

Guidelines and procedures for  
**managing the  
environmental  
impacts of weeds**



on public land in Victoria 2007



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Other photographs—p4 High quality native grassland near Dunkeld, John Seebeck; p5 Bluebell Creeper *Billardiera heterophylla* invasion at Airey's Inlet, an emerging weed. Robin Adair; p6 Buckthorn *Rhamnus alaternus* at Nelson, Robin Adair; p10 Bridal Creeper *Asparagus asparagoides* in coastal vegetation, Point Nepean National Park, Kate Blood; p13 Sweet Pittosporum *Pittosporum undulatum* a native species invading outside its natural range, at Carpendeit, Robin Adair; p15 Orange Firethorn *Pyracantha angustifolia* at Anglesea, Robin Adair; p18 Arum Lily *Zantedeschia aetiopica* at Simpson, Robin Adair; p26 Red-capped Robin *Petroica goodenovii* – one of many fauna species potentially affected by weed invasions, Graeme Chapman; p29 Squirrel-tail Fescue *Vulpia bromoides* invading native grassland following construction of a trench, Laverton, Stephen Platt; p30 Weed invasion can be a serious issue following fire such as Ash Wednesday 1983, Grass trees *Xanthorrhoea* at Aireys Inlet, Stephen Platt. \*denotes introduced species.

[www.dse.vic.gov.au](http://www.dse.vic.gov.au)

# Minister's foreword

Weeds pose an enormous threat to our natural environment however this fact is not always well understood or acknowledged. More than 580 weed species affect natural ecosystems in Victoria, and without active management that list will grow because the barriers to invasion are becoming more difficult to manage and disturbances, such as fires and human activities, are more likely to occur.

At the 2002 State election the Victorian Government announced a new initiative providing \$14 Million over 4 years for a major weed and pest control program on public land. In May 2007, the Government announced a further \$30.1 Million boost to protect Victoria against weeds and pests including a \$4 Million boost for new programs to prevent weeds and \$26 Million to extend existing programs including protection of high-value assets on public land.

The Weeds and Pests on Public Land Initiative delivered a range of on-ground projects across Victoria aimed at maintaining the value of our parks and reserves. The funding has also enabled the development of these Guidelines, which set out a framework for managing the environmental impacts of weeds on public land. The Guidelines establish a priority-based approach to decision-making and action by tackling new and emerging weeds while they can be eradicated, and focusing activity on protecting our most important natural assets at risk from established weeds.

These Guidelines replace the Interim Guidelines prepared for public comment in 2006. Thank you to those people who took the time to submit their views and I look forward to ongoing feedback through public land managers. The local community is to be congratulated for providing valuable information that will guide planning processes and support individual projects.

Strong partnerships between the Victorian Government, land managers and the community are essential in making a difference in managing weeds on ground. Through working together everyone can contribute to more effective weed management on public land.

These guidelines will provide a robust framework to address this serious threat to our environment.



A handwritten signature in black ink that reads "Gavin Jennings". The signature is stylized and written in a cursive-like font.

**GAVIN JENNINGS**  
**Minister for Environment and Climate Change**

<sup>1</sup> [www.dpi.vic.gov.au](http://www.dpi.vic.gov.au) and search for 'weed spotters'



# Preface

Public land contributes to the wellbeing of every Victorian through services such as clean water, enjoyment of the outdoors and providing habitat for our native wildlife. Weeds are one of the main threats to these services. This document explains how what we value about public land can be protected against the threat posed by weeds.

This document outlines the objectives, legislation, principles, priorities, standards and planning procedures for managing the environmental impacts of weeds on *public* land throughout Victoria. This includes the interface with private land and covers all terrestrial and aquatic<sup>2</sup> environments (but not marine).

It aims to:

- provide a practical and adaptive framework to guide weed management decisions
- develop a high level of consistency in the planning, implementation and evaluation of weed management efforts on public land

The emphasis on the environmental impacts of weeds is deliberate and seeks to raise performance in this sphere in line with the long-term ongoing focus on agricultural weeds.

The document is written primarily for public land and water managers and begins by outlining the legislative and policy framework relating to weed management. It then outlines some universal principles, based on the best available science, for the management of environmental weed impacts for ecological outcomes and the information required to report on achievements. Finally, it concludes with a consideration of the steps involved in implementation and clarifies responsibilities. It should be emphasised that these are guidelines and are not prescriptive. They should be interpreted in the light of *local* biodiversity, weed and natural resource management information including cultural values.

Managing the environmental impacts of weeds is fundamentally important for maintaining many of the State's biodiversity assets. To achieve an integrated approach that spans land tenure, the processes outlined in this document need to be integrated with those for private land where the focus is often on protection of economic assets. In that regard, this document informs the development of Regional Weed Plans under the Victorian Pest Management Framework (NRE 2002a) and Victorian Weed Management Strategy (NRE 2002b).

The practical application of these Guidelines has been piloted in the Otways region of south-west Victoria with promising results for a statewide approach<sup>3</sup>.

<sup>2</sup> Aquatic environments inclusive of natural and artificial systems. Includes estuaries and saline lakes.

<sup>3</sup> Platt *et al.* in prep.

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# Summary

The 8.5 million hectares of public land in Victoria provides a wide range of environmental services to the community. In particular, public land provides habitat for much of Victoria's diverse plant and animal life. Weeds, of which there are some 584 taxa (576 species), are a major threat to the environment<sup>4</sup>. This document outlines the objectives, legislation, principles, priorities, standards and planning procedures for managing the environmental impacts of weeds on public land throughout Victoria.

The objectives of managing the environmental impacts of weeds on public land in Victoria are to:

1. Maintain indigenous biodiversity, particularly ecosystems of high conservation value
2. Maintain the viability of threatened species and communities
3. Promote ecological sustainability and the provision of ecosystem services
4. Prevent adverse social or economic impacts by taking an integrated approach to management

This document proposes a priority-setting framework for managing the environmental impact of weeds based on:

- Highest priority: prevention of new and emerging weeds and,
- Next priority: for all established weeds, an approach based on asset protection—protecting the highest value assets at greatest risk.

A detailed approach to implementing this priority-setting framework has been further developed through a case study in the Otway region of Victoria<sup>5</sup>.

Of great importance to managing the threat posed by weeds is further strengthening of the partnership between public land and water managers and the wider community.

<sup>4</sup> Scott *et al.* in prep., Commonwealth of Australia.

<sup>5</sup> Platt *et al.* in prep., Department of Sustainability and Environment.



# Context

Victoria has a diverse indigenous terrestrial and aquatic biodiversity including some 3,140 species of vascular plants, 900 lichens, 750 mosses and liverworts, 111 mammals, 447 birds, 46 freshwater fish, 133 reptiles, 33 amphibians, and an untold number of invertebrates, fungi and algae species. There are many unique ecosystems, represented by around 300 Ecological Vegetation Classes. Protection of these significant assets for current and future generations has been recognised as of international, national and state significance. Victoria's Biodiversity Strategy<sup>6</sup> is the whole-of-government document outlining the State's approach to the conservation of ecosystems, the species they contain and the genes of which they are made.

Environmental weeds<sup>7</sup> pose one of the major threats to native biodiversity<sup>8</sup> and this has been formally recognised with the listing of 'The invasion of native vegetation by environmental weeds' as a potentially threatening process under the *Flora and Fauna Guarantee Act 1988*. Carr *et al.* (1992) present a list of 584 taxa (576 species) of environmental weeds in Victoria.

Weeds on public land also threaten social and economic assets. They affect recreational and tourism activities through, for example, restricting access to sites or attracting potentially harmful animals such as feral bees. Weeds on public land can affect the provision of other ecosystem services such as the availability and quality of water. They may also impact on cultural values such as significant sites to aboriginal people.

Maintaining these valuable biodiversity and other assets is an important task for all Victorians. On public land, the role of steward falls to public land and water managers (see Appendix 1 for a list) with support from community-based Committees of Management, community organisations and volunteers. Public land covers some 8.5 million hectares of Victoria<sup>9</sup> subdivided among numerous tenures (see Table 1 and Appendix 4) and having considerable spatial diversity (small to extensive parcels, coastal to alpine). Around 1 million hectares of public land is leased to private landholders. The interface between public and private land is extensive being around 60,000 kilometres long.

6 NRE 1997

7 See Glossary for a definition.

8 Scott *et al.* 2007, Commonwealth of Australia 2006

9 Pers. Comm.. S. Ransome 2004

The challenge is to protect Victoria's assets against both the significant potential for new introductions of pest plant species<sup>10</sup> whilst also maintaining the effort against those that have become established. To achieve this, public and private land and water managers must work together, across land tenures, to achieve an integrated outcome that maximises environmental, social and economic benefits. Confronted with such a diversity of weed issues, careful planning and prioritisation is required to ensure maximum benefit from public expenditure. In 2004-05 this amounted to over \$14.6 million expenditure on weed management on public land in Victoria alone. The total economic costs of weeds nationally is estimated to be \$4 billion<sup>11</sup>. In many instances, it will be necessary to accept that established weeds are impossible to eradicate in the foreseeable future and so effort will need to be directed at controlling impacts where the weed has the potential for worst effect.

Of fundamental importance is the application of scientific knowledge to management. An understanding of how ecosystems work and the risk particular weeds pose to their structure and function should influence management decisions. Weeds affect ecosystem 'health' in a variety of ways including changes to vegetation structure and cover, regeneration processes and species diversity with implications for fauna species using these habitats<sup>12</sup>. There is a paucity of research into the actual ecological impacts of weeds, which are often assumed.

Evaluating the performance of environmental weed management presents a major scientific and management challenge. How can prevention of an impact be adequately measured? How do we measure the decline in the health of ecosystems? How do we apply the available monitoring resources to achieve a sufficiently broad understanding across wide landscapes but still maintain validity at the scale of human experience and local management decisions?

To date, much of the legislation and policy direction for weed management has been aimed at protection of agriculture from the economic impacts of weeds and on single weed species. The government's Weeds and Pests on Public Land Initiative has provided the opportunity to extend our vision to include consideration of strategic approaches to managing the environmental impacts of weeds where the emphasis is on protecting the services and values the community derives from environmental assets. This involves a considerable shift in methodology and culture from one that emphasises progress in tackling management of a weed to one that highlights progress in conserving environmental values and assets. Public land management will benefit from a move toward a more co-ordinated, transparent, strategic, and less reactive framework. Private landholders will benefit through improved management of the public land estate.

**Table 1: Approximate areas under management of key public land and water managers<sup>13</sup>**

Public land manager	Approx. area under management
Parks Victoria	4.2 million ha
Forests (DSE)	3.3 million ha
Crown Land Management (DSE)	
• Committees of Management	50,000 ha
• Primary producers & other leaseholders	1 million ha (36,500 licences)
VicRoads/Municipalities (roadsides)	567,400 ha roadsides and unused road reserves (some leased)
Melbourne Water	830,000 ha drainage management 157,000 ha water supply - catchment management 75,000 ha Melbourne Water - owned land
<b>TOTAL PUBLIC LAND<sup>14</sup></b>	<b>8,508,900 ha</b>

10 Weiss 1999

11 Sinden *et al.* 2004

12 Rooney *et al.* 2004

13 Figures supplied by land managers. Does not include Commonwealth land. See also Appendix 4.

14 Note that the figures shown in the table will not necessarily total due to overlapping responsibilities and other factors. These figures are subject to change over time as the purpose of land reservation is reviewed, management responsibilities alter or land is added to the public land estate.

