

Action Statement

Flora and Fauna Guarantee Act 1988

No. 100

Introduction of exotic organisms into Victorian marine waters

Description and Distribution

The introduction of exotic organisms into Victorian marine waters threatens the biodiversity and ecological integrity of Victoria's marine ecosystems, poses risks to human health, and threatens the social and economic benefits derived from the marine environment, including aquaculture, recreational and commercial fishing and domestic and international shipping.

Once an exotic organism has been introduced, it may or may not establish a viable breeding population. When established in marine systems, exotic organisms are extremely difficult and often impossible to control or eliminate.

Some 99 exotic organisms are known to have become established in Victorian marine waters (Thresher *et. al* 1999). Such organisms vary in size from large plants to micro-organisms and include algae, fishes, polychaetes, rotifers, nematodes, crustaceans, ascidians, bryozoans, bivalves, gastropods, hydroids and ciliates (Hewitt *et. al* 1999). Exotic organisms of particular concern to Victoria are likely to be one or more of the following:

- species which can dominate space and competitively exclude native species, eg. Sabella worm (*Sabella spallanzanii*), kelp (*Undaria pinnatifida*);
- species which are voracious predators, eg. Northern Pacific seastar (*Asterias amurensis*);
- species with the potential to have adverse impacts on fisheries habitat, eg. Corbula (*Corbula gibba*) (Gunthorpe *et. al* 1997);
- dinoflagellate species which cause toxic algal blooms;
- species with the potential to affect environmental processes, the Sabella worm

may, for example, have impacts on nitrogen cycling in Port Philip Bay (Parslow and Murray 1999); and

- disease causing organisms such as viruses, protozoa and bacteria that pose risks to human health (eg. cholera), and threaten indigenous species, marine aquaculture and wild fish stocks.

Current and potential impacts of exotic organisms in Victorian marine waters and overseas, are discussed in more detail in *Report on Ballast Water and Hull Fouling in Victoria* (ENRC 1997).

Exotic organisms may be transported to Victoria as spores, larvae or adults through various means including:

- discharge of organisms in water and sediments from ship ballast tanks;
- as part of fouling communities on vessel hulls;
- through sediment in dredges; and
- via aquaculture and fishing industries as, for example, in the transport of exotic species with live fish and transfer of species on fishing equipment.

Most exotic species that have become established in Victorian marine waters are believed to have been introduced via ships' ballast water and on ships' hulls (ENRC 1997).

Ballast water provides vessel stability and is essential for the safe, efficient and effective operation of sea-going vessels.

When sea water is pumped into ballast tanks, organisms and sediment present in the water may also be taken on-board.

Organisms in ballast tanks may survive for days, weeks or months. When ballast is discharged, sediment and organisms that have been carried in the tanks from source locations are also released, and organisms may successfully establish new populations.

Fouling organisms such as barnacles, molluscs and sponges cling to the submerged part of vessel hulls. In port they may release eggs, spores or larvae which can settle on nearby berths and piers. Other animals such as sea-stars or crabs nestle in fouling encrustations or hide in pipes and other apertures and can therefore be transferred as adults from one place to another. Where hulls are cleaned by divers in-water, the release into the water of cleaning debris is also a potential source of exotic organism introductions. If disposed of incorrectly, the organic material in debris from on-shore hull cleaning of commercial, fishing and recreational vessels may also result in exotic organism introductions.

In addition to the risk of transfer of exotic organisms from international ports, there is a risk of translocation of established exotic species into Victoria from other Australian ports; from one Victorian port to another; and from one location to another within Victorian ports.

The large number of vessel visits to Victoria and the quantities of ballast water received by Victorian ports gives some indication of the risk to Victoria of organism introductions via ships. It has been estimated, for example, that in 1994/95, Victoria's four major commercial ports (Melbourne, Geelong, Hastings and Western Port) received approximately six million tonnes of ballast water (Walters 1996). In the same period, a total of 3 416 commercial vessels originating from a large number of Australian and international ports visited Victoria (Walters 1996). Social and economic values of Victorian Marine Waters

Victorian marine waters provide valuable economic and social benefits for Victoria. Many of these benefits may be threatened by the degradation of the marine environment by exotic organisms.

The marine waters of Victoria support significant economic activity, generating billions of dollars from commercial and recreational use. Such activities include recreational and commercial fisheries, aquaculture, eco-tourism, and recreational water-based activities such as boating, swimming and scuba diving. It has been estimated, for example, that in 1995/96, Port Phillip Bay and Western Port Bay contributed \$7.7 billion to the State economy, or 7.4% of Gross State Product (KPMG 1997). The contribution of the recreational fishing industry to Victoria's Gross State Product in 1996 was estimated at \$1.265 billion (Unkles 1997). The wholesale value of the

Victorian commercial marine fishery in 1996/97 was approximately \$74 million. Many of these economic benefits may be affected by exotic organism introductions.

