



Natural Resources  
and Environment

AGRICULTURE

RESOURCES

CONSERVATION

LAND MANAGEMENT

# Interim Victorian Protocol for Managing Exotic Marine Organism Incursions

December 1999



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# Contents

## **1. Introduction**

- 1.1 Aim of the Protocol
- 1.2 Objectives of the Protocol
- 1.3 Authority for the Protocol
- 1.4 Scope of the Protocol
- 1.5 Policy
- 1.6 Integration with Other Plans
- 1.7 Maintenance of the Protocol

## **2. Implementation of the Protocol**

- 2.1 Administrative Responsibility
- 2.2 Operational Responsibility
- 2.3 Victorian Incursion Management Committee
- 2.4 State Contact Officer

## **3. Response to an Incursion**

- 3.1 Initial Response Arrangements
- 3.2 Operational Response Arrangements

## **4. Initial Response Arrangements**

- 4.1 Aim
- 4.2 Responsibility for Implementation
- 4.3 Role of the Executive Director
- 4.4 Role of the State Contact Officer
- 4.5 Elements of Initial Response Arrangements
  - 4.5.1 Detection
  - 4.5.2 Reporting
  - 4.5.3 Verification
  - 4.5.4 Notification and Recording
    - Notification
    - Recording
  - 4.5.5 Decision
    - Responsibility for Decision Making
    - Decision Options
    - Issues to be Considered

## **5. Operational Response Arrangements**

- 5.1 Aim
- 5.2 Operational Response Plan
- 5.3 Responsibility for Developing an Operational Response Plan
- 5.4 Responsibility for Approving an Operational Response Plan
- 5.5 Content of Operational Response Plan
  - 5.5.1 Planning
  - 5.5.2 Implementation
  - 5.5.3 Monitoring
  - 5.5.4 Resourcing
  - 5.5.5 Communicating
  - 5.5.6 Evaluation

- 
- 5.5.7 Reporting
  - 5.6 Incursion Management Report
    - 5.6.1 Publication of Reports

## **6. Explanatory Notes**

**Appendix A Exotic Marine Organism Reporting Form**

**Appendix B Exotic Marine Organism Site Inspection Form**

# 1. Introduction

The implementation of this Protocol is intended to minimise the adverse impacts of exotic marine organism incursions in Victorian marine waters.

## **1.1 Aim of the Protocol**

To ensure that Victoria has appropriate measures in place to minimise the adverse effects of future incursions of exotic marine organisms into Victorian marine waters, and to minimise the adverse effects of current exotic marine organism incursions.

## **1.2 Objectives of the Protocol**

In preparation for, or in the event of an incursion, to have in place measures that:

- identify the roles and responsibilities of personnel responding to an exotic organism incursion;
- outline operational procedures and plans to evaluate and co-ordinate the response;
- ensure rapid and effective decision making on what specific actions should be taken to manage an incursion;
- identify the strategies and actions to be adopted in the event of an incursion;
- provide clear documentation; and
- provide relevant contact details.

Provide administrative arrangements that will:

- ensure integration and co-operation between the Protocol and other national and state plans and strategies;
- provide appropriate public information and education;
- identify arrangements to ensure on-going management of incursions; and
- identify arrangements to ensure effective implementation and review of the Protocol.

## **1.3 Authority for the Protocol**

The Interim Victorian Protocol for Managing Exotic Marine Organism Incursions is established and maintained under the authority of the Secretary, Department of Natural Resources and Environment.

## **1.4 Scope of the Protocol**

The Protocol applies to suspected and confirmed introductions of exotic marine organisms to Victoria's marine waters. They include: waters along the open coast out to the territorial limit of 3 nautical miles; the bays, inlets and estuaries; and the associated intertidal and seafloor habitats.

An exotic marine organism incursion occurs when an exotic marine organism is introduced into, and establishes viable breeding populations in Victorian marine waters.

### **1.5 Policy**

The Victorian Government's policy for managing exotic marine organism introductions is outlined in the Action Statement 'Introduction of Exotic Organisms into Victorian Marine Waters'. This Action Statement is prepared under the *Flora and Fauna Guarantee Act 1988*.

The policy objectives 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 incursions of exotic organisms in Victorian marine waters.