# Objectives

Weed management on public land contributes to achieving Victoria's objectives of protecting the environment for future generations<sup>15</sup> and improving sustainability through maintaining and restoring our natural assets<sup>16</sup>. It helps maintain healthy, diverse and enjoyable parks, rivers, catchments and coastal environments.

The objectives of managing the environmental impacts of weeds on public land in Victoria are to:

1. Maintain indigenous biodiversity, particularly ecosystems of high conservation value<sup>17</sup>
2. Maintain the viability of threatened species and communities
3. Promote ecological sustainability and the provision of ecosystem services
4. Prevent adverse social or economic impacts by taking an integrated approach to management<sup>18</sup>

## **Objective 1: Maintain indigenous biodiversity, particularly ecosystems of high conservation value**

This objective includes:

- Protecting and restoring the health (quality, resilience) and integrity (structure and function) of ecosystems in terrestrial and freshwater environments.
- Conserving the diversity of species and ecological communities across each bioregion
- Protecting the genetic constitution of indigenous species

## **Objective 2: Maintain the viability of threatened species and communities**

This objective includes:

- Preventing decline in the viability of any rare or threatened species or of any rare or threatened ecological community
- Increasing the viability of threatened species and quality and resilience of threatened ecological communities

## **Objective 3: Promote ecological sustainability and the provision of ecosystem services**

This objective includes:

- Providing for future generations of Victorians
- Maintaining services such as clean water, enjoyment of public spaces etc.
- Land and water protection (e.g. erosion control)

## **Objective 4: Prevent adverse social or economic impacts by taking an integrated approach**

This objective includes:

- Taking an integrated approach that considers management in the context of the wide range of outcomes and activities occurring at various scales (e.g. catchments, bioregions).
- Working in collaboration with other public and private interest stakeholders and the community.

<sup>15</sup> State of Victoria 2005. Growing Victoria Together: A Vision for Victoria and Beyond (p12). Department of Premier and Cabinet, Melbourne

<sup>16</sup> State of Victoria 2005. Our Environment, Our Future. (p 8). Department of Sustainability and Environment, Melbourne.

<sup>17</sup> See VPMF 2002, 1.3 Vision and 2.3 Desired outcomes 1.

<sup>18</sup> See VPMF 2002, 1.3 Vision and 2.3 Desired outcomes 1.



# Legislative and Policy Framework

The management of public land and water to prevent the impacts of weeds on environmental, social and economic values is widely recognised in legislation and government policy. A diverse range of legislation, guidelines, codes of practice and policies relate to the management of weeds on public land in Victoria<sup>19</sup>. Detailed descriptions and excerpts have been included in Appendix 2.

Whilst Appendix 2 provides specific legislative and policy references to biodiversity and weed management it is not intended to be a comprehensive list of all documents or relevant clauses. The aim is to provide an overview of the range and scope of legislative and policy responsibilities. Note that legislation is subject to change from time to time and that specific legal advice should be sought on the applicability of legislation to any particular situation.

The legislated purpose of managing the environmental impacts of weeds on public land is usually to protect biodiversity and promote ecological sustainability. These two concepts—'biodiversity' and 'sustainability'—are locally, nationally and internationally recognised as important. Victoria's public land and water managers have a clear public interest responsibility to protect biodiversity and promote sustainability on public land. This is additional to responsibilities to control weeds affecting economic interests (usually declared as 'noxious' weeds), particularly those affecting agriculture<sup>20</sup>.

The primary piece of legislation relating to weed management is the *Catchment and Land Protection Act 1994*, which details the approach to declaring weeds as noxious. However many weeds impacting on the environment have not been declared. For these weeds, management responsibility is contained in the environmental objectives of a range of Acts including the *Flora and Fauna Guarantee Act 1988* (FFG Act), *National Parks Act 1975* and *Sustainable Forests (Timber) Act 2004*.

'The invasion of native vegetation by environmental weeds' is listed as a Potentially Threatening Process under the FFG Act. Section 4 of the FFG Act states that it is the responsibility of all public authorities to be administered as to have regard to the flora and fauna and management objectives of the Act.

<sup>19</sup> The Environment and Natural Resources Committee of Cabinet report 'Weeds in Victoria' 1998 has been useful in compiling this summary [see [http://www.parliament.vic.gov.au/enrc/inquiries/old/enrc/weeds/MASTER%20PESTS%20NEW-02.htm#P897\\_78772](http://www.parliament.vic.gov.au/enrc/inquiries/old/enrc/weeds/MASTER%20PESTS%20NEW-02.htm#P897_78772)]. A summary of legislation is also available in the Victorian Pest Management Framework (NRE 2002a)

<sup>20</sup> The control of weeds affecting economic interests can also have broader environmental and community benefits.



# Principles

Formulating a set of general principles that cover the diversity and complexity of managing the environmental impacts of weeds across public land in Victoria is a challenging task. Nevertheless, a number of generally agreed ideas can be found in the extensive literature discussing approaches to weed management. Many of these principles apply equally well to public land (and ecosystem) management in general. These principles apply to all weeds, of which declared noxious weeds are a special case<sup>21</sup>.

## Scientific and management principles

Principle 1: Prevention is better than cure.

Prevention of both the introduction and spread of pests and weeds is a major priority as it is the most effective means of reducing the impact and cost of management in most instances. Early detection and intervention can enable total eradication. Prevention is closely linked to maintaining ecosystem resilience and managing other threats to the health and viability of ecosystems. This principle means that important work may well be done at locations that are currently relatively free of pests and weeds and can be given higher protection against invasion with relative ease. It also underlines the importance of investment in surveillance, quarantine, early detection and rapid response mechanisms.

Principle 2: Programs should endeavour to address the cause and source of weed invasion.

A causal approach (treating causes and not just symptoms) is a key aim of sound integrated natural resource management. It reduces asset damage, future threat of reinvasion, secondary-threatening processes, and ensures economic and efficient use of resources. Treating causes means understanding the pathways of weed introduction which often relate to human activity (e.g. garden escapees which account for some 58% of escapees<sup>22</sup>, vehicle movement, altered hydrological regimes, dumping of rubbish and inappropriate siting of tips, poor land management practice such as overgrazing) and taking action to address these.

Principle 3: Programs should manage to promote the health of systems (*eco-systems*) and support the application of sound ecological management principles.

The aim here is to maintain ecosystem function by treating the threats and impacts that cause dysfunction in the 'system'. Preventative strategies, such as increasing ecosystem resilience (health), are an approach that guards against future threats. Temporal and spatial scales need to be appropriate to achieve long-term ecological outcomes. Disturbance reduces the ability of ecosystems to resist change, including invasion by weeds and pests by reducing the competitive balance that enables weeds to establish<sup>23</sup>. The general priorities for native vegetation protection are firstly to prevent further losses, enhance the quality of degraded areas, and restore new areas through revegetation.

<sup>21</sup> The criteria used to declare noxious weeds are defined under Sections 59-63 of the *Catchment and Land Protection Act 1994*.

<sup>22</sup> Groves and Hosking 1998, Virtue and Melland 2003

<sup>23</sup> Hobbs 1991

Principle 4: Programs should adopt an asset-based risk management approach.<sup>24</sup>

Prioritisation should be based on maintaining the viability of important environmental assets and optimising outcomes for asset protection and management. Assets should be ranked according to the value of the services they provide to the community. In the case of biodiversity, they should be ranked by their Conservation Significance<sup>25</sup>. Where two ecosystems of the same conservation value are being compared, generally intact ecosystems will have priority for management over degraded ecosystems and ecosystems at higher risk will have priority over those at lower risk.

Principle 5: A holistic, tenure-blind and consistent approach to natural resource management should be applied.<sup>26</sup>

Weeds and pests do not recognise socio-political boundaries so management planning must cross land tenure and be unaffected by the type of land or water manager. Preference should be given to co-operative, collaborative and consistent approaches that recognise that a whole-of-catchment or whole-of-ecosystem approach is in most instances the logical way to proceed.

Approaches should be integrated and consistent within and across businesses and agencies. Relevant frameworks at various scales (catchment, regional, local) need to be applied in an integrated way. The aim is to assimilate natural resource management issues in determining priorities, trade-offs and options for management, maximising success and minimising risk. This includes management of fire, threatened species and communities, salinity, disaster, natural resource use and extraction (e.g. forestry, fisheries), other conservation objectives and recreation. It also includes cooperative and coordinated management where weeds act as habitat or infest significant sites, particularly for threatened species and communities or locally significant populations (See also Other Issues: Ecological Substitution). The risk to other values from weed control, including biodiversity, must be weighed against the risk posed by the weed and appropriate management solutions formulated.

Principle 6: Environmental weed projects must be planned to achieve explicit, demonstrable and measurable ecological management objectives.

Setting of clear ecological management objectives is vital to planning processes and for monitoring, evaluation and reporting. An ecological management objective describes the desired or expected new condition of the ecosystem as a result of the management applied.

Principle 7: Ecologically Sustainable and 'Triple Bottom Line' (TBL) approaches should be used.

TBL objectives of weed and pest management on public land are:

- Environmental: to maintain ecosystem health; maintain the viability of indigenous species and communities; maintain genetic integrity
- Social: to maintain human health and wellbeing; retain culturally significant assets; maintain access for recreational purposes
- Economic: to retain economic benefits of ecosystem services; reduce costs of maintaining ecosystem services; prevent impacts on agriculture and other economic activities

Principle 8: Evidence-based decision-making must be a feature of program development, so as to demonstrate that planning and prioritisation is based on sound and up-to-date scientific and technical information including conceptual frameworks.

This evidence is also useful in determining the appropriate level of investment and to highlight research priorities for the protection of priority environmental assets.

<sup>24</sup> See VPMF 2002, 3. Pest Management Principles, 3.6 Pest management must occur within a risk framework.

<sup>25</sup> NRE 2002d

<sup>26</sup> See VPMF 2002, 3. Pest Management Principles, 3.2 The effective management of pests requires an integrated approach as part of the broader management of land and water resources. Commonwealth of Australia 1999 "Weed management is an essential and integral part of the sustainable management of natural resources and the environment, and requires an integrated, multidisciplinary approach."

Principle 9: Control programs should be based on an adaptive management approach to ensure continuous development and improvement based on a framework incorporating monitoring, evaluation, feedback and change.

Adaptive Management (AM)<sup>27</sup> or 'learning by doing' is a technique by which managers evaluate the outcomes of management strategies and use this information to develop more efficient and effective management practices. At the most basic level, adaptive management involves monitoring the effectiveness of changes to management, identifying which practices give improved outcomes and adopting the management practices that produce these improved outcomes. The widely-used practice of adaptive management is most efficient when the elements of more formal experimental design are incorporated, including replication of sites, random allocation of treatments, and the use of non-treated (non-managed) experimental controls. This more formal version of adaptive management is termed adaptive experimental management (AEM). Adaptive experimental management has been applied to management of broom in the Victorian Alps<sup>28</sup> and foxes<sup>29</sup>.

Principle 10: If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation<sup>30</sup>.

This principle is significant in the context of managing the environmental impacts of weeds because of the limited number of scientific studies into their actual impacts. In many cases 'expert opinion' may be the highest level of evidence available.

## Social and economic principles

Principle 11: Public funding will be invested in public good outcomes<sup>31</sup>

Public monies are provided to achieve public benefits, which may be environmental, social or economic, or a combination of these. There is an expectation that private individuals or organisations will pay for activities that provide them with a 'private benefit'. In many cases the benefits may be shared and cost-sharing or co-contribution arrangements are organised to reflect the relative level of benefit. The Good Neighbour Program (GNP) is a transparent way of investing in priorities shared between public and private landholders at public land boundaries. This involves collaborative action between public and private landholders at the public-private land interface.

