effective regulatory system including policy, legislation and institutional arrangements.

Box 2: Case study

Scientific name: *Carcinus maenas*

Common names: European shore crab, green crab, strandkrabbe

This crab is native to Europe and northern Africa. It has been introduced to the USA, Australia and South Africa. It is euryhaline, and a voracious predator which, in some of the locations where it has been introduced, has caused the decline of other crab and bivalve species. This species has been included among the 100 of the "World's Worst" invaders (by ISSG).

General impacts: A voracious predator. Able to crush mussels, and is a potential threat to mussel farms.

Geographical range: In its native range (north western Europe, including the western Baltic Sea), it is abundant on any kind of seashore in shallow waters (upper intertidal to shallow subtidal), including estuaries.

Invasion pathways: Aquaculture, aquarium trade, live food trade, ships' ballast water, hull fouling.

Local dispersal methods: Boats, self-propelled, water currents.

Extracted from: http://www.issg.org/database

Before embarking on this process, it is important for the country concerned to have a clear understanding of the existing national regulatory framework and, in particular, those aspects which are relevant to ballast water management. Such information would assist in determining whether, and what, changes would be necessary to enable effective ballast water management in a manner which is consistent with existing policy.

3.2.4.1 *Review of relevant policies, legislation and institutional arrangements*

In reviewing the existing regulatory arrangements, consideration must be given to the country's international and regional obligations, national policies and legislation, as well as local regulations where applicable.

INTERNATIONAL AND REGIONAL OBLIGATIONS

It is highly likely that most countries already have an obligation to manage invasive species – and in the case of coastal states, marine invasives – in terms of more general **international** conventions to which they are already probably party. These include:

- The Convention on Biological Diversity (CBD); Article 8(h) requires Parties: "As far as possible and as appropriate, (to) prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species."
- The United Nation's Convention on the Law of the Sea (UNCLOS); Article 196 provides that: "States shall take all measures necessary to prevent, reduce and control . . . 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."

At the **regional** level, while the conventions which provide the legal framework for the UNEP Regional Seas Programme do not generally have specific provisions on invasive species, they do oblige Parties to provide protection for marine and coastal environments. Moreover, a number of them have adopted resolutions and/or developed regional agreements (ROPME), strategies (SPREP) or action plans (Caribbean, Mediterranean, HELCOM, Southern and Eastern Africa) on invasive species and/or ballast water.

Understanding these obligations is important not only to ensure that they are being met, but because they can be used to motivate and support efforts to introduce more specific ballast water management measures.

NATIONAL POLICY AND LEGISLATION

At the national level, invasive species are most likely to have been addressed in policies and strategies on biodiversity. The CBD, for example, obliges Parties to develop a National Biodiversity Strategy and Action Plan, which would include a component on invasive species. A National Strategy on Ballast Water should therefore be consistent with this strategy.

In terms of legislation, there are various categories which could deal with invasive species and/or ballast water management, or aspects thereof. These include:

- legislation which is primarily intended to give domestic effect to certain international obligations – for example, a Biodiversity Act is likely to include provisions which give effect to obligations under the Convention on Biological Diversity and the ensuing policy and strategy on biodiversity;
- more general biodiversity and natural resources-related legislation, for example that covering management of protected areas or fisheries;
- Coastal Zone Management legislation;
- legislation regulating pollution from ships (noting that invasive species are sometimes termed "biological pollution");
- health legislation (noting that pathogens or disease-causing organisms such as *Cholera* may be spread via ballast water);
- Port regulations.

A list of such policies, strategies and legislation – together with the key relevant provisions – should be compiled to serve as a starting point for any legislative reform that might be required in terms of the national strategy.

NATIONAL INSTITUTIONS

Given that invasive species – and even ballast water – management involves many stakeholders, once a decision has been taken to develop a policy and strategy on ballast water, it is necessary for the government to assign responsibility to a particular agency to drive the process – the Lead Agency. The Lead Agency may then establish a Task Force comprising representatives of the national institutions which will have key roles in the implementation of that strategy.

The assessment should therefore include a list of key national institutions which are likely to play a role in ballast water management, including a description of existing relevant responsibilities. These are likely to be:

- Ministry of Transport/ Maritime Safety Authority;
- National Port Authority;
- Ministry of Environment.

3.2.4.2 *Port State control*

Port State control measures are applied to ships visiting the ports of a coastal state to ensure their compliance with both international conventions (IMO Conventions such as MARPOL), as well as with local requirements. It should, therefore, be relatively easy to extend this to cover ballast water management measures. In order to assess this, and to ensure that a ballast water strategy is consistent with existing practice, the assessment should include an analysis of the current system.