### **1.6 Integration With Other Plans**

The Protocol complements arrangements to improve management practices for the shipping, marine engineering, boating, fishing and aquaculture industries to reduce the risk of spread of exotic marine organisms within Victorian waters.

The Protocol recognises contingency arrangements identified in Fisheries Management Plans that may be prepared from time-to-time, for the management of exotic marine organisms used for aquaculture; and management plans for ports, that may be prepared from time-to-time to manage marine pest incursions and populations.

### **1.7 Maintenance of the Protocol**

The Interim Victorian Protocol for Managing Exotic Marine Organism Incursions is subject to ongoing update and review. It will also be amended to incorporate new research and other national and international developments in the management of incursions. The Department of Natural Resources and Environment is responsible for ensuring that the information contained in this Protocol is current.

Maintenance of the Protocol is the responsibility of the Executive Director Parks Flora & Fauna to whom all amendments should be addressed. Proposed amendments should be submitted to:

Executive Director Parks Flora & Fauna  
Department of Natural Resources and Environment  
PO Box 500  
East Melbourne Victoria 3002

## **2. Implementation of the protocol**

### **2.1 Administrative Responsibility**

The Department of Natural Resources and Environment has administrative responsibility for the implementation of this Protocol.

### **2.2 Operational Responsibility**

The Department of Natural Resources and Environment, Executive Director Parks Flora & Fauna, is responsible:

- for the decision to choose between either an immediate or a long-term response to an incursion as provided by the Initial Response Arrangements, see Section 4;
- for the approval of an Operational Response Plan, as provided by the Operational Response Arrangements, see Section 5;
- for the approval of the release of an Incursion Management Report, as provided by the Operational Response Arrangements, see Section 5.

Responsibility for the delivery of management actions resulting from this Protocol may be delegated by the Executive Director Parks Flora & Fauna through an Operational Response Plan.

### **2.3 Victorian Incursion Management Committee**

The Executive Director Parks Flora & Fauna will establish a Victorian Incursion Management Committee. The role of the committee is to advise the Executive Director Parks Flora & Fauna on matters related to initial response to an incursion, the approval of Operational Response Plans, and Incursion Management Reports. The Executive Director will appoint the committee chair, and members will be chosen for their general scientific skills relevant to the management of incursions.

### **2.4 State Contact Officer**

The Executive Director Parks Flora & Fauna will appoint a State Contact Officer. The State Contact Officer will be the contact point for the reporting of incursions and will also implement aspects of the Initial Response Arrangements.

### 3. Response to an Incursion

Arrangement that provide a structured response to suspected and confirmed incursions can be of two forms: an *Initial Response* and an *Operational Response*.

#### **3.1 Initial Response Arrangements**

The Initial Response Arrangements provide a framework to ensure that rapid decisions on appropriate management options are made in the event of an incursion in Victoria.

#### **3.2 Operational Response Arrangements**

Operational Response Arrangements are implemented following an incursion of exotic marine organisms. They may be either:

- **Immediate** containment/eradication; or
- **Long-term**.

## **4. Initial Response Arrangements**

### **4.1 Aim**

To provide arrangements that ensure a rapid decision on the management response following an incursion. The Initial Response Arrangements are to be implemented when the sighting of a suspected incursion is reported, and terminated when a decision is made regarding an appropriate management response.

### **4.2 Responsibility for Implementation**

The Department of Natural Resources and Environment is responsible for the implementation of Initial Response Arrangements. Key personnel for ensuring that the Initial Response Arrangements are implemented are the Executive Director Parks Flora & Fauna and the State Contact Officer.

### **4.3 Role of the Executive Director Parks Flora & Fauna**

For any confirmed new incursion the Executive Director will have responsibility for the decision on the type of response to be taken to the incursion.

### **4.4 Role of the State Contact Officer**

For any reported sighting of a suspected incursion the State Contact Officer will have:

- responsibility for ensuring that the reporting, verification and notification elements of the Initial Response Arrangements (Chart 1) are initiated; and
- responsibility for ensuring that the above elements are fully implemented within 5 days of a suspected sighting being reported.

Specifically, the State Contact Officer will:

- complete an Exotic Marine Organism Reporting Form;
- determine whether a suspected exotic organism sighting should be investigated further;
- arrange for a site inspection to be conducted and specimens to be collected;
- arrange for taxonomy of the specimen to be confirmed;
- inform key organisations of the incursion;
- arrange for the Victorian Incursion Management Committee to consider incursion management options; and
- inform key organisations of the actions to be taken as decided by the Executive Director Parks Flora & Fauna.