Principle 12: Funding should be directed to cost-effective activities that provide the best return on investment.

Principle 13: Investment should be directed to leverage fundamental resource condition change.

These principles mean that the benefits need to be considered in terms of their duration and their contribution to the overall outcomes being sought as well as the expenditure.

The above three principles reinforce the fact that public money must be invested judiciously, responsibly and accountably.

Principle 14: The community should be engaged in the strategic planning and management of public land.

Planning processes should be transparent and open to comment by the community. They should aim to incorporate community views on priorities and actions and support indigenous people to connect with and care for country. Where a community contribution to management is being provided, this may influence the priority of that action within the overall strategic framework. Community education opportunities should be encouraged.

27 The Weeds and Pests on Public Land Initiative aims to develop and trial protocols for AM approaches to environmental management in situations with multiple weed species and ecosystems through a case study. Some AM protocols for individual species (Red Fox) are already available (e.g. Robley and Wright 2003) or in development (Southern Ark project).

28 Allan *et al.* 2004

29 Robley and Wright 2003, Southern Ark project

30 EPBC Act 1999, Sec 3A(b)

31 See VPMF 2002, 4.1 Shared Investment Principles.

Principle 15: Legislation and government policy in regard to social issues must be followed (e.g. non-discriminatory, provision of access, inter-generational equity, consultation about matters affecting communities including indigenous communities).

This principle embodies the notions of a progressive and cohesive society.

Where it corresponds with strategic priorities, Government investment should be directed to activities where community or other non-government sources of effort or investment match its investment (ie. where additional value is added).

Funding should be directed to community engagement/education opportunities where there is a direct relationship between the engagement and education and the participation in management.

Principle 16: In managing land under their jurisdiction, land and water managers need to take account of the broader social and economic implications and issues for land potentially affected by weeds.

This principle encourages land and water managers to think beyond their immediate tenures (as in Principle 5) and to contribute in a cooperative fashion to reducing the social and environmental impacts of weeds across the landscape.



# Information and Standards

## Information

Along with a consistent approach, one of the keys to implementing effective and accountable ecologically-based weed management programs is having access to and in turn documenting reliable, up-to-date information on a wide range of factors including:

- environmental assets (e.g. distribution, abundance, life history and other ecological data for vegetation communities and flora and fauna species)
- level of risk and threat to services provided by environmental assets (e.g. cause of threat, natural level of resilience, weed distribution and abundance)
- the relative cost and practicality of alternative management options (e.g. cost-effectiveness data)
- the progress and outcomes of management and means to continuously improve performance (e.g. monitoring and evaluation data).

Victoria is fortunate in having some of the most comprehensive and accessible databases in Australia on the status and distribution of its biodiversity assets. Less information is currently readily available on the social and economic values on public land at risk from weeds. Weed mapping and project management systems are becoming increasingly sophisticated but there is considerable opportunity to standardise approaches and to improve co-ordination, curation and access to data. Data users should exercise caution in regard to the coverage, accuracy, and reliability of data. Where possible, ground-truthing should be undertaken.

At the time of publication, the Department of Sustainability and Environment (DSE) is undertaking a Pest Management Information Systems Review. The review will identify user needs with the aim of moving toward improved information systems for managing weeds and pests in Victoria. Parks Victoria is also developing ParkView, an online information system to support park management. These initiatives provide great potential to improve information systems and support a wide range of users.

Biodiversity databases include:

Department of Sustainability and Environment—

- Flora Information System (FIS) and Atlas of Victorian Wildlife (AVW) - with over three million records of animal and plant species including the recorded locations of rare or threatened species and a filter for environmental weeds. Some information about species' attributes is also recorded.
- EVC typology database –includes descriptors of Ecological Vegetation Classes including characteristic weeds.
- Actions for Biodiversity Conservation database (ABC) - facilitates the preparation, implementation and review of Action Statements under the *Flora and Fauna Guarantee Act 1988*; the implementation of Recovery Plans under the *Environment Protection and Biodiversity Conservation Act 1999*; the assigning of priorities to actions; the communication of actions and priorities to land and water managers and other authorities, and the monitoring of progress towards implementation. Specifically, it is possible to identify instances in which weeds and pests pose a threat to listed species and communities.
- Significant Sites Database - which contains currently recorded information on significant areas for flora and fauna and the major threatening processes at each site.

Parks Victoria—

- Environmental Information System (EIS) - provides a tool for viewing and querying spatial data on environmental assets. It also enables environmental activities (e.g. pest plant control), environmental risk (e.g. pest plant infestations & densities) and new information on environmental assets (species records) to be recorded across the protected area estate. The EIS uses and exchanges data with DSE's statewide databases (e.g. FIS and AVW). The EIS will be replaced by ParkView (see p10).

The Department of Sustainability and Environment has an extensive Corporate Geospatial Data Library with various natural resource management features mapped.

Other relevant Statewide databases include:

Department of Sustainability and Environment—

- Catchment Activity Management System (CAMS) – a web-based system for the recording and reporting on catchment activities and on-ground work activities.
- RiVERS – The River Values and Environmental Risk System is a planning tool to assist program managers to establish priorities for planning of stream health programs. It considers environmental, social and economic values and threats to these values. RiVERS enables risk assessment by linking values to threats and rating likelihood and consequence of the threat impacting on the value. In doing so it enables the manager to consider the values of the waterways (basin to site specific); consider the threats (type and magnitude); and locate river reaches identified as high value.
- State Forest Resource Inventory (SFRI) – DSE's Forest Estate Condition and Monitoring Unit (formerly Forest Resource Inventory) have collected an extensive data set on weeds across productive State forest within the Midlands, North East, Central Highlands and Central and East Gippsland areas. The weed information is gathered as an integral part of a plot-based Forest Resource and Vegetation Structure Survey. Weed information has been collected for 3400 plots providing a valuable dataset for weed management.

Department of Primary Industries—

- Integrated Pest Management System (IPMS) – a cross-tenure system for recording and reporting on weed infestations and pest animal occurrences.

Melbourne Water—

- Hansen – Melbourne Water's asset management system for recording and reporting on on-ground work activities.

Victoria also has an established native vegetation mapping system in place. The entire State is now covered by mapping at 1: 100 000 scale (some areas of 1:25 000 scale) of *Ecological Vegetation Classes (EVCs)*, which are defined on the basis of floristics, vegetation structure and environmental and ecological features. Victoria has adopted a *bioregional approach* based on the Interim Biogeographic Regionalisation of Australia, IBRA<sup>32</sup>. Bioregions are the broad unit for planning for biodiversity management.

32 Cummings and Hardy 2000, *Victoria's Biodiversity Strategy NRE 1997*, <http://www.environment.gov.au/parks/nrs/ibra/index.html>

## Standards

Managing the environmental impacts of weeds involves a wide range of activities and skills including the correct identification of target plant species, the use of chemicals that may be harmful to humans or the wider environment, and the use of equipment that can transport weed propagules or pathogens.

Chemical Use—The *Agricultural & Veterinary Chemicals (Control of Use) Act 2002* regulates the use of chemicals used for land management. Chemical Standards in the Department of Primary Industries can advise on compliance with Australian Pesticides and Veterinary Medicines Authority (APVMA, previously known as the National Registration Authority) procedures and conducts training in the correct use of 'agricultural' chemicals.

Departmental procedures—Draft minimum standards for the prevention of weed spread are in development. These include procedures for vehicle hygiene.

Plant identification—It is essential that a botanist or person appropriately trained or skilled in plant identification supervise any person involved in weed management on public land at least to the level of competently identifying species that are to be controlled from those that are to be conserved. Under Section 47 of the *Flora and Fauna Guarantee Act 1988* it is an offence to take protected flora without a licence or permit or unless authorised by Order of the Governor in Council published in the Government Gazette. 'Take' in relation to flora and fauna means to kill, injure, disturb or collect. This clause does not apply to accidental take if reasonable care has been exercised. Under the Victoria Planning Provisions (see Appendix 2), a planning permit is required to remove, lop or destroy native vegetation with certain exemptions.

Use of biological control agents—National and State biological control legislation (see Appendix 2) covers the introduction and use of organisms in biological control. Biological control agents are typically used as an adjunct to other methods for controlling large dense weed infestations of low to medium management priority. Land and water managers seeking to use biocontrol agents should contact Biocontrol Services in Primary Industries Research Victoria (PIRVic) to discuss procedures and agreements.

Monitoring and evaluation and Information systems—Parks Victoria has developed a number of protocols for the collection and analysis of data on environmental risks, including for weeds.

Database managers can advise on the data standards applying to individual information systems (see 'Information' above).



# Monitoring and Reporting Framework

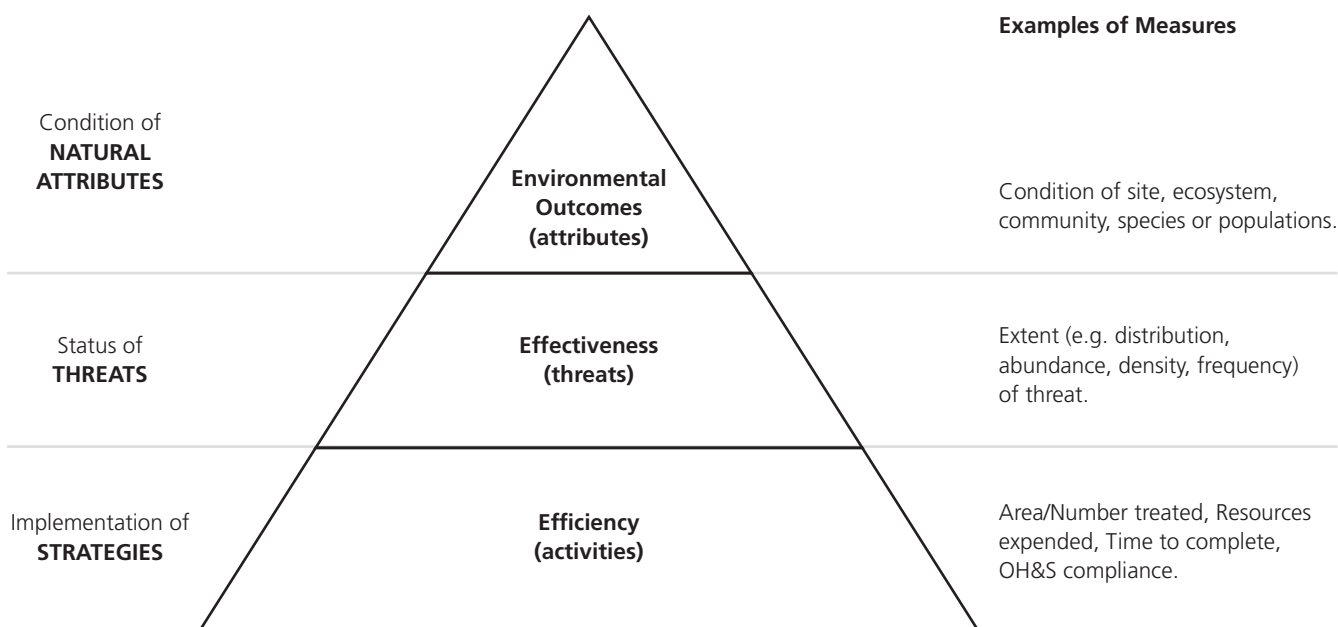
The primary aim of monitoring and evaluation is to determine whether the objectives were achieved. Three types of indicator can be recognised:

**Efficiency (and activity) indicators** (also called input measures) are quantitative measures of threat management actions allowing evaluation of management in terms of quantity of treatment, timeliness and cost. Efficiency indicators are monitored as part of routine management and results are observed in the short term, at least annually (e.g. hectares of pest plant control and dollars spent).

