Global **Ballast Water**
Management Programme

Stopping the ballast water stowaways!

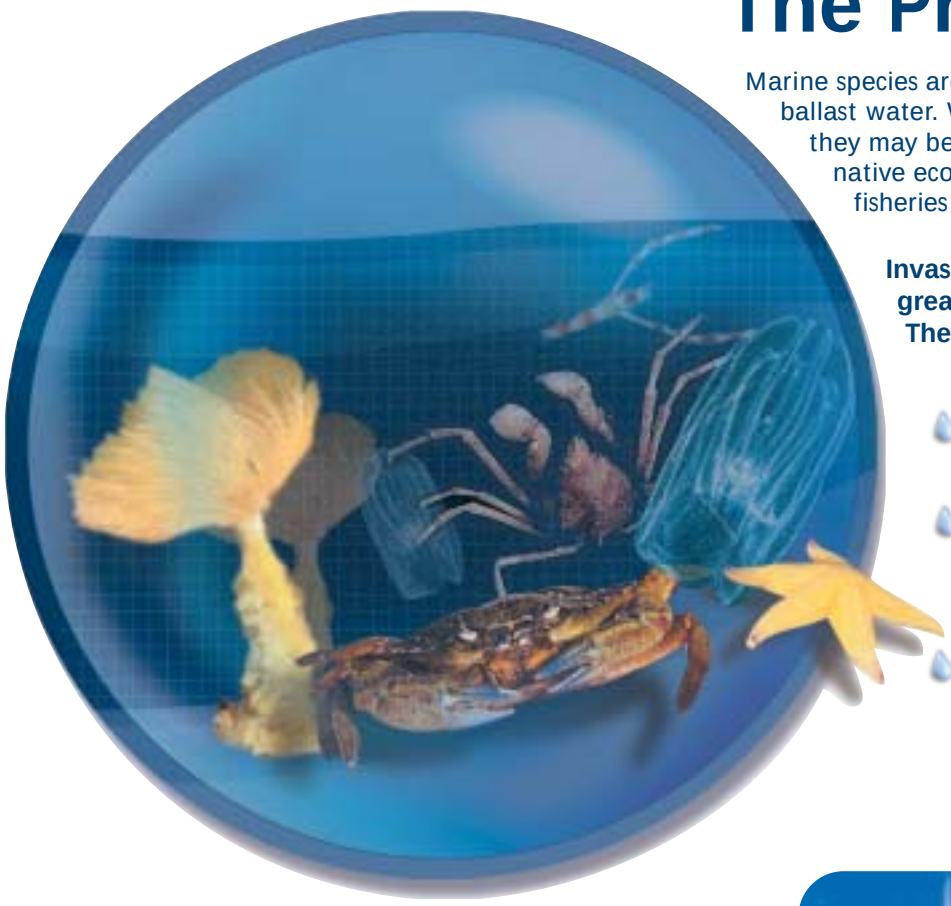
GEF

UNDP

IMO

A cooperative initiative of the Global Environment Facility,
United Nations Development Programme and International Maritime Organization.

The Problem



Marine species are being carried around the world in ships' ballast water. When discharged into new environments, they may become invasive and severely disrupt the native ecology, impact economic activities such as fisheries and cause disease and even death in humans.

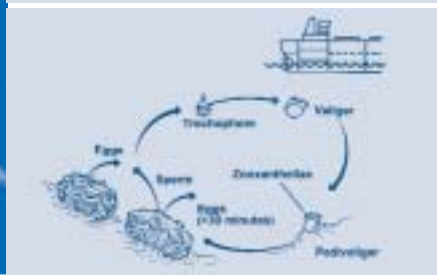
Invasive marine species are one of the four greatest threats to the world's oceans. The other three are:

- **Land-based sources of marine pollution.**
- **Over-exploitation of living marine resources.**
- **Physical alteration and destruction of coastal and marine habitat.**

What is Ballast Water?

Ballast is any material used to weight or balance an object. One example is the sand-bags carried on conventional hot-air balloons. These can be discarded to lighten the balloon's load, allowing it to ascend.

In ships, ballast is used to maintain balance, stability and structural integrity, especially when the ship is empty of cargo. Ships have carried solid ballast, in the form of rocks, sand and metal, for thousands of years. Modern ships use water as ballast.



Crab larva - Roger Steene

Ship discharging ballast - Steve Raaymakers

Unwanted Stowaways

A problem may arise when ballast water taken on by a ship contains unwanted marine organisms. These may be bacteria and other microbes, planktonic species, small invertebrates and the spores, eggs and larvae of larger species.

The potential for species transfer is compounded by the fact that almost all marine species have planktonic stages in their life-cycle, which may be small enough to pass through a ship's ballast water intake ports and pumps. This means that species with adult stages that are large or attached to the seabed, may still be transported in ballast water.