## **4.5 Elements of Initial Response Arrangements**

- |                               |   |
|-------------------------------|---|
| 1. Detection                  | Suspected exotic organism is sighted  |
| 2. Reporting                  | Sighting is reported to State Contact Officer   |
| 3. Verification               | Identity of suspected exotic organism is confirmed by State Contact Officer   |
| 4. Notification and Recording | Appropriate state and national organisations are notified of the exotic organism incursion. Specimen is lodged with Museum of Victoria or the National Herbarium of Victoria                                    |
| 5. Decision                   | <p>a) <b>Immediate</b> containment/eradication operational response arrangements are to be implemented.</p> <p><b>OR</b></p> <p>b) <b>Long-term</b> operational response arrangements are to be implemented</p> |

### ***4.5.1 Detection***

A suspected exotic marine organism may be detected by a wide variety of people including:

- port users and managers;
- staff and students from research institutions;
- staff from management agencies such as NRE and EPA;
- representatives from the aquaculture, recreational and commercial fishing industries;
- recreational divers and other community members who use the marine environment.

### ***4.5.2 Reporting***

The Initial Response Arrangements establish formal reporting channels for suspected exotic marine organism sightings.

On receiving notification of a suspected sighting of an exotic marine organism the State Contact Officer will:

- complete an Exotic Marine Organism Reporting Form (Appendix A); and
- assess details of the sighting, provided by the person who made the sighting, in order to decide whether the sighting is to be further investigated. If the decision is to discontinue the investigation, advise the Executive Director Parks Flora & Fauna accordingly.

### ***4.5.3 Verification***

Following an assessment of the sighting and decision by the State Contact Officer to continue the investigation, the State Contact Officer must:

- arrange for a site inspection and ensure that specimens are collected from the site; and
- confirm the identity of the specimen.

*Site Inspection* Site inspections must be conducted by a suitably qualified person who provides a report to the State Contact Officer through the submission of a completed Site Inspection Form (Appendix B). In summary, the person conducting the inspection must:

- record details of the personnel conducting the inspection;
- provide accurate location data of the site inspected;
- describe in detail the distribution, abundance and biological characteristics of the suspect exotic organism;
- collect and preserve specimens;
- provide photographic or video evidence if appropriate;
- dispatch specimens for taxonomic verification; and
- note other relevant observations and conclusions.

#### **4.5.4 Notification and Recording**

*Notification* Once the identity of a suspected exotic marine organism is confirmed and the sighting has been verified as a positive sighting, the State Contact Officer must immediately notify the following organisations of the incursion:

- Environment Protection Authority – Manager Water and Catchment Policy;
- Victorian Channels Authority – Navigation Services Manager;
- Australian Quarantine and Inspection Service – Manager AQIS Ballast Water Management Program;
- Centre for Research on Introduced Marine Pests – Head of Centre; and
- Environment Australia – Manager Introduced Pests Program.

This notification is given on the understanding that, until the Executive Director Parks Flora & Fauna has decided on what action is to be taken to manage the incursion, third parties are not to be notified.

Once a decision has been made by the Executive Director Parks Flora & Fauna, the State Contact Officer must again contact the organisations listed above and notify them of the intended management actions to be taken. This is in addition to any advice to key stakeholders, press releases or other publicity generated as part of any Operational Response Arrangements.

*Recording* Once an exotic organism has been positively identified, the State Contact Officer must lodge a specimen and relevant documentation with the Museum of Victoria or the National Herbarium (Victoria).

Specimens may also be lodged with other relevant organisations.

#### **4.5.5 Decision**

*Responsibility for Decision Making* The Executive Director Parks Flora & Fauna must choose an option for the management of a confirmed incursion within 5 days of the verification of an exotic marine organism sighting. Attempts to eradicate and/or contain exotic marine organism incursions are most effective if implemented at the early stages of an incursion.

*Decision Options* Depending on the degree of risk to the marine environment and feasibility of management techniques and technologies, a decision must be made to either:

- immediately attempt a species-specific containment/eradication program through the implementation of immediate eradication/containment; or
- manage the incursion as part of the long-term arrangements for existing incursions.