**Effectiveness indicators** (also called output measures, milestones) are quantitative or qualitative measures of the outcomes of threat management actions and may take several years to show a response (e.g. the reduction in density of a weed species over time).

**Outcome (condition) indicators** (also called outcome measures, resource condition targets) are quantitative or qualitative measures of the effects or environmental outcomes of management strategies on natural values including environmental, social and economic assets. Trends may only be discernible in the longer term. Improved condition of a vegetation community or threatened species as a result of a weed treatment may take many years to detect and will be dependent on prevailing environmental conditions (e.g. drought, wildfire).

In the case of weed management it is important to understand the pre and post treatment condition of environmental assets in comparison to a desirable state. This is usually done through 'benchmarking' of the starting condition. At a practical level, indicators of performance must be chosen. Their selection is crucial to understanding whether the overall goal (the 'war' on weeds) is being achieved versus individual steps (winning some battles but losing overall). Thus, monitoring and evaluation must involve careful selection of performance indicators that are broad enough in scope, yet specific enough to be meaningful, to determine whether the overall management objectives are being achieved. Measuring whether a single occurrence of a weed has been dealt with in a location at one point in time will not achieve this. The first step in performance management then is to determine, at the broad and specific level, precisely what outcomes are to be achieved.



**Figure 1: Hierarchy of performance indicators for natural values management (Parks Victoria)**

This general hierarchy of indicators can be used for environmental, social [c.f. Bennett's Hierarchy, Bennett and Rockwell (1995)] and economic performance evaluation.

All three types of measures may form the basis for evaluation and reporting, but for the purposes of measuring the actual achievement of ecological objectives following weed management, *outcome-based reporting* is required. Examples of environmental outcome performance indicators include:

- Measures of the effectiveness of prevention activities.
- Measures of the continued maintenance or improvement in ecological condition (structure and function) of vegetation.
- The population distribution, abundance or fecundity of species targeted for protection, such as a threatened species.
- Level of protection of cultural assets, capacity for enjoyment of public facilities and natural environments on public land, and other social outcomes.
- Extent to which economic pursuits can be practiced without detriment from weeds.
- Community behaviours supporting weed management including knowledge, aspirations, skills and attitudes.

Thus, a hierarchy of measures that track progress toward outcomes, which may be long-term in achievement, is typically applied. In the case of weed management, Parks Victoria's Pest Plant Mapping and Monitoring Protocol is a useful tool for output monitoring. A method for monitoring the biodiversity outcomes of weed management at a broad scale (Ainsworth *et al.* in prep.) has been developed as part of the Otway Weeds Case Study (Platt *et al.* in prep.). A dynamic model of the spread of *Billardiera heterophylla* (White, in prep.) has also been developed to assist in estimating the cost-benefit of control of new and emerging weed species affecting environmental values.

National indicators for the National Land and Water Resources Audit are currently in development.



# Procedural Framework

## Planning context

In brief, natural resource management planning begins at the broad **strategic** level of Statewide policies and strategies (e.g. Victoria's Biodiversity – Directions in Management, Victoria's River Health Strategy, Regional Catchment Strategies, Environmental Policy for Victoria's State Forests, Victorian Weed Management Strategy). Note that it is the intention that these Guidelines are placed under the Victorian Pest Management Framework (Figure 2).

At a **tactical** level of planning, Regional Weed Plans<sup>33</sup> (aligned with Regional Catchment Strategy priorities) identify priorities for weed management within Catchment Management Authority (CMA) boundaries (Figure 3). Biodiversity Action Plans identify biodiversity assets and priorities across land tenures within bioregional boundaries. Regional Native Vegetation Plans (NVP) are prepared by CMAs and indicate, at a catchment scale, priorities for native vegetation management. Regional River Health Strategies identify river health assets and priorities for river health management, including riparian and aquatic weed management if they threaten these assets. Flora and Fauna Guarantee Action Statements and Recovery Plans describe the management actions required for threatened species, ecological communities and threatening processes and Coastal Action Plans relate to the Victorian Coastline.

Specific information on assets and priorities for natural resource management (NRM) actions on public land are generally assembled in management plans (e.g. Park and Forest Management Plans). They seek to integrate weed management into a holistic NRM framework for individual parks, forest management areas or other parcels of public land.

Landscape Plans have been developed under the Biodiversity Action Planning framework. The focus of these plans is on biodiversity. Landscape Plans include the native vegetation priorities identified in regional NVP and identify the best options for restoring native vegetation to recover biodiversity at a more detailed scale than is possible in the Regional Native Vegetation Plans. The biodiversity information provided in Landscape Plans<sup>34</sup> is a resource input to Local Area Plans (LAPs). Local Area Plans integrate NRM planning at a local scale largely focussed on private land but often incorporating some Crown lands.

It is obviously important that these planning processes inform each other so that an integrated planning approach is achieved.

33 Currently, draft Glenelg-Hopkins and Corangamite Regional Weed Plans prepared based on departmental Guidelines

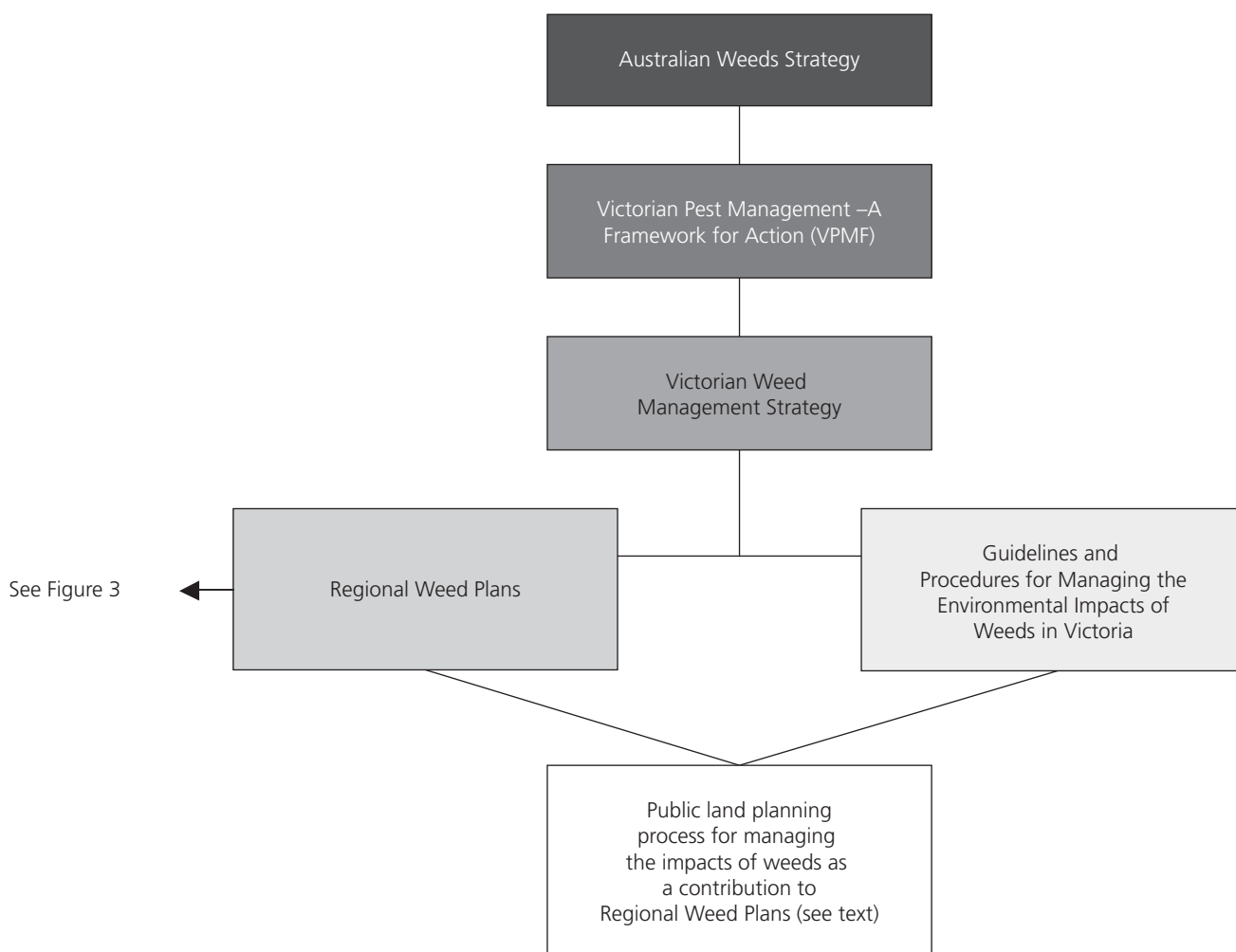
34 available at [www.dse.vic.gov.au](http://www.dse.vic.gov.au)

These Guidelines anticipate the development of a public land weed planning process, as piloted in the Otway Weeds Case Study<sup>35</sup>, as a contribution toward development of catchment-wide Regional Weed Plans. Such plans would both inform and be informed by the above planning processes. They would document the weed priorities from an environmental protection perspective and could be integrated with Regional Weed Plans for a more holistic view. The Implementation Plan for the Otways Weeds Project (Maltby *et al.* in prep.) is the first step toward documenting this approach.

Finally, the relevant land manager conducts **operational** planning at the district level and this is incorporated into work plans of individuals, crew or contractors. Operations plans and work plans are used to manage resources and schedule activities associated with management planning. In developing operations plans, it is important that a long-term view is taken where the commitment is to achieving the desired outcome. This may take numerous years depending largely on the capacity of the environment to recover and the life history characteristics of individual species (e.g. fecundity and survivorship, longevity of soil-stored seed).

**Figure 2: Relationship between the Guidelines and Procedures and the Victorian Pest Management Framework**

The following figure shows how the Guidelines relate to other strategic documents for pest management. The Guidelines are intended to help inform actions under the Victorian Weed Management Strategy.