The Impacts

Most species carried in ships' ballast water do not survive the voyage. Most of those that do, do not survive when discharged into the new environment. Under certain circumstances some species do survive to form viable populations, and may become serious pests.

Impacts can be divided into three main categories:

- **Ecological:** when the native biodiversity and/or ecological processes may be disrupted by the invading species. It is estimated that introduced marine species invade new environments somewhere in the world on a weekly to daily basis.[1]
- **Economical:** when fisheries, coastal industry and other commercial activities and resources are disrupted by the invading species. It is estimated that the cost of all invasive species exceed US$138 billion per year in the USA alone![2]
- **Human health:** when toxic organisms, diseases and pathogens are introduced through ballast water, causing illness and even death in humans.

There are hundreds of examples of severe ecological, economical and human health impacts from invasive marine species around the world. Some outstanding examples include:

- **The European Zebra Mussel *Dreissena polymorpha*:** Introduced to the North American Great Lakes. It has spread to infest more than 40% of US waterways, fouls the cooling-water intakes of industry. It may have cost between US$750 million and US$1 billion in control measures from 1989 to 2000.[3]

Zebra Mussels - Sergei Olenin

Once established, it is virtually impossible to control an invasive marine species. Impacts are usually irreversible.

- **The North Pacific Seastar *Asterias amurensis*:** Introduced to southern Australia. This voracious predator threatens commercial stocks of shellfish species such as oysters and scallops. This large Seastar is a prolific breeder and in one estuary alone in Tasmania reached an estimated total population of nearly 30 million individuals, at densities greater than any recorded in it's native range.[4]

North Pacific Seastar - CSIRO Australia

- **Toxic dinoflagellates:** Spread to several locations around the world through ships' ballast water. Under favourable conditions these micro algae may bloom to form 'red tides'. If absorbed into filter-feeding shellfish such as oysters and scallops, they may release toxins. This can cause paralysis or death in humans who eat the contaminated shellfish.

Toxic dinoflagellates - Gustaaf Hallegraeff

The Progress

Guidelines

In response to this global threat, the International Maritime Organization (IMO) has developed *Guidelines for the control and management of ships' ballast water, to minimise the transfer of harmful aquatic organisms and pathogens* - IMO Assembly Resolution A.868(20). The guidelines recommend a number of measures aimed at:

- **Minimising the uptake of organisms during ballasting.**
- **Minimising the build-up of sediments in ballast tanks, which may harbour organisms.**
- **Undertaking ballast water management measures, including ballast exchange at sea, to minimise the transfer of organisms.**

They also provide for vessel-specific ballast water management plans, record keeping and reporting and port-based management practices. The Guidelines are available on the GloBallast website, http://globallast.imo.org.

Model Management Plan

To assist ships in complying with the IMO Guidelines, the International Chamber of Shipping (ICS) and the International Association of Independent Tanker Owners (INTERTANKO) have produced a Model Ballast Water Management Plan. Contact ics@marisec.org

Regulation

IMO member countries are also developing a new international convention to provide a standardised, global regulatory regime for the management of ballast water. Negotiations and drafting are at an advanced stage and it is anticipated that the convention will be adopted in 2003.

Research & Development

In recognition of the safety, operational and environmental limitations of the currently recommended practice of ballast exchange at sea, there are a large number of R&D projects being carried out around the world to develop more effective ballast water treatment methods. Options being considered include:

- **Mechanical and physical treatment such as filtration, separation and sterilisation using ozone, ultra-violet light, electric currents and heat treatment.**
- **Chemical treatment such as adding biocides to ballast water to kill organisms.**

All of these possibilities currently require significant further research. Any control measure that is developed must meet a number of criteria, including:

- **It must be safe.**
- **It must be environmentally acceptable.**
- **It must be cost-effective.**
- **It must work.**

The GloBallast website contains a global directory of ballast water treatment R&D projects.

Facts & Figures

- Shipping carries more than 80% of the world's commodities and is essential to the global economy.
- A single bulk cargo ship of 200,000 tonnes can carry up to 60,000 tonnes of ballast water.
- Ballast water is essential to the balance, stability and structural integrity of a ship when it is empty of cargo. Ships MUST use ballast.
- It is estimated that around 3 to 10 billion tonnes of ballast water are carried around the world each year. Studies are underway to define this more clearly.[5]
- It is estimated that more than 7,000 different species are carried around the world in ships' ballast each day.[6]
- It is estimated that the cost of all invasive species is in the vicinity of US$138 billion per year in the USA alone![2]
- Shipping is increasing and greater quantities of ballast water are being carried more quickly and more frequently to an increasing number of new destinations.
- Invasive marine species are one of the four greatest threats to our oceans.
- The Global Ballast Water Management Programme is working to address this threat.

The Programme

Technical Assistance

IMO has joined forces with the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP) to assist developing countries to reduce the transfer of invasive marine species in ballast water.

The Global Ballast Water Management Programme (GloBallast) is working through six initial demonstration sites to implement the existing IMO guidelines and prepare for the new international regulatory regime.