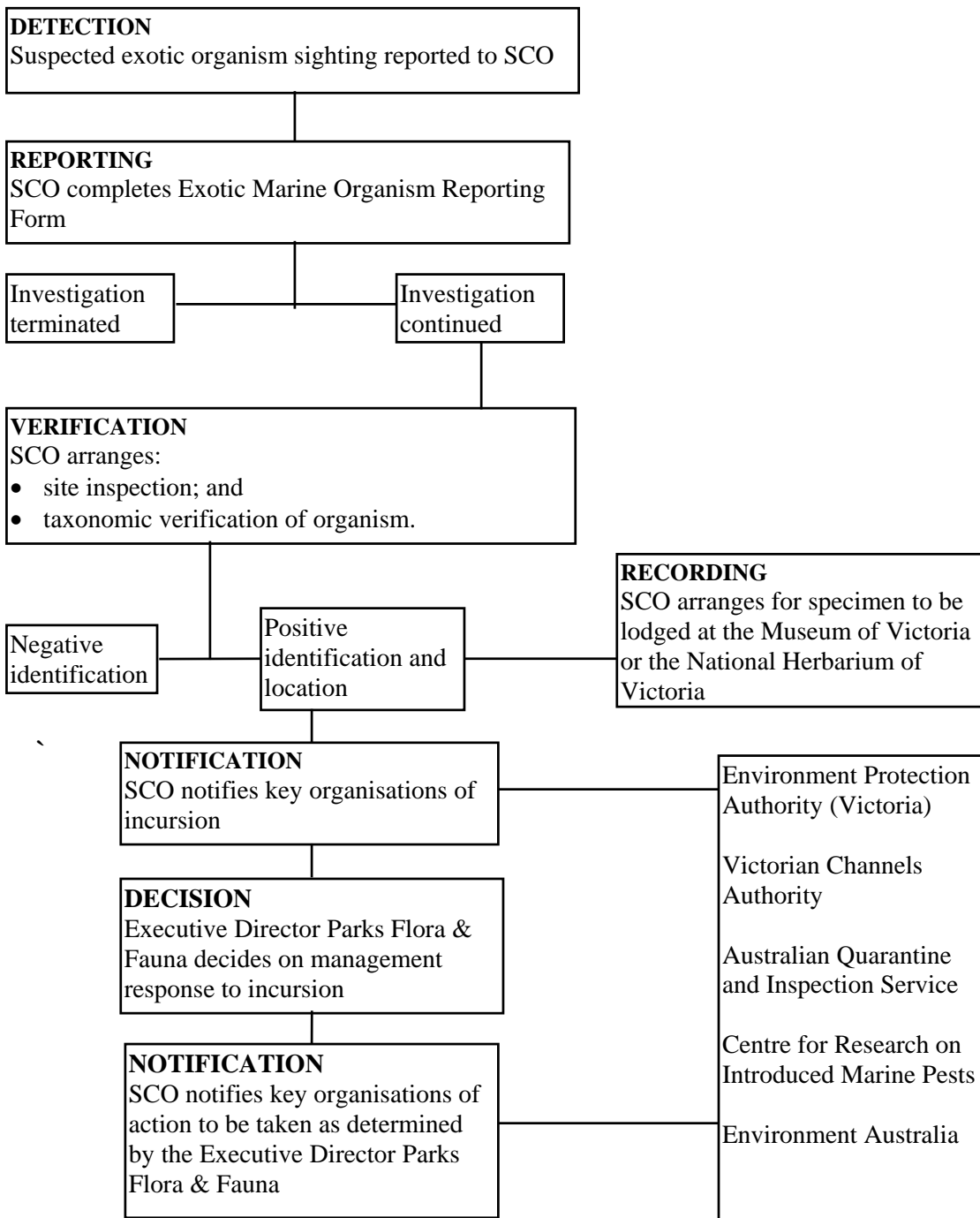
The Executive Director Parks Flora & Fauna must therefore, based on the available information, make an assessment of the degree of risk posed to the Victorian marine environment by the introduced exotic marine organism, and consider the feasibility of readily available management options. The details of any management programs are to be determined later, through the development of an Operational Response Plan (Section 5).