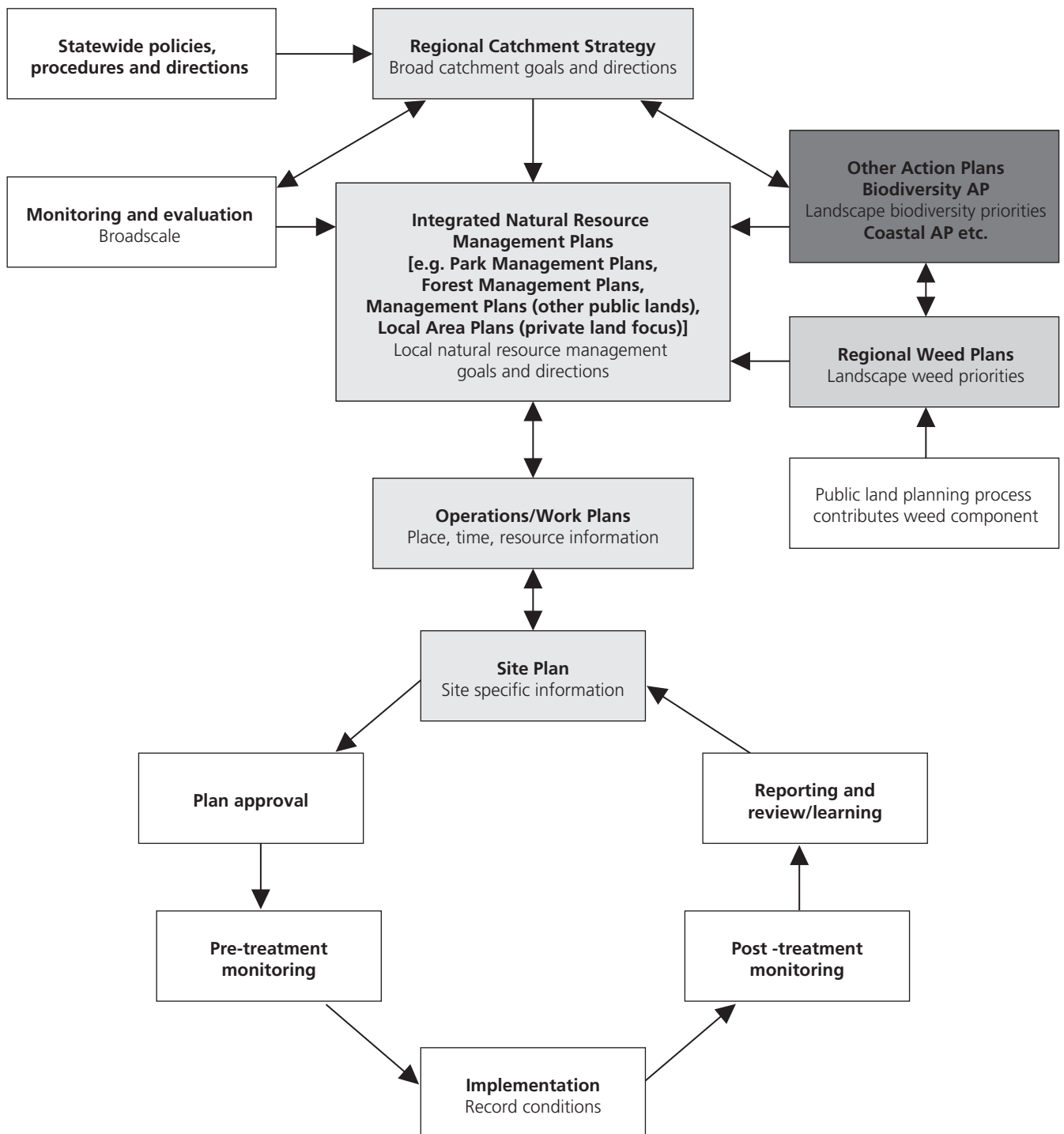


35 Platt *et al.* In prep.

## Catchment level planning

The schematic diagram below (Figure 3) shows the relationships between a range of procedural documents used in managing the environmental impacts of weeds at the regional catchment level. Legislation, Codes of Practice, and other policy documents, affect all levels of planning and implementation. The diagram does not attempt to illustrate emergency co-ordination and other arrangements necessary for weed management.

**Figure 3: Relationships between Regional Catchment Strategies and tactical and operational planning for weed management on public land in Victoria**



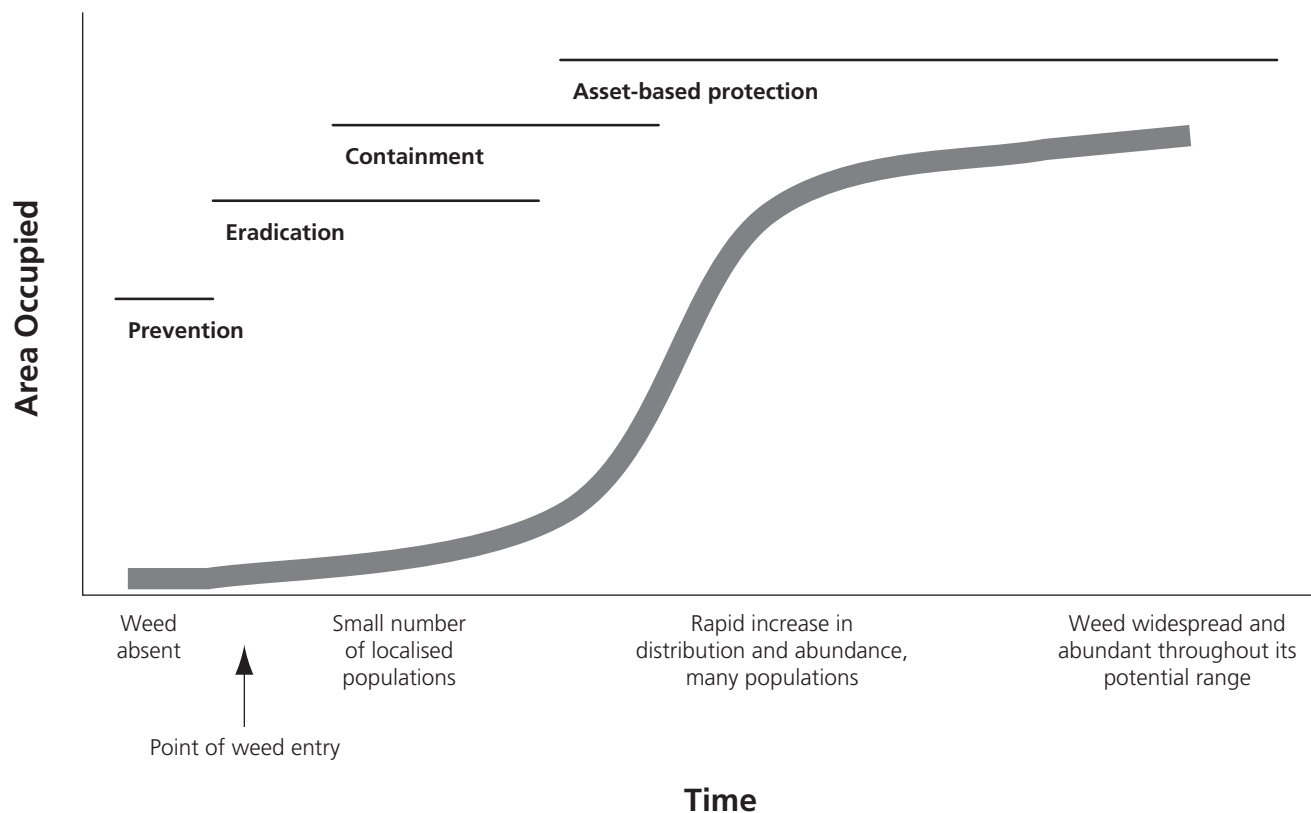


# Priority setting

## Background

The diagram below illustrates a typical weed invasion curve<sup>36</sup>. Initially weeds are absent and management effort can be directed at quarantine, surveillance and maintaining ecosystem resilience to prevent establishment. When propagules arrive, it usually takes some time for the pest plant population to become naturalised. At this time populations are small, localised and relatively easily controlled though often hard to locate. This is the time when eradication is possible and the ideal management goal. The potential for eradication will depend on the species' biology and practical considerations such as the resources available and feasibility of control. This period is then typically followed by a period of relatively rapid population and range expansion until the full potential distribution and density are achieved. At this point eradication is extremely unlikely and so, in order to maximise the benefits of control, it is logical to direct management toward protecting the most important values and services at risk through various strategies including containment, biological control and eradication at a site. From a management perspective, these values are contained in 'asset areas' with one or more values. The more values at one location that can be protected, the higher it's relative ranking for protection.

**Figure 4: Theoretical weed invasion curve showing change in area occupied and abundance over time with the appropriate management goal**



36 Modified from Hobbs and Humphries 1995

This logic is similar to that used in fire fighting. Initially the aim is to extinguish a new fire. When that becomes impossible, then the logical approach is to fall back and defend key asset areas, such as where people live.

It is clear that eradicating new and emerging weeds before they become widespread has the potential to be more effective in controlling the long-term threat and result in significant savings in resources.

This is also true of sleeper weeds. Though they may not have shown significant weed characteristics to date, small populations of alien species, especially where they are in native bushland<sup>37</sup>, are of concern. Over time evolutionary pressures may enable the species to adapt to the local environment and thus spread. Sleeper weeds may also exhibit rapid increases following a change in the environment, such as introduction of an associated organism. An example is the potential effects on many introduced plants should bumblebees establish on mainland Australia<sup>38</sup>. Thus, with the cost very low and benefit potentially high, 'sleeper weeds' are considered to be of high priority for management. In the fire management analogy, this is the equivalent of addressing post fire 'hot spots' before unfavourable weather returns.

## Priorities

The priorities for weed management on public land in Victoria are:

1. Highest priority: New and emerging weeds (wherever they occur, statewide or regional, includes 'sleeper' weeds) prioritised according to the level of potential risk to assets.

New and emerging weeds are those which have a reasonable likelihood of eradication and, given the biology of the species and resources available, this is considered feasible.

Factors to consider in preventing new and emerging weeds include the relative risk of the pathways of introduction and naturalisation. The relative risk to the environment posed by sleeper weed populations must also be evaluated.

2. Next priority: For all established weeds, an approach based on asset protection (see Determining Priority p23) in which priority is given to the highest value asset areas at highest risk.

Three main factors must be taken into account when determining the priority given to management actions aimed at protecting environmental assets from the threat posed by established weeds:

- a) The value of the assets being protected
- b) The risk to those assets
- c) The practicality of achieving control and return on community investment

The frameworks and weightings associated with each of these aspects is affected by many factors. For example, they are affected by the value we place on different assets, by our knowledge (e.g. of the level of inherent ecosystem resilience, which affects risk) and the programs being implemented at various locations and times (e.g. working in with other landholders). These factors vary over space and time.

Priority can be assessed at differing levels of scale. A preliminary evaluation of statewide priorities for managing the environmental impacts of weeds on public land has been undertaken as part of the Weeds and Pests on Public Land Initiative<sup>39</sup>.

Current frameworks for assessing these factors are explained in the following pages. The section on determining asset values concentrates on biodiversity assets because of the obvious link to weeds as a threat and the clear framework for valuing biodiversity that is available. Land and water managers should be aware that weeds might also affect social, cultural and economic assets<sup>40</sup>. Advice on the relative value of aboriginal cultural assets can be obtained from local aboriginal communities and Aboriginal Affairs Victoria (AAV). The Department of Sustainability and Environment's Indigenous Facilitators and AAV can advise on local aboriginal community contacts.

37 Mulvaney 2001

38 Refer to the listing of 'The introduction and spread of the Large Earth Bumblebee *Bombus terrestris* into Victorian terrestrial environments' as a Potentially Threatening Process and documents associated with the national assessment for live importation at [www.deh.gov.au](http://www.deh.gov.au).

39 White *et al.* In prep

40 See also 'Social and Economic Principles', p8

## Prevention of new and emerging weeds

Prevention involves addressing the pathways of invasion of weeds into Victoria<sup>41</sup> and onto public land. At the national level this is primarily a responsibility of the federal government through the Australian Quarantine and Inspection Service.

Weeds that manage to arrive in Australia spread by various means including trade in plant propagules and live specimens, by hitching a ride on vehicles, dispersing by natural means such as by animal movement, water and wind.

The Victorian Pest Management Framework (VPMF, NRE 2002b) gives priority to prevention. It [including the Weed Alert Rapid Response (WARR) program], aims to address many of the pathways by which weeds spread to public land. For example, it has established rapid response teams to address new weed outbreaks before they can spread, is working in collaboration with the nursery and garden industry to address trade in weeds and establishing a Weed Spotters network<sup>42</sup>, and developing vehicle hygiene standards<sup>43</sup>.