Victorian marine waters provide many social benefits to Victorians. Amenity value, for example, is an important social resource. Approximately 80% of Victoria's population live along the coast, and for many Victorians, the coast and marine waters are an important resource for recreation and leisure. Much of the appeal and value of Victoria's coasts lies in the biodiversity and good health of the marine environment. It is estimated, for example, that Victorians make 92 million individual visits to the coast annually (TQA Market Research 1996). This figure does not include visits to the coast for recreational fishing.

Eco-tourism associated with Victorian marine waters provides valuable economic and social benefits. The Penguin Parade at Phillip Island, for example, generated approximately \$5 million in 1995/96 from 520 000 visitors, and it is estimated that these visitors contributed a total of around \$96 million to the Victorian economy (KPMG 1997).

Management Status

Current status

The Introduction of Exotic Organisms into Victorian Marine Waters is listed as a Potentially Threatening Process on Schedule 3 of the Flora and Fauna Guarantee Act 1988 (Vic).

Reasons for management status

In its final recommendation for the listing of exotic organism introductions as a Potentially Threatening Process, the Scientific Advisory Committee (SAC 1992) determined that, in the absence of appropriate management, the introduction of exotic organisms into Victorian marine waters:

- poses or has the potential to pose a significant threat to the survival of a range of flora and fauna.

Major Management Objective

Recognition of the importance of conserving and preserving biodiversity is reflected in a number of international and national agreements and arrangements including the Convention on Wetlands of International Importance (1971) (Ramsar Convention), *National Strategy for the Conservation of Australia's Biodiversity* (Commonwealth of Australia 1996), *National Strategy for Ecologically Sustainable Development* (Commonwealth of Australia 1992) and the *Intergovernmental Agreement on the Environment*

(1992). The Australian Oceans Policy (Government of Australia 1998), released in 1998 by the Commonwealth, will also address the risks posed to marine biodiversity by exotic organism introductions.

The Victorian Government is committed to ecologically sustainable development (ESD). The application of ESD principles will help ensure that, as a society, we are not running down our natural assets and building up an 'environmental debt', such as occurs through the establishment of exotic marine organisms.

Accordingly, major management objectives of this Action Statement are:

- to minimise further introductions of exotic organisms into Victorian marine waters ; and
- to develop and implement, where possible, practical measures to manage the spread and minimise the adverse effects of current and future (if any) incursions of exotic organisms in Victorian marine waters.

In prioritising these two management objectives, it is recognised that an approach which focuses on on-going minimisation of further exotic organism introductions is more effective in environmental and economic terms, than attempting to eradicate or manage exotic organisms once they have arrived.

Management Issues

A number of long- and short-term management challenges must be met if the above objectives are to be achieved. These challenges relate to both the risk minimisation of further organism introductions, and the risk minimisation of impacts from organisms which have already become established (incursions).

The development and implementation of a systematic approach for the management of exotic organism introductions through ballast water operations and hull fouling poses challenges which are uniquely complex. In many nations, ballast water management is still emerging as an environmental imperative. Nationally and internationally, responses to the ballast water problem are still being developed and issues of jurisdiction, responsible authorities, and international and national co-operation are far from settled. In addition, the impacts of exotic marine incursions affect a wide range of industry and community stakeholders, each with their own suite of expectations - all of which require consideration. Other factors contributing to the management challenges posed by exotic organism introductions include:

- Internationally, ballast water management is not an issue which achieves uniform

recognition. Vessels do not experience uniformity of management from one place to another, and ship owners and managers themselves approach the problem with varying degrees of concern.

- Many current ballast water treatment technologies do not offer viable solutions to the ballast water problem or have limited application due to environmental concerns and operational or economic constraints. Refer to *Report on Ballast Water and Hull Fouling in Victoria* (ENRC 1997) for more detail.
- The slow vessel replacement rate for the shipping fleet that visits Victoria means that the introduction of new design standards incorporating ballast water management technologies is some time off, particularly in the absence of broad international support.
- The limited taxonomic and survey data for most Australian and international ports inhibits the effectiveness of species-specific risk-based approaches to the minimisation of organism introductions.
- The development of technologies and management strategies for exotic marine incursions is in its infancy. Consequently, actual management responses to exotic organism incursions in Australia have been on a case-by-case basis and have focussed on physical removal and containment of organisms.