*Issues to be Considered* In reaching a decision, the following are to be considered:

- the specific social, environmental and economic values at risk as a result of the incursion, including the listing of the species on any relevant Victorian or National marine pest schedule; and
- the practicality and likely effectiveness of available management options.

**CHART 1**

**INITIAL RESPONSE ARRANGEMENTS**  
**PROCEDURES FOR STATE CONTACT OFFICER (SCO)**



## **5. Operational Response Arrangements**

### **5.1 Aim**

To provide arrangements that ensure an effective management response to incursions through the development and implementation of an approved Operational Response Plan.

### **5.2 Operational Response Plan**

Management responses to an incursion will be outlined in an approved Operational Response Plan. The focus of such Plans may be either:

- Immediate - where predominantly immediate field actions will be required in the days or weeks following an incursion. These are likely to be locality and species specific in focus.
- Long-term - where actions generally relate to research programs to further the understanding of the species and/or development of control techniques for the exotic species, or the introduction of quarantine measures. Long-term actions are likely to extend over months or years.

### **5.3 Responsibility for developing an Operational Response Plan**

The Executive Director Parks Flora & Fauna is responsible for the development of an Operational Response Plan, and may delegate this responsibility as appropriate. For incursions that require an immediate response, a draft Plan is to be completed as a matter of urgency following a decision to prepare such a Plan.

### **5.4 Responsibility for Approving an Operational Response Plan**

The Executive Director Parks Flora & Fauna is responsible for the decision to approve or request amendment to a draft Operational Response Plan. For a Plan that involves an immediate operational response, a decision is to be provided within 48 hours of receipt of the Plan. Approval of the Plan will constitute approval of its implementation.

### **5.5 Content of an Operational Response Plan**

Operational Response Plans are to be prepared in a project brief format and would be expected to be less than three pages. Explanatory notes may be attached as required. Operational Response Plans must address the following Sections:

- Planning - what is intended to be achieved.
- Implementation - what are the tasks, when will they occur and when will they cease.
- Monitoring - how will the tasks and their effect be recorded.
- Resourcing - the funds and/or other resources required.

- Communicating - who will be responsible for communicating with key stakeholders and the media.
- Evaluation - how will effectiveness of the operational response be assessed.
- Reporting - arrangements to report on the implementation of the Plan.

### ***5.5.1 Planning***

This Section will outline the objectives to be met by implementing the Plan. Optimally, there will be less than seven objectives. Other action plans containing related objectives are to be listed.

### ***5.5.2 Implementation***

This Section will outline:

- personnel responsible;
- methodologies;
- scheduling;
- health and safety issues; and
- contingency arrangements.

### ***5.5.3 Monitoring***

This Section will outline the monitoring requirements relevant to the implementation of the Plan and those that may be required to determine if the intended objectives have been achieved.

### ***5.5.4 Resourcing***

This Section will identify the funds and/or other resources required to implement and report on the Plan, along with the source of such resources and any conditions that may need to be met in order to obtain them.

### ***5.5.5 Communicating***

This Section will identify responsibilities for communicating with key stakeholders and the media, with respect to the Plan.

### ***5.5.6 Evaluation***

This Section will outline methods and expertise required for the evaluation of the effectiveness of the design of the Plan as a whole and its implementation in the light of Government policy for managing the risk of exotic marine organisms. The evaluation will specifically address: the implementation; monitoring; resourcing; and communicating Sections of the Plan.

### ***5.5.7 Reporting***

This Section will identify the resources and responsibility for completing an Incursion Management Report (Section 5.6).

## **5.6 Incursion Management Report**

The implementation of an Operational Response Plan will be reported in an Incursion Management Report. A draft is to be submitted to the Executive Director Parks Flora & Fauna for approval, prior to its release.

Reports arising from Plans with a focus on immediate action are to be completed within 3 months of Plan implementation. Where Plans have a long-term focus, progress reports are to be provided at appropriate intervals.

An Incursion Management Report must include:

- background details of the Operational Response Plan;
- all monitoring data and results to date;
- an evaluation of the effectiveness of the Plan and its implementation, and, where appropriate;
- recommendations that may assist improving the management of incursions.

### ***5.6.1 Publication of Reports***

Incursion Management Reports will be published in approved NRE Divisional Reports and at the NRE Web site ([www.nre.vic.gov.au](http://www.nre.vic.gov.au)).