3.3 NATIONAL EXPERTS AND SOURCES OF DATA AND INFORMATION

A list of individuals with expertise in, for example, shipping, marine invasives, relevant pathways or vectors (such as ballast water), marine law and taxonomy of marine species should be compiled with a

view to assessing the capacity available within the country to develop and implement a national strategy on ballast water. Conversely, this assessment will also identify training needs.

Similarly, sources of relevant data and other information – such as databases, websites etc – should be identified and listed.

3.4 THE NATIONAL BALLAST WATER STATUS ASSESSMENT REPORT

The primary purpose of the ballast water status assessment is to provide the basis for informed decisions on what needs to be done with respect to ballast water management within the country concerned. It is therefore important that the findings of the assessment be presented in a manner which will allow relevant decision-makers to quickly gain a clear understanding of the issues and what is required to address them.

The template provided in the Annex provides a guide to both the structure and content of such a report. Each section should provide an overview of the key issues rather than in-depth information, and should use figures and illustrations as much as possible. The information provided should clearly support the conclusions and recommendations of the report which should cover:

- the relative importance of shipping and coastal resources to the economy of the country;
- an analysis of the threat posed by ballast water;
- identification of gaps in the information base; and
- the steps required to put in place an appropriate national ballast water management regime including the ratification of the BWM Convention.

It is suggested that collecting and compiling the information suggested in these guidelines should take 3–4 months, maximum.

The intention of using the approach suggested here is not to provide a detailed analysis of the issue, but to compile and evaluate the basic information needed to support the process of developing a national BWM strategy and policy. Other guidelines in the GloBallast Monographs series will provide more detailed information on specific aspects such as strategy development, economic assessment, and legal reform.

4

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UNCTAD (2008) Review of Maritime Transport. UNCTAD Report. 181 pp.

UNEP (2005) *The UNEP Large Marine Ecosystems Report: A Perspective on Changing Conditions in LMEs of the World's Regional Seas*. UNEP Regional Seas Reports and Studies No. 182, 872 pp.

4.2 WEBSITES

Biogeographic areas: www.edc.uri.edu/lme

www.worldwildlife.org/science/eco**regions/marine**/item6101.html

www.lme.noaa.gov/

Convention on Biological Diversity: www.cbd.int

Global Ballast Water Management Programme: http://globallast.imo.org/

Global Invasive Species Programme: www.gisp.org

International Ocean Institute–Southern Africa (IOI-SA): www.ioisa.org.za/

International Maritime Organization : www.imo.org

IUCN Global Marine Programme: www.iucn.org/about/work/programmes/marine/

UNCTAD: www.unctad.org

APPENDIX 1

Template

The template below lists the recommended Table of Contents for a National Ballast Water Status Assessment Report. In addition, there is a description in *italics* **of the information suggested for inclusion in each section (to be removed when the report is written), and potential sources of such information.**

Be sure to include any existing BWM information under each of the headings below, such as voluntary or mandatory Ballast Water reporting requirements.

National Ballast Water Status Assessment

1 SHIPPING

1.1 The role of shipping in the national economy

Indicate whether or not your country is a Flag state, and, if so, provide a list of registered shipping companies, number and types of vessels registered. In addition, provide information on :

- the total number and types of foreign-registered vessels visiting your ports annually;
- shipbuilders;
- shipyards;
- the number of people employed in the sector;
- role in imports and exports;
- foreign exchange earnings, etc.

If possible, include information on future expectations for this sector.

SOURCES OF INFORMATION

Information on the shipping sector should be available either:

- *within the country – from the relevant line Ministries and agencies (e.g. Transport, Maritime Safety Authority, Trade & Industry, etc.) and from the shipping companies themselves;*
- *from the websites of relevant organizations (e.g.* www.imo.org , www.unctad.org*); or*
- *Lloyd's List*.

1.2 Ports and harbours

Provide the following information:

- *the number and location of all existing – and planned – ports and harbours, as well as small craft harbours or marinas which are visited by vessels (for example yachts) from outside of the coastal State's jurisdiction;*
- *the legal boundaries of the ports;*

- *the annual volumes of traded goods – imports and exports – passing through each port;*
- *linked to the above, the type and frequency of vessels visiting each port;*
- *the nature and value of other uses of the port area;*
- *the ecological conditions in each port:*
- *information on ports/shipyards that currently handle ballast water sediments (NB not oily ballast sludge/sediments).*

SOURCES OF INFORMATION

Information on national ports should be available from the following sources.