Despite these challenges, progress is being made in the development of mechanisms to address the problems of exotic organism introductions.

Previous Management Action

Since the early 1970s, action at the international and national levels to address the issue of exotic organism introductions has laid the foundation for the ongoing development of a more systematic and integrated approach to managing the risks associated with such introductions. A detailed list of relevant actions over the last two decades is provided in *Report on Ballast Water and Hull Fouling* (ENRC 1997).

Some of the major activities with particular relevance to Victoria are outlined below:

- In 1990 the Australian Quarantine and Inspection Service (AQIS) introduced voluntary ballast water management guidelines to minimise the risk of organism introductions into Australia from international shipping.
- In 1993, in recognition of the international problem of exotic organism introductions, the International Maritime Organisation (IMO) recommended that international ballast water management guidelines be included as an

Annex to the *MARPOL Convention* (International Convention for the Prevention of Pollution from Ships).

- In early 1995, the EPA and the then Victorian Ports of Melbourne, Geelong, Western Port and Portland, commissioned a study to examine the risks to Victoria of exotic organism introductions, the quantities and movement of ballast water into Victorian ports, and the risk of introductions via hull fouling and in-water cleaning (Walters 1996).
- In December 1995, AQIS released its *Australian Ballast Water Management Strategy* for international shipping, and in 1996, the Australian Ballast Water Management Advisory Council (ABWMAC), a non-statutory group reporting to the Commonwealth Minister for Primary Industries and Energy, was established to implement the Strategy.
- In July 1996, the EPA issued a Pollution Abatement Notice to prevent a vessel suspected of carrying high-risk ballast water from Tasmania from discharging its ballast in Victoria.
- In November 1996, ABWMAC adopted voluntary *Australian Coastal Voyage Ballast Water Management Guidelines* to minimise the risk of exotic organism introductions from domestic vessel voyages.
- In January 1997, a Code of Practice for Hull Cleaning in Victorian ports was introduced by the Victorian Channels Authority to minimise the risk of further exotic organisms introductions into Victoria via hull fouling.
- In October 1997 the Environment and Natural Resources Committee of the Parliament of Victoria released its *Report on Ballast Water and Hull Fouling in Victoria* (ENRC 1997) which contained 15 bipartisan recommendations for improved management of ballast water and exotic organism incursions in Victoria.
- In December 1997 the EPA began development of a statutory Industrial Waste Management Policy and Policy Impact Assessment for the Management of Ships' Ballast Water and Hull Cleaning (EPA 1997), to minimise the risk to the marine environment, the fishing and aquaculture industries and human health, from exotic organism introductions.
- In September 1999, the Commonwealth Government announced that ballast water management will be mandatory for ships entering Australian waters from July 2001.
- In October 1999, CSIRO released a comprehensive scientific report - *Marine Biological Invasions of Port Phillip Bay, Victoria* - that forms an international benchmark for marine pests management (Hewitt *et.al* 1999).

Implementation will be aided by: detailed surveys of exotic species in the Ports of Portland (Parry *et al.* 1997), Hastings (Currie & Crookes 1997), Geelong (Currie *et al.* 1998) and Melbourne (in progress); various research, monitoring and other programs for introduced species initiated by research institutions and government (e.g. Nicholson & Roob 1997, Officer 1997, Bite *et al.* 1997, Trowbridge 1999); trialing of ballast water management arrangements (PPK Environment & Infrastructure Pty Ltd and Thompson Clarke Shipping 1999) and statutory support provided by existing Victorian legislation, for example, various exotic species are currently listed as Noxious Aquatic Species under the **Fisheries Act 1995**.

Intended Management Action

Introduction

In implementing the actions listed below, it is recognised that the problem of exotic organism introductions through ship's ballast water and hulls is an international, national and state issue, and that significant research and consultation is occurring at all levels to address the problem of such introductions. Australia's pursuit of an international agreement on improved ballast water management practices is necessary for practices to be fully effective. However by their nature international and national agreements take time, and these developments will only address the issue in the longer term.

Recognising the potentially serious and irreversible nature of exotic marine introductions, the management actions are intended to be implemented in a way which will contribute to, and is consistent with, anticipated international and national developments.

The intended ballast water management actions outlined in this Action Statement are based on current national and international guidelines for ballast water management. They are sufficiently flexible to incorporate new nationally agreed measures as they are developed, and will enable adaptation and improvement as knowledge and experience increases.

A risk-based approach is adopted as the basis for decision making associated with the eradication and management of exotic organisms in Victorian marine waters. Such an approach complements the national approach taken by AQIS in dealing with this issue.