Public land managers can contribute to preventing new and emerging weeds from establishing through quarantine and surveillance activities, and activities that maintain the resilience of natural ecosystems. They should target their surveillance activities at priority sites for invasion including past and present towns, roads (especially pull overs and picnic areas), rubbish tips, ornamental and trial plantations. They can ensure that vehicle hygiene is maintained and that other causes of weed invasion, such as disturbance (e.g. soil, wildfire) is carefully managed. They should work closely with the Weed Alert Rapid Response project and Weed Spotters network. They can also work with the broader community, including contractors undertaking works on public land, on education about the threats posed by weeds and means to address them.

## Determining asset value

At the present time, there is no universally-agreed natural resource management approach to valuing land and water assets from an environmental, economic or social perspective. The Department of Sustainability and Environment is undertaking a number of projects to help inform future directions and the proposed White Paper on Biodiversity and Land Health<sup>44</sup>. For example, a 'Land Asset Based Approach Framework' is in development as well as a methodology for valuing wetlands. Catchment Management Authorities are also looking at this issue in the development of new Regional Weed Plans.

Until a standard approach is available, the following sections can be used for general guidance. At a practical level, the Otway Weeds Case Study<sup>45</sup> used a combination of available data layers (vegetation Conservation Significance, threatened fauna habitat, threatened plant distribution and a measure of fragmentation) to rank the Otway landscape and determine important asset areas. This evidence-driven approach is based on available data, the Conservation Significance framework outlined below and largely coincided with the expectations of local land managers.

41 Weiss *et al.* 2006

42 Refer to [www.dpi.vic.gov.au](http://www.dpi.vic.gov.au) and search for Weed Spotters

43 Moerkerk 2006

44 DSE 2006

45 Platt *et al.* in prep.

## Determining asset value—biodiversity

Conservation Significance is a concept developed in conjunction with Victoria's Native Vegetation Management: A Framework for Action (2002). This reference contains further details of the method. Native vegetation is ranked as being of from Very High to Low Conservation Significance as shown in Table 2. Land managers will find that the Conservation Significance of biodiversity assets for areas of land under their management have been conveniently compiled in Biodiversity Action Plans and their associated Landscape Plans and are available electronically on DSE's corporate Geographic Information System.

**Table 2: Determining categories of conservation significance for biodiversity assets**

BIODIVERSITY ATTRIBUTES				
CONSERVATION SIGNIFICANCE	VEGETATION TYPES	HABITAT SCORE	OR SPECIES	OR OTHER ATTRIBUTES
VERY HIGH	Endangered Vulnerable Rare	0.4 – 1 0.5 – 1 0.6 – 1	<ul style="list-style-type: none"> <li>Best 50% of habitat for each threatened species in a Victorian bioregion</li> </ul>	<ul style="list-style-type: none"> <li>Sites with unique National Estate values</li> <li>Sites identified as being of national significance as a relict, endemic, edge of range or other non-species values</li> <li>Ramsar Sites</li> <li>East Asian-Australasian Shorebird Network sites</li> <li>Other wetlands of international significance for migratory waterbirds</li> <li>Areas identified as providing refuges (e.g. during drought) for threatened species</li> </ul>
HIGH	Endangered Vulnerable Rare Depleted	< 0.4 0.3 – 0.5 0.3 – 0.6 0.6 – 1	<ul style="list-style-type: none"> <li>The remaining 50%<sup>46</sup> of habitat for threatened species in a Victorian bioregion</li> <li>Best 50% of habitat for rare species in a Victorian bioregion</li> </ul>	<ul style="list-style-type: none"> <li>Sites with rare National Estate values</li> <li>Sites identified as being of state significance for relictual, endemic, edge of range or other non-species values</li> <li>Wetlands listed in 'A Directory of Important Wetlands in Australia'</li> <li>Wetlands of national significance for migratory waterbirds</li> <li>Areas identified as providing refuges (e.g. during drought) for rare species</li> <li>Priority areas for the re-establishment of habitat for a threatened species (eg. as determined in a Biodiversity Action Plan).</li> </ul>
MEDIUM	Vulnerable Rare Depleted Least concern	< 0.3 < 0.3 0.3 – 0.6 0.6 – 1	<ul style="list-style-type: none"> <li>The remaining 50% of habitat for rare species in a Victorian bioregion</li> <li>Best 50% of habitat for regionally significant species</li> </ul>	<ul style="list-style-type: none"> <li>Sites with uncommon National Estate values</li> <li>Sites identified as being of regional significance for edge of range or other non-species values</li> <li>Wetlands of bioregional significance (based on application of National Land and Water Resources Audit criteria).</li> </ul>
LOW	Depleted Least concern	< 0.3 < 0.6		

<sup>46</sup> That is, the 50% that is not the best 50% of habitat.

## Determining asset value—social and economic

Comparable frameworks for determining social and economic values in the context of natural resource management are currently unavailable. A reasonable approach is to rank the values these assets represent (e.g. high, medium, low, unknown) according to criteria such as the level of use, the consequences of loss and the willingness to pay for replacement. The protection and management of cultural heritage and cultural heritage values are considered an integral component of land and water management processes.

## Determining risk

In this instance the risk being measured is that of potential environmental (ecosystem) consequences arising from the likelihood of detriment via weed invasion or post-invasion. The Department of Sustainability and Environment risk-rating matrix (DSE 2004) provides a general introduction to ranking risk. The framework is based on the national standard for risk management (Standards Australia AS/NZS4360:2004).

Risk can be determined at a range of scales. Broad scale weed risk assessments have been undertaken for a selected range of species using Victoria's Weed Risk Assessment process developed by PIRVic (Plant Health – Frankston) and Parks Victoria<sup>47</sup>. In addition, all weeds impacting on the environment have been ranked by an expert panel using biological information about each species. These lists are available for bioregional groups<sup>48</sup> (i.e. groups of bioregions).

At the local scale, impacts may vary from a broadscale evaluation and it is important that general risk categories be evaluated and interpreted in the light of local evidence.

Where no other information exists, an approximation of likelihood of impact can be estimated from factors such as the 'weediness' (ruderal characteristics etc.) of the plant species, the resilience of the ecosystem and the distance to the site or species affected. The consequence can be estimated from prior history of impacts on the vegetation type/group/species or the anticipated extent of ecological damage likely to result from a structural or functional change.

The process for making operational this framework into a practical and meaningful tool for land managers has been developed as part of the Otway Case Study<sup>49</sup>.

## Categorising weeds

A useful framework for categorising weeds is shown in Table 4 along with a suggested appropriate level of response. Weeds are grouped here according to their degree of establishment in Victoria. This framework is used in assigning priorities (see below).

**Table 3: Weed categories, goals of management and suggested response**

Category	Goal	Response
<b>New and Emerging (including 'sleeper' weeds)</b>	<b>Eradication</b>	<b>Identify, prioritise and eradicate</b> [Contact Weed Alert Rapid Response (WARR) program for advice]
<b>Established and expanding range and/or density</b>	<b>Containment</b>	<b>Identify, prioritise and control</b>
<b>Established across potential range to maximum density</b>	<b>Suppression</b>	<b>Identify, prioritise and control</b>

47 Weiss and McLaren 2002

48 White *et al.* In prep.

49 Platt *et al.* In prep.

## Determining practicality

During program implementation, practicality becomes an important consideration. The life history strategies of many weeds make them very difficult to control effectively. For example, soil-stored seed may persist for generations and well beyond the life of individual projects. Practicality is a major reason why prevention and addressing new and emerging weeds is so important and the number one management priority because, once established, many species are impractical to control except in limited areas. It also elevates the importance of managing weeds that currently only occupy a small area of their potential distribution (including sleeper weeds). Though some of these species may never become a major problem, in many cases the relative ease of control dictates that the risk of such an event can be reduced at minimal cost.

At a strategic level, a 'triage' approach can be adopted to managing species and communities with respect to weeds<sup>50</sup>. This approach is based on the premise that, in addition to targeting actions based on the greatest need, effective conservation planning must avoid the allocation of scarce resources to areas/assets that will fail to persist regardless of actions taken to protect or manage them. For prioritisation purposes, a triage approach would assess and assign each asset (for each scale of analysis) into one of three categories:

- those which can be helped by action (in this case – weed management) at a deliverable level (Category 1)
- those which will probably persist without action (Category 2), and
- those which are likely to continue to decline regardless of the amount of action (weed management) delivered (Category 3).

The use of this approach can help land managers obtain a clearer idea of where best to apply their limited conservation resources— in this case toward managing the environmental impacts of weeds— to achieve the maximum long-term effect. The determination of which assets fall into which class can be made by the informed judgement of local land managers with assistance from weed biologists.

Field reconnaissance is highly valuable in collecting information relating to the practicality of achieving management objectives.

Working in with other private and public land managers may be critical to ensuring management is at an effective scale and matched by an appropriate level of resources. Community support may be crucial to achieving an effective long-term solution. Working with the community can help make strategic weed projects on public land more practical.

## Determining priority (see also p19)

The priorities for managing the environmental impact of weeds on public land in Victoria are:

Priority 1. New and emerging weeds (wherever they occur, statewide or regional, includes 'sleeper' weeds) based on the level of potential risk the weed species poses to assets.

As discussed in the Principles section, preventing the impacts of new and emerging weeds through early intervention avoids future costs. Eradication is the goal for new and emerging species. Whether this is a realistic option given the biology of the species and resources available must be assessed by the land manager.

Sleeper weeds are included in this category because of the potential over time for significant impacts. This may occur due to selection of natural variation within the species or due to extrinsic factors, such as the introduction of an exotic pollinator. Sleeper weeds that occur within largely natural bushland should be a high priority for eradication. They may occur, for example, at former townships, rubbish dumps, mining sites, tracks and plantations.

Priority 2. Established weeds based on the relative value of the asset area, the level of risk and the practicality of control.

In this case the goal is to protect the most valuable asset areas from the impacts of weeds. Having selected the most valuable asset area then weeds can be ranked according to the level of risk they pose to the assets in question and the practicality of control.

An asset area is an area containing one or more assets of value, such as vegetation of high conservation significance or one or more threatened species, at risk from weeds.

<sup>50</sup> cf. Hobbs and Kristjanson 2003

When comparing areas, priority should be given, in order, to:

- the value of the asset,
- the level of risk and
- the practicality of effective management.

Note that priority one requires a weed-led approach whereas priority two is site-led.

## A focus on cause

It is important that management attempts to address the cause of decline in environmental health. At the broad scale, this is a major factor being considered in the development of Regional Catchment Strategies and higher-level planning for natural resource management. Often causes of weed invasion are unknown. The major cause of infestation of native vegetation by 'weeds' is the introduction of species with competitive advantages over their native counterparts leading to displacement of the native species. This may be aided by natural or human-induced disturbance such as soil cultivation and erosion, fire, windthrow; changed environmental conditions (e.g. a change in water temperature due to a dam, addition of nutrients as fertilizer) or the occupation of 'available' ecological niches (rarer). Vectors also play an important role and are an important part of any management strategy. Animals are agents of disturbance (e.g. grazing, digging) but also important vectors for weeds, which may travel attached to fur, feathers, internally and so on. Human involvement is often significant and includes transport of propagules on clothing, vehicles and machinery as well as altered disturbance regimes (e.g. grading roads, altered fire regimes) and cultivation of introduced species in gardens, the latter being one of the major sources of new weeds historically. A comprehensive weed management approach may involve dealing simultaneously with introduction and spread, potential vectors and re-establishment of indigenous species.