- *For shipping, trade and regulatory aspects: the relevant line Ministries and agencies (e.g. Transport, Maritime Safety Authority, Finance, Customs etc) and/or from the Port Authority.*
- *For the ecological aspects: from environmental authorities (at national, provincial and local levels), the Port Authority (where this authority has an environmental branch) and relevant academic institutions.*

1.3 Ballast water uptake and discharge

The actual or estimated volumes of ballast water being loaded and discharged annually, as well as the sources of discharges should be provided. Figures should be provided separately for each port, as well as the total volumes per source for the country as a whole.

SOURCES OF INFORMATION

Since the IMO has for many years recommended a ballast water reporting requirement, it is possible that some countries may already have data on ballast water discharges. This should include information both on volumes and source ports, and should be available from the Port Authorities and/or Maritime Safety Authorities.

Where reporting has not yet been implemented, data on the types of cargo and vessels going through any particular port can be used to provide an initial, if somewhat rough, estimate of the volumes of ballast water being discharged (see Table 3 in the Guidelines).

Similarly, information on the trading partners for the country's main exports will provide an indication of the main sources of ballast water discharges, and should be available from the relevant line Ministries and agencies (e.g. Trade and Industry, Finance, Customs, etc.) and/or from the Port Authority.

1.4 Ecological characteristics of source and destination ports

If possible, it would be useful to include information on the ecological characteristics of both the source (foreign) and destination (national) ports, including information on known invasive species.

SOURCES OF INFORMATION

Information on national ports should be available from environmental authorities (at national, provincial and local levels), the Port Authority (where this authority has an environmental branch) and relevant academic institutions. The GloBallast Port Environmental Database contains data on environmental parameters from some 400 ports around the world. This dataset can be obtained upon request from the GloBallast Partnerships Programme Coordination Unit at IMO.

2 THE MARINE AND COASTAL ENVIRONMENT

2.1 Marine and coastal ecology

A general description of the entire coastline should be provided, with more detail for areas in and around the major ports. This should cover:

- *Oceanographic conditions*
  - *Major currents and related features, e.g. upwelling systems*
  - *Wave dynamics (high/low energy coastline)*
  - *Average sea temperatures and salinities*
  - *Unusual features such as areas of low oxygen, high nutrient levels, etc.*
- *Habitats and biological communities, which should provide a list of the major coastal habitat types such as:*
  - *rocky shores*
  - *sandy beaches*
  - *sand/ mudflats*
  - *estuaries*
  - *wetlands*
  - *salt marshes*
  - *mangroves*
  - *coral reefs*
  - *kelp beds.*

It should also provide a description of the offshore environment up to the edge of the continental shelf, and should identify the major biogeographic zones.

SOURCES OF INFORMATION

Most countries are likely to have previously participated in projects requiring detailed descriptions of their marine and coastal environments. Much of the information may also already be available in the form of coastal sensitivity maps, relatively easily available from:

- relevant national Ministries (Environment, Marine Affairs, Fisheries, etc.);
- the GEF Focal Point;
- academic institutions.

Reports on previous GEF-funded projects are generally also available on the GEF website: www.thegef.org, *while general information on biogeographical regions can be found at:* www.lme.noaa.gov/ *or* www-.worldwildlife.org/science/ecoregions/marine/item6101.html

Information on the global distribution of various habitats/ species, etc. can be found on: www.unep-wcmc.org/imaps/imaps_index.aspx

2.1.1 Sensitive and vulnerable coastal environments

The description of the marine and coastal environment should identify and highlight areas which are particularly vulnerable to invasions, including:

- *isolated biogeographic areas with limited native biodiversity and/or a large proportion of endemic species;*
- *degraded environments, particularly those in the vicinity of locations where ballast water is discharged.*

SOURCES OF INFORMATION

Where detailed descriptions of marine and coastal environments have already been prepared for other projects (including GEF projects), they are likely to include information on sensitive and vulnerable areas. This information should be relatively easily available from:

- relevant national Ministries (Environment, Marine Affairs, Fisheries, etc.);
- the GEF Focal Point;
- academic institutions.

Reports on previous GEF-funded projects are generally also available on the GEF website: www.thegef.org*, while general information on biogeographical regions can be found at:* www.lme.noaa.gov/*or* www.worldwildlife.org/science/ecoregions/marine/item6101.html

2.2 Resources of economic importance

The report should include information on resources of socio-economic importance, including:

- Fisheries – list commercial, subsistence and recreational fisheries and for each provide as far as possible the following data:
  - *species*
  - *location*
  - *total annual catch (for previous 5–10 years)*
  - *value*
  - *number of people dependant on the fishery.*
- Coastal aquaculture – list all coastal aquaculture facilities and for each provide as far as possible the following data:
  - *species (native or alien)*
  - *location*
  - *type of structures used (cages, rafts, etc.)*
  - *total annual yield and value (for previous 5–10 years)*
  - *number of people dependant on the operation.*
- Other living resources