Activities

Technical assistance activities being carried out under GloBallast include:

- **Education and awareness.**
- **Ballast water risk assessments.**
- **Port baseline surveys.**
- **Ballast water sampling.**
- **Training of port and shipping personnel in ballast water management practices.**
- **Assistance with laws and regulations.**
- **Self financing mechanisms.**

The initial demonstration sites will be replicated in each region as the programme develops.

IMO member countries are developing a new international convention to provide a standardised, global regulatory regime for the management of ballast water.

GloBallast Demonstration Sites

Demonstration Site	Pilot Country	Region
Dalian	China	Asia/Pacific
Khark Is	I.R. Iran	ROPME Sea Area & Red Sea
Mumbai	India	South Asia
Odessa	Ukraine	Eastern Europe
Saldanha	South Africa	Africa
Sepetiba	Brazil	South America

UN Agencies		
GEF - Washington DC (Funding Agency)	UNDP - New York (Implementing Agency)	IMO - London (Executing Agency)

Programme Summary

Global ***Ballast Water*** *Management Programme*

Development Objectives	● Assist developing countries to reduce the transfer of harmful aquatic organisms in ships' ballast water. ● Assist developing countries to implement the IMO Ballast Water guidelines (A.868(20)) and prepare for the new IMO Ballast Water Convention.
Timeline	● Initially three years – March 2000 to March 2003, extended by 1 year to March 2004.
Initial funding	● US$7.4 million from Global Environment Facility (GEF). US$2.8 million support-in-kind from participating countries.
Implementation	● United Nations Development Programme (UNDP).
Execution	● International Maritime Organization (IMO), through Programme Coordination Unit (PCU).
Recipients/beneficiaries	● Initially, six pilot countries/demonstration sites, to be replicated throughout regions.
Partners	● Shipping and port industries, international environmental non-government organisations, other parties as programme develops.
Activities	● Establish Programme Coordination Unit at IMO, comprising Chief Technical Adviser, Technical Adviser, Programme Assistant and support. ● Establish Information Clearing House – including website, databases/directories, library collection, newsletter and global communications system. ● Establish and support Lead Agency, Country Focal Point (CFP), Country Project Task Force (CPTF) and CFP Assistant in each pilot country. ● Establish Global coordination arrangements – Global Project Task Force (GPTF). ● Develop and implement communication, education and awareness raising programmes. ● Undertake Ballast Water Risk Assessments to assess risk of introductions of marine species at each demonstration site. ● Undertake Port Baseline Surveys of native biota and introduced marine species at each demonstration site. ● Develop Training Packages to train Lead Agency, port and shipping personnel in ballast water management measures as contained in IMO guidelines. ● Review legislation relevant to ballast water in each country and advise/assist improvements. ● Develop and implement National ballast water management plans for each pilot country. ● Hold global R&D symposium to review scope for new ballast water management and treatment measures and coordinate R&D agenda. ● Develop Compliance Monitoring and Enforcement (CME) systems for each demonstration site, including ballast water sampling equipment and training. ● Form Regional Task Forces (RTFs), support RTF meetings and study tours to the demonstration sites by personnel from neighbouring countries. ● Identify long term economic instruments that can be used to resource in-country ballast water management arrangements. ● Hold Strategic Directions/Donor Conference to provide sustainable continuity of the programme.

2nd Edition July 2002

Further Information

Programme Coordination Unit
Global Ballast Water Management Programme
International Maritime Organization
4 Albert Embankment London SE1 7SR United Kingdom
Tel +44 (0)20 7587 3247 or 3251
Fax +44 (0)20 7587 3261
Web http://globallast.imo.org

References

1. Carlton, J.T. 2002. Personal Communication.

2. Pimentel, D., Lach, L., Zuniga, L. and Morrison, D. 2000. Environmental and economic costs of nonindigenous species in the United States. *BioScience 50:53-65.*

3. O'Neill, C. R. 2000. Cited in: Carlton, J.T. 2001. *Introduced Species in U.S. Coastal Waters: Environmental Impacts and Management Priorities.* Pew Oceans Commission, Arlington VA.

4. C.L. Goggin (Ed.). 1998. Proceedings of a meeting on the biology and management of the introduced seastar *Asterias amurensis* in Australian waters. *Centre for Research on Introduced Marine Pests Technical Report No. 15* CSIRO, Hobart.

5. Andersen, A.B., Gollasch, S. & Rigby, G. 2002. Personal Communications.

6. Carlton, J. T. 1999. The scale and ecological consequences of biological invasions in the world's oceans, pp. 195-212. in: Odd Terje Sandlund, Peter Johan Schei, and Åuslaug Viken, editors, *Invasive Species and Biodiversity Management.* Kluwer Academic Publishers, Dordrecht, 431 pp.

Produced by the GloBallast PCU • Designed and printed by Daniel West & Associates