These guidelines do not pre-suppose what activities and tools will be most appropriate to achieve the desired outcomes in different situations. Since the focus is on preventing decline in the health of biodiversity assets, actions such as surveillance, closing a track, installing vehicle wash down stations and so on are just as legitimate as spraying with herbicides or managing with fire. Responsibility for this level of decision-making and selection of appropriate tools to achieve the desired outcomes falls to land and water managers acting within prevailing legislative, policy and procedural frameworks.

## Local area planning - key steps

The following steps have been used to develop a practical implementation plan for weed management. They are further expanded in an accompanying publication<sup>51</sup>.

### Project initiation and establishment

Action (a): Appoint a coordinator

Action (b): Establish a Regional Weed Working Group (RWWG) or equivalent to coordinate the development of an implementation plan and on-ground management activities, and hold regular meetings

Action (c): Hold an annual meeting of stakeholders to coordinate weed management activities across tenures

Action (d): Determine the budget available for tackling weeds affecting environmental values

Action (e): Prepare a communication plan

### Step 1: Identify a Landscape Management Unit

Action 1: Select an appropriate Landscape Management Unit (LMU)

### Step 2: Identify broad environmental objectives for the region

Action 2: Collate and document the broad policy objectives for the region

<sup>51</sup> Platt *et al.* in prep.

**Step 3: Identify potential sources of introduction and pathways of weed spread**

Action 3(a): Identify potential sources of introduction and high risk areas for establishment of new and emerging weeds

Action 3(b): Establish quarantine, surveillance and rapid response processes

Action 3(c): Identify sites of known occurrences of new and emerging, and sleeper weeds

**Step 4: Collate and map biodiversity assets**

Action 4: Identify where those areas of greatest biodiversity conservation significance occur spatially

**Step 5: Collate and map social and economic assets**

Action 5: Collate information on social and economic assets of significant value and likely to be at risk from weeds and rank these according to their value

**Step 6: Collate and map weed distribution records**

Action 6: Collate weed records from all sources and map

**Step 7: To the extent possible, identify the relative risk (threat) that each species/site poses to environmental assets**

Action 7: Rank all known weed species according to their likely impact

**Step 8: Supplement and verify weed occurrence and distribution with field surveys, especially at and in the vicinity of priority biodiversity asset areas**

Action 8: Undertake surveys in the vicinity of priority biodiversity asset areas to obtain more accurate data on actual weed occurrence, risk, possible causes of invasion and the practicality of control

**Step 9: On the basis of the known assets and perceived weed threats, set the more specific ecological management objectives**

Action 9: Describe the specific aims of management for new and emerging weeds and important asset areas

**Step 10: Prioritise and group sites and define site specific objectives of weed management**

Action 10(a): Select sites or clusters of sites for management

Action 10(b): Ensure no interference with other programs

Action 10(c): Set objectives for the site

Action 10(d): Design a management process for the site that will deal with the weed risk and potential causes

Action 10(e): Determine performance indicators based on S.M.A.R.T.<sup>52</sup> principles

Action 10(f): Assign responsibilities

Action 10(g): Prepare job sheets (site plan)

**Step 11: Undertake the management actions, recording the conditions of assets and threats before, during and after treatment**

Action 11(a): Brief staff, contractors or volunteers and supply job sheets

Action 11(b): Supply equipment such as cameras, data loggers, GPS, chemicals, plants for revegetation

Action 11(c): Visit site and undertake management actions keeping records

Action 11(d): Document results in relevant databases

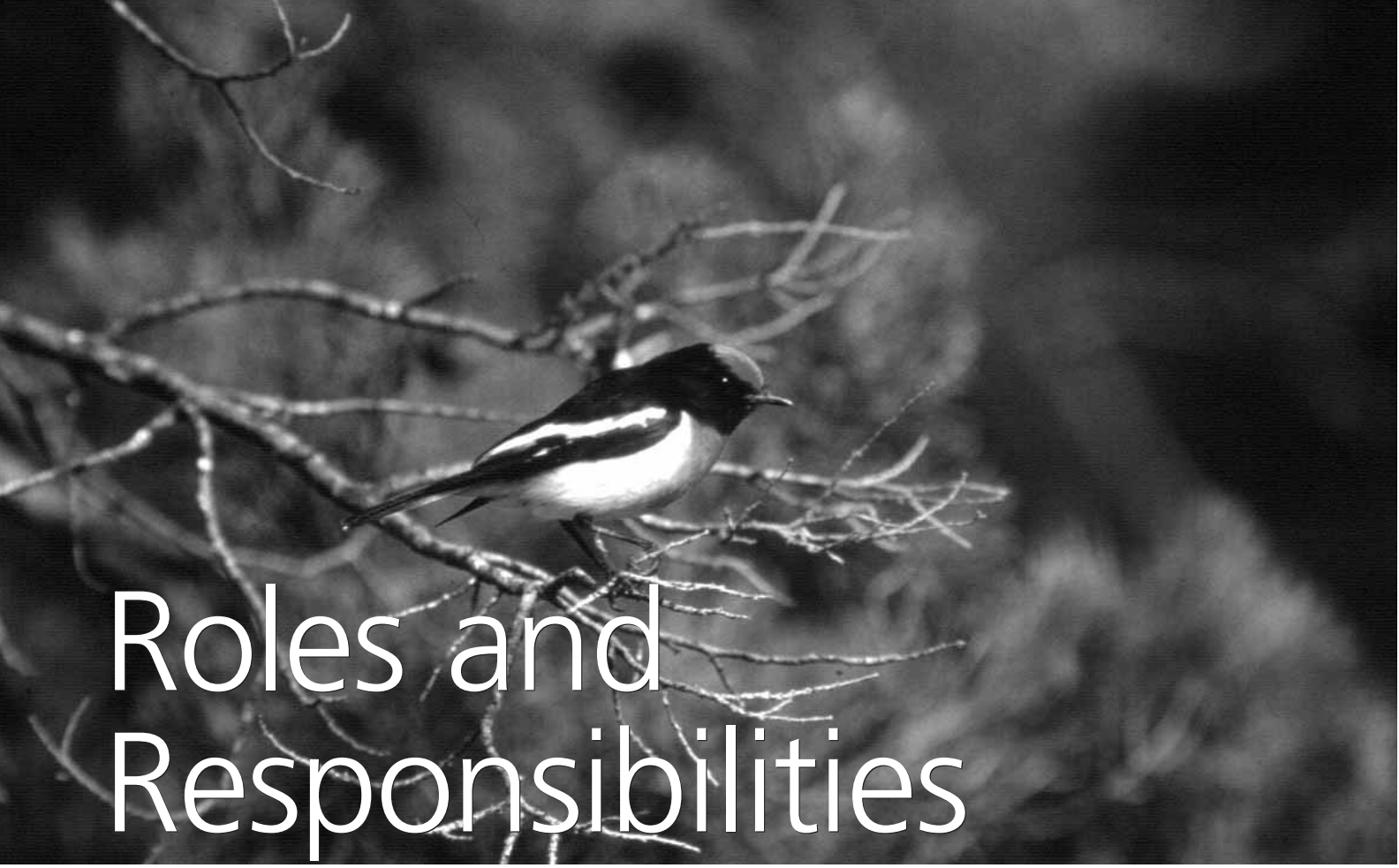
Action 11(e): Identify repeat visit frequency and monitoring requirements

Action 11(f): Evaluate the results against management objectives (outcomes)

Action 11(g): Ensure all data is recorded in relevant information systems

**Step 12: Return to step 3 and, if necessary, update and repeat**

52 Explained in glossary, p31



# Roles and Responsibilities

All public land and waterway managers have some responsibility for managing the environmental impacts of weeds and to act as responsible stewards of public land. The wider community has a responsibility to support them as custodians of these public and shared assets. The following text detailing some of the more specific responsibilities largely follows that of the Victorian Weed Management Strategy (NRE 2002b). The Australian Weed Strategy (Commonwealth of Australia 2006) states “Combating weed problems is a shared responsibility that requires all parties to have a clear understanding of their roles.”

## **Department of Sustainability and Environment, and Parks Victoria**

The Department of Sustainability and Environment (DSE) has policy interpretation and legislative responsibility for weed and biodiversity management and coordinates the implementation of the Government’s management programs. These programs are delivered through the direct management of public lands and through the provision of behavioural change programs.

Public land and water managers – DSE land management Divisions (covering parks, forests and other crown lands) are responsible for the management of most public land in Victoria. Parks Victoria provides direct management of the parks and reserves estate.

Public land management is carried out in accordance with relevant legislation and policy frameworks.

Where weed management on public land primarily benefits the land itself, such as biodiversity conservation and the protection of the natural resource base, management is the core responsibility of the relevant public land and water manager.

Where weed management is required on public land to protect adjoining private land, this management will also be the responsibility of the relevant public land or water manager. In some cases, these management costs can be supported through the Good Neighbour Program (GNP) in partnership with the public land or water manager. The GNP is managed by DSE to address damage caused to the community by pests originating on adjoining public land.

The Pest Management Coordinating Committee has been established under the Victorian Pest Management Framework (NRE 2002a) to co-ordinate DSE's approach to pest management.

In commercially harvested forests, VicForests is responsible for weed management during the harvesting and regeneration phase (an important time as it involves disturbance) and checking contractors comply with relevant prescriptions (e.g. washing down machinery for weed hygiene).

### **Victorian Catchment Management Council**

The Victorian Catchment Management Council (VCMC) was established under the *Catchment and Land Protection Act 1994*. Its role is to advise the Minister for Environment and Conservation on natural resource management issues and report on the quality of land and water resources. The VCMC has a number of statutory roles in relation to weed management. These include legislation review, statewide research priorities, community education and program review. The VCMC is well placed to support the coordination of weed management by Catchment Management Authorities at the statewide level, to advise on weed listings and to provide links between participants in weed management in Victoria. The VCMC has a role in advising the Minister on the condition of land and water in the State, which is done through production of a catchment condition report.

### **Catchment Management Authorities**

Victoria's Catchment Management Authorities are empowered under the *Catchment and Land Protection Act 1994* to develop regional catchment strategies, promote co-operation among land and water managers, advise the Minister (e.g. on priorities, management guidelines, condition), and promote community awareness and understanding of catchment management.

CMAs have a responsibility to oversee the development and guide the implementation of Regional Weed Plans and inform their regional communities about the agreed programs, priorities and funding for weed management. CMAs identify regional priorities in Regional Catchment Strategies and underlying action plans (e.g. Regional Weed Plans, Regional River Health Strategies). Funds (federal, state and initiative) are allocated to regions via the regional catchment investment planning process and priorities for funding within regions are determined by Regional Assessment Panels. CMAs undertake weed management, such as in some riparian and riverine environments.

### **Melbourne Water and water authorities**

The Victorian Government owns Melbourne Water. Melbourne Water manages Melbourne's water supply catchments, removes and treats most of Melbourne's sewage, and manages rivers and creeks (including their frontages) and major drainage systems in and around Melbourne.

Urban and rural water authorities have responsibilities for weed management including terrestrial weeds around their storages channels and drains, aquatic weeds within their storages, channels, irrigation channels and drains and in water supply catchments.

### **VicRoads**

VicRoads is responsible for maintaining and improving the condition and performance of Victoria's 22,240 km of arterial roads and 4924 bridges and major culverts as specified in the *Road Management Act 2004*. It is also responsible for the implementation of pest management as defined under the *Catchment and Land Protection Act 1994* on roads under its management.