## 6. Explanatory Notes

These notes provide a context for and explanation of the Protocol.

### 1. Introduction

The Victorian Government determined its policy for managing the risk of exotic organism introductions to Victoria's marine waters when it responded to the recommendations contained in the *Report on Ballast Water and Hull Fouling in Victoria*<sup>1</sup>. It indicated that the Department of Natural Resources and Environment would be responsible for arrangements related to responding to new incursions and the ongoing management of existing incursions. This responsibility forms part of a formalised, systematic and integrated approach to managing the risks of exotic marine organisms.

Relevant state, national and international emergency or contingency plans examined prior to preparing this protocol, included:

- AUSVETPLAN<sup>2</sup>
- Victorian Marine Pollution Contingency Plan<sup>3</sup>
- Port Phillip Region Marine Pollution Contingency Plan<sup>4</sup>
- Response Plan to Deal With Wildlife Affected by an Oil Spill, Port Phillip Area - Melbourne<sup>5</sup>
- Emergency Management Manual Victoria<sup>6</sup>
- The Incident Control System of the Australian Inter-service Incident Management System<sup>7</sup>
- Fire Preparedness and Response Plan, Port Phillip Area 1993/94<sup>8</sup>
- A Study of the Emergency Response Process in NRE<sup>9</sup>.

### 1.5 Policy

Relevant Government policy is summarised in the Action Statement 'Introduction of Exotic Organisms into Victorian Marine Waters'<sup>10</sup>. The policy recognises that continuing efforts to minimise further exotic organism introductions is more effective in environmental and economic terms, than are attempts to eradicate or manage exotic marine organisms once they have arrived.

<sup>1</sup> Environment and Natural Resources Committee 1997. Report on Ballast Water and Hull Fouling in Victoria. Report of the Parliament of Victoria Environment and Natural Resources Committee. Victorian Government Printer.

<sup>2</sup> Developed and agreed to by the Commonwealth and State and Territory Governments, in consultation with industry to enable fast, effective and efficient eradication action to be implemented in the event of an exotic disease outbreak

<sup>3</sup> Department of Transport (1995) Victorian Marine Pollution Contingency Plan, Department of Transport.

<sup>4</sup> Victorian Channels Authority (1998) Port Phillip Region Marine Pollution Contingency Plan, Victorian Channels Authority.

<sup>5</sup> Department of Conservation and Natural Resources (1994) Response Plan to Deal With Wildlife Affected by an Oil Spill, Port Phillip Area - Melbourne, October 1994, Department of Conservation and Natural Resources.

<sup>6</sup> Minister for Police and Emergency Services (1997) Emergency Management Manual Victoria, Law Press

<sup>7</sup> AIIMS Working Party (1992) The Incident Control System (ICS) of the Australian Inter-service Incident Management System (AIIMS), AARFA Publications Association Inc. on behalf of the AIIMS Publications Group.

<sup>8</sup> Department of Conservation and Natural Resources (1994) Fire Preparedness and Response Plan, Port Phillip Area 1993/94. Department of Conservation and Natural Resources

<sup>9</sup> Simson Bowles & Associates (1998) A Study of the Emergency Response Process in NRE.

<sup>10</sup> The Action Statement is found at the NRE Web site ([www.nre.vic.gov.au](http://www.nre.vic.gov.au)).

Government policy was developed and established in the context of existing international, state and national agreements including the *Ramsar Convention*, *National Strategy for the Conservation of Australia's Biodiversity*, *National Strategy for Ecologically Sustainable Development*, *Intergovernmental Agreement on the Environment and State Environment Protection Policies*, such as that for *Waters of Victoria*.

NRE administers Victorian statutes that address the management of exotic marine organisms and their impacts, including: *Flora and Fauna Guarantee Act 1988*, *Fisheries Act 1995*, *National Parks Act 1975* and the *Coastal Management Act 1995*.

## **1.6 Integration with other Plans**

It is anticipated that the Protocol will operate within a 'National Protocol', developed under the auspices of the Australian and New Zealand Environment and Conservation Council.

At the national level, the establishment of a ready response capability for introduced marine species is a priority of the Introduced Marine Pests Program of the Commonwealth's *Coasts and Clean Seas* program. The Victorian Protocol will be able to be linked with Commonwealth initiatives and contribute information to national data bases on exotic organisms.