It is intended that these management actions will ameliorate the effects of the Potentially Threatening Process of the Introduction of Exotic Organisms into Victorian Marine Waters.

Actions

1. Victorian Ballast Water Management System

A Victorian Ballast Water Management System is to be developed and managed by the EPA to:

- minimise organism introduction via the ballast water of commercial vessels visiting Victoria's four commercial ports (Melbourne, Geelong, Hastings and Portland); and
- minimise the risk of organism introductions and spread via the hulls of commercial vessels.

Components of the System include the development and implementation of:

- Port Ballast Water Management Plans;
- Ship's Ballast Water Management Plans;
- Ballast Water Management Guidelines;
- Risk assessment procedures for all vessels visiting Victoria;
- Information and awareness campaign;
- Compliance Monitoring Scheme; and
- Victorian Code of Practice for Hull Cleaning (Victorian Channels Authority Code of Practice).

Responsibility for measures under the System is shared between government, the commercial shipping industry, the fishing and recreational industries, and the community.

The System will become operational during 2000.

2. Industrial Waste Management Policy for Ballast Water and Hull Fouling

An Industrial Waste Management Policy (IWMP) is to be developed by the Environment Protection Authority (EPA) and provides a framework for preventative action to reduce the risk of exotic organism introductions into Victoria. Commercial shipping, fishing vessels, recreational craft and the management of marinas will be subject to the IWMP. The IWMP is the mechanism that will be used by the EPA to implement the Victorian Ballast Water Management System (VBWMS).

Responsibility for implementing measures to ensure that policy objectives are met will be shared between national and state governments, the shipping industry, port operators, and the community.

The IWMP will be finalised by December 2000.

3. Disposal of Biological Waste from Land-based facilities

The IWMP will include requirements for the operation of land-based facilities. The information and awareness campaign will include guidelines for the proper disposal of biological waste from small vessels on marinas and slipways.

Responsibility for implementing measures under the Guidelines extends to operators of maintenance facilities for ships and small vessels, marinas, the fishing industry and the community.

4. Codes of Practice or other Effective Measures to Minimise the Risk of Introduction and Spread of Exotic Organisms via Aquaculture, Fishing Activities and Boating

The Department of Natural Resources and Environment, in conjunction with relevant parties, will develop and implement codes of practice or other effective measures to minimise the risk of introduction and spread of exotic organisms via fishing, aquaculture, and boating. The 1999 Ministerial Council for Forestry, Fisheries and Aquaculture *National Policy for the Translocation of Live Aquatic Organisms* will assist with managing aquaculture related practices. Codes of practice or other effective measures will be finalised by December 2000.

5. Interim Victorian Protocol for Managing Exotic Marine Organisms Incursions

The Interim Victorian Protocol for Managing Exotic Marine Organism Incursions is to be developed, and implemented by NRE to minimise the impacts of, and manage exotic organism incursions. Components of the Protocol provide for:

- Rapid response in the event of a pest introduction;
- Protocol for notification and recording of suspected introduced exotic organisms;
- Arrangements for the eradication and containment of exotic organisms; and
- Management arrangements for exotic organism incursions that include requirements for monitoring and evaluation.

The implementation of measures under the Protocol is shared between government, industry and the community. It is to be implemented by March 2000.

Legislative Powers Operating

In addition to the international, national and state agreements (outlined previously) which are relevant to the protection and conservation of marine biodiversity, there is a body of Commonwealth and Victorian State legislation which provides various tools and mechanisms for preventing exotic organism introductions and managing exotic organism incursions.

Commonwealth and Victorian legislation applicable to the management of exotic organism introductions is summarised below:

Commonwealth Legislation

Coastal Waters (State Powers Act) 1980: provides a basis for the Commonwealth and the States to legislate on ballast water management issues. When the Commonwealth ceded to the states legislative powers over ports, harbours, shipping facilities, fisheries and the sea-bed, it did not cede quarantine powers over state waters. Federal/state jurisdictions over ballast water overlap in this respect. State laws relating to quarantine matters will therefore be invalid to the extent that they are inconsistent with federal provisions.

Protection of the Sea (Prevention of Pollution From Ships) Act 1983: gives effect to the provisions of the *MARPOL Convention*. This statute will be of importance only if a new Annex regarding ballast water is adopted by the International Maritime Organisation (IMO).

Quarantine Act 1908: provides powers and offences to regulate the introduction of exotic marine

species into Australian waters. The Act creates offences in relation to actual quarantinable material.

Victorian Legislation

Environment Protection Act 1970: provides for the prevention of pollution which is potentially harmful to plants, animals and humans, or which is detrimental to any beneficial use made of waters.