  In addition to fish and shellfish, a number of other living marine resources may be used for consumptive purposes. Mangroves, for example are often harvested for wood and/or for making charcoal – usually on a subsistence basis. Reeds from estuaries and wetlands are sometimes used for construction purposes e.g. thatching, and for the production of arts and crafts. Where available, similar data should be provided for these uses as for fisheries.
- Coastal tourism

  A general overview of coastal tourism should be provided, with additional detail on industries involving resources such as:
  - *coral reefs*
  - *wetlands*
  - *marine mammals and birds.*
- *Coastal infrastructure*

  A list should be provided of commercially important submerged coastal infrastructure (which is prone to damage by fouling species – alien or otherwise e.g. zebra mussel). This should include:
  - *marinas and jetties;*
  - *water intakes for power stations and other industries for cooling or other purposes.*

SOURCES OF INFORMATION

Information on living marine resource use should be available from:

- relevant national Ministries (Fisheries, Marine and Coastal Management, Environment, etc.);
- industry associations (e.g. Fishing Industry Association);
- academic institutions.

More general information on tourism should be available from the Tourism Ministry and/or related agencies at national provincial or local levels. Coastal municipalities may also be in a position to provide, for example, numbers of beach users.

3 CASE STUDIES OF MARINE BIOINVASIONS

Where possible, national case studies should be provided. Alternatively, regional examples can be used. Case studies should include:

- *species name (scientific and common names);*
- *natural distribution range;*
- *general biology and characteristics which make it invasive;*
- *pathway/s of introduction and local dispersal methods;*
- *impacts in the country/region (ecological, economic and health as appropriate);*
- *management methods.*

Case studies demonstrating ***socio-economic and/or health impacts*** *are particularly important for advocacy purposes.*

SOURCES OF INFORMATION

Information on national and regional invasions should be available from:

- relevant national Ministries (Fisheries, Marine and Coastal Management, Environment, etc.);
- academic institutions;
- *regional programmes (e.g. UNEP Regional Seas).*

Alternatively, information can be derived from a number of international websites and databases including:

Marine Invasive Species Database: http://crimp.marine.csiro.au/nimpis

Global Invasive Species Database : http://www.issg.org/database

Alien Invasive Species Inventories for Europe : www.europe-aliens.org

Global Invasive Species Programme : www.gisp.org

Invasive Species in the Mediterranean : www.ciesm.org/atlas

4 LEGAL, POLICY AND INSTITUTIONAL ASPECTS

4.1 International and regional obligations

Indicate whether or not your country has ratified the following Conventions, and, if so, the date of ratification:

- *Ballast Water Convention*
- *Convention on Biological Diversity*
- *UN Convention on the Law of the Sea*

- *UNEP Regional Seas Conventions.*

SOURCES OF INFORMATION

Information on whether or not the country is party to any particular convention – as well as the texts thereof – should be available either:

- *within the country – from the Ministry of Foreign Affairs, State Legal Advisors, parliamentary structures or the relevant line Ministries (e.g. Environment, Oceans, Maritime Transport, etc.); or*
- *From the websites of the Conventions themselves (e.g.* www.cbd.int, www.un.org/Depts/los/, www.unep.org/regionalseas/).

4.2 National policies and legislation

List relevant national policies, strategies and legislation with a summary of applicable provisions. Of particular importance are:

- *the National Biodiversity Policy, Strategy and Action Plan and legislation – and especially the section on invasive species;*
- *policies, strategies and legislation on Coastal Zone Management;*
- *shipping-related policies and legislation;*
- *port regulations (including port health regulations).*

SOURCES OF INFORMATION

Information on national institutions, policies, strategies and legislation should be available from the relevant line Ministries.

4.3 National Institutions

List the key national institutions which are likely to play a role in ballast water management, including a description of existing relevant responsibilities. These are likely to be:

- Ministry of Environment
- *Ministry of Transport/ Maritime Authority/Navy/Coast Guard*
- National Port Authority

4.4 Port State control

This should cover:

- *identification of responsible agency/ies*
- *frequency of inspections*
- *inspection protocols*
- *reporting requirements*
- *enforcement mechanisms.*

SOURCES OF INFORMATION

Information on existing Port State control practices should be available from the Ministry of Transport/ Maritime Safety Authority and/or Port Authorities.

5 STAKEHOLDERS

List all relevant stakeholders (see Table 1).

6 NATIONAL SOURCES OF INFORMATION

List national experts on marine invasives, ballast water, etc., as well as relevant sources of information – databases, websites, etc.

7 CONCLUSIONS AND RECOMMENDATIONS

More Information?

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