The Victorian Government has an integrated approach to exotic organism management and in addition to this Protocol is implementing other arrangements to address exotic organism introductions, including:

- An Industrial Waste Management Policy for Ballast Water and Hull Fouling, developed by the Environment Protection Authority to provide a framework for the development and implementation of a Victorian Ballast Water Management System. The Policy will include requirements for the proper disposal of biological waste from small vessels on marinas and slipways.
- Measures to minimise the risk of introduction and spread of exotic marine organisms via fishing and aquaculture activities and boating, to be implemented by the Department of Natural Resources and Environment.
- Guidelines for cleaner marinas<sup>11</sup>.

## **2.2 Operational Responsibility**

The Executive Director Parks Flora & Fauna through management plans may allocate responsibilities to other areas of the Department (dependent on statutory responsibility, available expertise, etc) or third parties - what ever arrangement is the most appropriate and provides the best result.

## **2.3 Victorian Incursion Management Committee**

The Committee may be ongoing, or established on an adhoc basis to assist with the management of incursions in specific waters or specific species. In the event of a national plan being developed for individual pest species and where an equivalent national incursion management committee exists – the advice of the national committee will be used.

### ***4.5.1 Detection***

National, State and community monitoring programs are currently being developed to improve the early detection of exotic organism incursions and their spread in Victorian marine waters.

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<sup>11</sup> Cleaner Marinas: Guidelines for Protecting Victoria's Marinas (EPA Publication 624)

#### **4.5.2 Reporting**

Given the range of individuals that may report suspected incursions, contact details for the State Contact Officer will be included in related promotional and educational material on marine activities and the marine environment.

Distribution and promotion of this Protocol and relevant information brochures will help ensure that contact details for the State Contact Officer are widely known.

#### **4.5.3 Verification**

*Site Inspection* Completion of a Site Inspection Form will ensure that a comprehensive site inspection is conducted, and that sufficient information is gathered to enable timely and informed decision on the most appropriate management action.

#### **4.5.4 Notification and Recording**

*Notification* Stakeholders to be contacted would include relevant local governments, and interstate agencies through their representatives on the Australian Ballast Water Management Advisory Committee. [Note that the SCARM Task Force into Managing Incursions stated in its 1996 Fish Sub-Committee Report that all new incursions of aquatic exotic species should be notified to appropriate state and Commonwealth agencies (p12)].

*Recording* As introduced species are reported from Victorian and Australian waters, it is important that these records are documented and that the authenticity of the records can be checked by referring to a voucher specimen. Most natural history museums have extensive collections which have been made in the last 100 years - in some cases longer - and studies of these collections may clarify when a particular species was first recorded in Australian waters or if in fact it really is an introduced species. For example, material from the 1969-71 baseline study of Port Phillip Bay is lodged at the Museum of Victoria. When an unusual species is found, it can be checked against these records, and it can be determined with confidence whether that particular species was present in the Bay during 1969-71 and a particular introduction can be timed. In addition, the taxonomy of many introduced species is confused, and as knowledge of marine organisms increases, the status of some species as 'introduced' may change.

#### **4.5.5 Decision**

*Decision Support Systems* Globally, the development of technologies and management strategies for exotic marine organism incursions is in its infancy. At this time, methodologies, frameworks and guidelines to assist marine resource managers in decision making are limited. Each incursion must therefore be examined individually, and decisions made in the context of available information. To date, actual management responses to incursions in Australia have been on a case-by-case basis and have focused on physical removal and containment of the organism.

*Expert Knowledge* It is not possible to predict with any confidence, the outcomes of an exotic marine organism incursion.

There are various characteristics of habitats and species favouring invasion, such as: disturbance; high dispersal rate; lack of natural enemies; finding an empty niche; and climatically matched.

Such characteristics are likely to contribute to the likelihood and extent of invasion. However, none of these features seems either necessary or sufficient to account for observed invasions, or predict future ones<sup>12</sup>.

In trying to predict how quickly a new incursion will have significant impacts on a marine environment, however, it is useful to identify potential vectors and organism characteristics that help spread an organism within a locality, or its spread to other localities.

Where information is available, examination of the environmental parameters that influence the organisms' ability to survive and reproduce successfully in different locations in Victoria will assist in determining potential risks and impacts of an incursion.