Fisheries Act 1995: provides for the protection and conservation of fisheries resources, habitats and ecosystems, and for the maintenance of aquatic ecological processes and genetic diversity. The Act creates strict liability offences for bringing, selling and transporting noxious aquatic species into Victoria and/or releasing them into protected waters.

Flora and Fauna Guarantee Act 1988: provides for the management of processes which are potentially threatening to Victoria's flora and fauna.

Marine Act 1988: empowers harbour masters to direct vessels in the time and manner of discharging ballast.

Plant Health and Plant Products Act 1995: provides for the control of plant pests and diseases across Victoria.

Pollution of Waters by Oil and Noxious Substances Act 1986: implements the *MARPOL Convention*. The Act will be of relevance in the future if a ballast water Annex is added to *MARPOL* by the International Maritime Organisation (IMO).

Port Services Act 1995: consolidates provisions of the *Marine Act* in relation to harbour masters' powers, and the *Pollution of Waters by Oil and Noxious Substances Act* in relation to regulating undesirable discharges from ships. The Act also divests pre-existing port authority powers to the Environment Protection Authority (EPA) and adopts the enforcement provisions of the *Environment Protection Act*.

Consultation and Community Participation

The intended management actions outlined in this Action Statement reflect Victorian Government policy regarding ecologically sustainable development and the maintenance of biodiversity. Actions to implement this policy have been informed by a number of extensive inquiries and investigations. These include: marine and coastal planning investigation by the Land Conservation Council (LCC 1996) and Environment Conservation Council (ECC 1998); the Ballast Water Inquiry of the Environment and Natural Resources Committee of the Victorian Parliament (ENRC 1997); the Port Phillip Bay Schedule F6 to the Waters of Victoria SEPP and associated Port Phillip Bay Environmental Study (Harris *et. al.* 1996); response arrangements to marine pest incursions (Ferns and Curnow 1999, Parry *et. al.* 1999) and the trial of nationally consistent procedures for ballast water management in coastal voyages (PPK Environment & Infrastructure Pty Ltd and Thomson Clarke Shipping 1999). These investigations, the ENRC Inquiry in particular, and Victorian Government participation in the ABWMAC have involved extensive consultation and discussion with state and federal government agencies, the shipping, fishing and aquaculture industries, conservation and community groups, researchers and other individuals.

The Industrial Waste Management Policy and policy impact assessment for the Management of Ships' Ballast Water and Hulls, will be developed in consultation with industry and community organisations.

Implementation, Evaluation and Review

Given the range and interdependence of the management strategies required to meet the objectives of this Action Statement, responsibility for the implementation of these strategies is shared by several agencies, industries, organisations and individuals. These include government agencies, the port, shipping and fishing industries, recreational organisations and the community.

Key implementation responsibilities within Government are as follows:

- The EPA will develop and manage a Victorian Ballast Water Management System. The EPA is responsible for the development of an Industrial Waste Management Policy for the Management of Ships Ballast Water and Hull Cleaning which will include reference to the disposal of biological waste from land-based facilities. The EPA will manage the Victorian Ballast Water Management System.

NRE will develop and manage the Interim Victoria Protocol for Managing Exotic Marine

- Organism Incursions. NRE is also responsible for the development of measures to minimise risks of introduction and spread of exotic organisms by fishing, aquaculture and boating. Operational responsibilities will be described in these documents.

Evaluation and review of the collective success of the management strategies outlined in this Action Statement will be the responsibility of NRE in co-operation with the EPA, industry and the community. An evaluation will be completed prior to review of this Action Statement in 2002, or earlier if necessary. This Action Statement may also be amended to incorporate national and international developments in the prevention and management of exotic species introductions.

Acronyms

- ABWMAC - Australian Ballast Water Management Advisory Council.
- AQIS - Australian Quarantine and Inspection Service.
- CRIMP - CSIRO Centre for Research on Introduced Marine Pests
- ENRC - Environment and Natural Resources Committee of the Parliament of Victoria.
- EPA - Environment Protection Authority.
- IWMP - Industrial Waste Management Policy.
- MARPOL - International Convention for the Prevention of Pollution from Ships.
- NRE - Department of Natural Resources and Environment.
- PIA - Policy Impact Assessment.
- SAC - Scientific Advisory Committee (Flora and Fauna Guarantee).
- VBWC - Victorian Ballast Water Committee.
- VBWMS - Victorian Ballast Water Management System.

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Further information can be obtained from Department of Sustainability and Environment Customer Service Centre on 136 186.

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