#### *Schedules of Exotic Marine Organisms*

Until agreed National/State schedules of marine pests are finalised, species meeting the following criteria, are to be considered as if they were on an agreed National/State schedule:

- all species declared noxious under the *Fisheries Act 1995*; or
- those species or categories of species documented by ABWMAV in a Target Species List (or a successor document), and that the Authority determines pose a risk to Victorian marine waters; or
- other exotic species determined by the Environment Protection Authority to pose particular risks to Victorian marine waters including any species having some or all of the following characteristics:
  - ability to dominate space and competitively exclude native species;
  - voracious predators that consume native species;
  - potential ability to cause toxic algal or dinoflagellate blooms;
  - any pathogen likely to survive in the marine environment and capable of affecting human health or the health of fish or other aquaculture species or indigenous marine organisms; and
  - ability to affect environmental processes.

[‘Notifiable’ exotic species are those species which cause or have the potential to cause significant production losses, trade and/or public health impacts or environmental damage<sup>15</sup>..]

Aquatic pests have been defined, for example as ‘an aquatic pest is an organism in an aquatic system that has a significant net deleterious impact on a valued resource; and a potential aquatic pest is an organism in an aquatic system that is assessed as having the potential for deleterious impact on a valued resource<sup>16</sup>’]

*Ecologists can make some powerful and wide-ranging predictions about invasions ... On the other hand, ecologists cannot accurately predict the results of a single invasion or introduction event.*

*The complexity of the interaction between species and community - each of which alone is difficult enough to characterise - is a central reason why predictions about specific introductions are so difficult to make..... Predictions about the outcomes of colonisations will always suffer uncertainty, and at best, will emerge only from focused studies on particular potential invaders and target communities<sup>13</sup>*

*There is a paucity of information about interactions between introduced and translocated species and endemic species and this hampers our ability to make accurate predictions about risk and pest potential and limits the use of existing predictive tools<sup>14</sup>*

<sup>12</sup> Williamson M.H., & Brown, K.C. (1986) The analysis and modelling of British invasions, *Phil. Trans. R. Soc. Lond. B* 314 505-522 (1986)

<sup>13</sup> Lodge, D.M (1993) Biological Invasions: Lessons for Ecology, *Tree* Vol.8, no. 4, April 1993 pp133-137. See also Jansson, K. (1994) Alien Species in the Marine Environment, Introductions to the Baltic Sea and the Swedish West Coast, Swedish Environmental Protection Agency

<sup>14</sup> SCARM (1996) Standing Committee on Agriculture and Resource Management Task Force into Managing Incursions, Fish Sub-Committee Report.

<sup>15</sup> Definition of ‘Notifiable’ as defined by the World Organisation for Animal Health.

<sup>16</sup> SCARM (1996) Standing Committee on Agriculture and Resource Management Task Force into Managing Incursions, Fish Sub-Committee Report.

*Feasibility of Management techniques and technologies* When evaluating potential control strategies for Zebra Mussel Invasions, a coalition of Vermont water suppliers on Lake Champlain considered the following in their ranking process for various controls: biological effectiveness; regulatory restrictions; costs; adaptability; operational impacts; and environmental impacts<sup>17</sup>.

### **5.3 Responsibility for developing an Operational Response Plan**

The Plan's development would address the roles and responsibilities of key industry, community and government stakeholders in the implementation of vector and impact mitigation measures. The Victorian IncurSION Management Committee would assist the Plan's development.

#### ***5.5.3 Implementation***

Implementation mechanisms will need to consider the capacity of the personnel that may be involved. This is particularly the case for those pests and circumstances where the misapplication of techniques may result in potentially significant unintended consequences. Arrangements to address this could include on-site training or direct supervision by suitably qualified staff.

#### ***5.5.3 Monitoring***

Monitoring for plans based on an immediate response to an incurSION should consider the potential requirement to monitor the impact of management actions on the incurSION over the longer term.

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<sup>17</sup> Blake, E. Lange, C.L., Short, T.M., & (1994) Development of Zebra Mussel Control Strategies for a Coalition of Vermont Water Suppliers on Lake Champlain, Proceedings of the Fourth International Zebra Mussel Conference, Madison, Wisconsin, March 1994.