Section 20(2) of the *Catchment and Land Protection Act 1994* states that a land owner must take all reasonable steps to prevent the spread of regionally controlled weeds and established pest animals on a roadside that adjoins the land owner's land. There is a range of exemptions including for freeways and arterial roads, which are managed by VicRoads. Section 37(1) of the *Road Management Act 2004* defines the responsible road authority for the management of a road, which includes VicRoads in a range of situations.

VicRoads, in partnership with other stakeholders, also implements strategies to ensure sustainable roadside biodiversity.

## Local government

Local government has an important role to play in natural resource management as it has relatively broad powers in relation to environmental control, protection and conservation, as well as being a land manager. Local government, through the local planning scheme, determines the appropriate use and development of land. In preparing or reviewing the scheme, due regard must be given to relevant aspects of Regional Catchment Strategies and any associated implementation plan or strategy approved under the *Catchment and Land Protection Act 1994*. Statutory and strategic planning provides an essential framework for future sustainable regional development.

There is also a role for local government as a priority setter, community educator and advocate and as a coordinator of community weed management programs. In addition to managing significant council owned land, such as reserves and municipal parks, local government manages approximately 2,800 Crown land reserves, as committees of management. In this role local government must meet all obligations under the *Crown Land (Reserves) Act 1978*, including weed management activities.

Current interpretation of the relevant legislation places legal obligations on local government for weed management on roadsides (See *Road Management Act 2004* and the *Catchment and Land Protection Act 1994*).

## Research

Research plays a key role in all aspects of weed and pest management. It provides the ecological understanding that supports the principles and approaches to management, it contributes data on which to base sound decisions and enables objectives to be objectively evaluated. A wide range of organisations contribute to this knowledge including government research institutions, universities, non-government organisations and private individuals.

## Community

Community groups and the broader community also have significant roles in reducing the threat of weeds to the environment. For example, effective quarantine and surveillance relies on the care shown in preventing new introductions of species and willingness of individual members of the community to report potential introductions. The community has a role in managing the threat of weeds on their own land and as volunteers looking after their public land estate. They are a major means of disseminating information about the risks posed by invasive species and the reasons for public investment.

## A partnership

Effective weed management depends on the development and implementation of working partnerships between Government, industry and the community. All levels of government together with private and public land and water managers, the Victorian Catchment Management Council (VCMC) and Catchment Management Authorities have a role to play in achieving environmentally sound, cost-effective weed management in Victoria. This will only be achieved through the development of effective working relationships between all public land and water managers and stakeholders, Landcare, community and industry groups such as the Victorian Farmers Federation and Victorian National Parks Association, the agricultural service industry, rural contractors, the nursery industry, seed producers, agricultural produce processors and marketers, and the wider community. The Government provides strategic direction, legislative support and funds weed management programs within shared investment guidelines.



# Applicability

## **Land tenure**

These Guidelines and Procedures have been developed specifically with reference to managing the environmental impact of weeds on *public land* throughout Victoria. The principles, standards and planning procedures outlined in this document, however, may also be useful in developing strategies for managing the environmental impact of weeds on private land if applied cautiously. Private land in Victoria differs in some significant aspects to its public land counterpart in ways that may have implications for weed management. For example, private land generally occupies more fertile soils and the majority of the land is covered by agricultural ecosystems with indigenous vegetation being highly fragmented and confined to small patches that are subject to increased disturbance from external sources.



# Other issues

## Mutual consideration

For effective weed management all land managers need to act as good neighbours to one another. This involves listening to and respecting the weed issues faced by people in different circumstances and the impacts they are having on important values. Public land and water managers need to be conscious of the impacts on adjoining private land and incorporate these issues into their programs. The government's Good Neighbour program provides funding for good neighbour activities on public land.

## Ecological substitution

In some (usually rare) instances weeds play an important role in conserving biodiversity assets. This is most likely to be the case in highly degraded ecosystems where important ecosystem elements/resources have been replaced by weed species (e.g. refuge for small birds provided by prickly weeds where natural understorey has been removed, indigenous pollinators that require weeds for part of their lifecycle). Care must be taken to ensure the natural component is available in the ecosystem prior to weed control, especially where a threatened or locally significant species may be affected. Section 4 (2) of the *Flora and Fauna Guarantee Act 1988* requires that "A public authority must be administered so as to have regard to the flora and fauna conservation and management objectives" of the Act. Thus, in situations where there are apparently conflicting objectives, such as the presence of a noxious weed at a site containing a threatened species, management solutions must weigh up the relative risks associated with taking or not taking action and manage toward the desired outcome of weed free habitat.

In addition, it is often the case that weed control, if it is to be effective in the long term, must be matched by a corresponding program to occupy the vacant space/niche created with indigenous replacements. Weed management is a component of a holistic approach to natural resource management that should be applied to the rehabilitation of a site.

## Social and economic values

An integrated approach to weed management requires that social and economic (as well as environmental) considerations, be taken into account when prioritising management actions. A complicating factor is that there is at this time no direct impartial method for comparison of the relative values of social, economic and environmental assets (see also page 22). At the present time, the land manager, having regard to the significance of the assets for the community at large and the full range of ecosystem services provided, must make these judgements.

## Heritage and cultural values

Where environmental weed species are considered to have some other value (cultural, historical), this must be weighed against the often-significant environmental impacts and costs of their retention. In instances where retention of the weed species is desirable, then a management program should be implemented to prevent potential environmental impacts.

## Revegetation

Weed control is often a precursor to revegetation activities, particularly in degraded systems such as many streamside reserves. Where environmental benefits are being sought from these activities, the priority given to the site may be elevated by the significance of the overall outcomes. Generally, the priority for vegetation protection is to protect what remains, enhance existing remnants then restore through revegetation.

## Document review

This document should be reviewed every ten years, or more frequently should significant new information need incorporation.

# Glossary

- Adaptive Management** The systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. In its most effective form (Adaptive Experimental Management), it employs management programs that are designed to experimentally compare selected policies or practices, by evaluating alternative hypotheses about the system being managed.
- Asset** A biophysical item of environmental, social, cultural or economic value to the community for the ecosystem services it provides (a natural 'resource').
- Asset area** An area containing one or more environmental, social, cultural or economic assets of value to the community.
- Biodiversity** The variety of life forms: the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form.
- Bioregion** Biogeographic regions (Bioregions) capture the patterns and ecological characteristics in the landscape or seascape providing a natural framework for recognising and responding to biodiversity values.
- Contain** To prevent spread beyond the defined boundary of the current infested area.
- Crown land**<sup>53</sup> Land which is, or is deemed to be, unalienated land of the Crown and includes—
- (a) land of the Crown reserved permanently or temporarily or set aside by or under an Act; and
  - (b) land of the Crown occupied by a person under a lease, licence or other right;
  - (c) land of the Crown managed by a public authority other than the Department of Sustainability and Environment or the Secretary;
  - (d) land of the Crown which is, or is part of, a national park or a park within the meaning of the *National Parks Act 1975*;
- Ecological Vegetation Class (EVC)** A level within a hierarchical vegetation classification system identified on the basis of floristics, vegetation structure and environmental and ecological features. An EVC may comprise one or a number of floristic communities that exist within a common set of ecological processes and habitat variables and may occur across a number of biogeographical zones. Areas of the same EVC manifest similar life forms, genera, families, vegetation structure, and landscape position.
- Ecosystem** The dynamic interaction between the complex of organisms that make up a community with their non-living environment and each other.<sup>54</sup>

<sup>53</sup> See Conservation Forests and Lands Act 1987 and Coastal Management Act 1995.

<sup>54</sup> Source: Australian Committee for IUCN 1996

<b>Ecosystem resilience</b>	Ecosystem resilience can be defined in two ways. The first is a measure of the magnitude of disturbance that can be absorbed before the (eco)system changes its structure by changing the variables and processes that control behaviour. The second, a more traditional meaning, is as a measure of resistance to disturbance and the speed of return to the equilibrium state of an ecosystem.
<b>Ecosystem services</b>	Ecosystem Services are the services provided by nature that benefit humans and include production of goods (e.g. food, pharmaceuticals, natural fibres and timber), regeneration processes (e.g. detoxification, pollination) and life-fulfilling functions (e.g. aesthetic beauty, spiritual inspiration, scientific value).
<b>Environmental weed</b>	An environmental weed is a non-indigenous plant species that has invaded (or has the potential to invade) natural ecosystems and threaten (or has the potential to threaten) environmental and/or conservation assets. It may include some Australian native plants not indigenous to a given area. There are a number of definitions in use. (see Csurhes and Edwards (1998) for a review of some others; note that this is not exhaustive). Environmental weeds can be declared as noxious weeds (under schedules in the <i>Catchment and Land Protection</i> (CaLP) Act 1994) but many are not declared and hence are defined here separately.
<b>Eradication</b>	Means that a weed has been removed or killed over time and no longer occurs at that site including its propagules <sup>55</sup> .
<b>Established weed</b>	Established weeds are weeds that have naturalised in a region and have increased their population size over a geographic area such that eradication would be in practical terms unlikely.
<b>New and emerging weed</b>	Weeds that have recently been recorded or have been present for some time and are known or are suspected to have the potential for detrimental impact on environmental, social or economic values. Definition is determined by extent of presence, and varies according to the scale of the environment of interest (Weed Alert Rapid Response Plan Victoria 2004/05). In this document, refers to weeds for which there is a high probability of eradication from a significant area (catchment, bioregion, landscape).
<b>Naturalised</b>	An organism freely reproducing in an area outside its natural range.
<b>Noxious weed</b>	Noxious weeds are species declared as such in schedules under the CaLP Act 1994. The Act defines four categories, 'State prohibited', 'regionally prohibited', 'regionally controlled' and 'restricted'. The legislation requires that these be controlled or eradicated.  The Act specifies that this applies to any plant if "it is, or has or may have the potential to become, a serious threat to primary production, Crown land, the environment or community health in Victoria" [Part 8, 558(4)].
<b>Public land</b>	All State forest, national park and protected public land as defined by section 3 of the <i>Forests Act 1958</i> , except that managed by the Victorian Plantations Corporation or its successors.  All land that is not freehold land. It refers to land owned by the Crown and set aside for public purposes. The term also includes land that is held and managed under delegated arrangements such as Crown Land Reserves managed by Committees of Management.
<b>Public land manager</b>	In this document refers to key public land and water managers that carry the responsibility for the planning, management and monitoring of natural resource management outcomes on public land in Victoria. It does not include private individuals or small groups that manage public land under licence or agreement on behalf of a public land management agency where that agency is responsible for ensuring appropriate management. It does include corporations and agencies (e.g. utilities including electricity, gas, grain, ports, rail, telecommunications and water) that manage large areas of vested public land for their own or public purposes and that have a duty of care to maintain the land on behalf of the Crown. Vested Crown land is vested for prescribed purposes but remains Crown land.
<b>Service</b>	Refers to the ecosystem services provided by biophysical assets to the community.
<b>Sleeper weed</b>	Sleeper weeds are exotic plants that have naturalised in a region but have not yet increased their population size rapidly.

<sup>55</sup> Source: DPI/DSE 2005 Weed Alert Rapid Response Plan Victoria

<b>S.M.A.R.T.</b>	The acronym for the criteria by which objectives should be set and performance indicators written: <b>S</b> pecific—what will be achieved is clearly defined, <b>M</b> easurable—there is some way of measuring what will be achieved, <b>A</b> chievable—the objective is realistic given the resources available, <b>R</b> elevant—the objective is relevant to the project vision and goals, <b>T</b> ime-framed—there is a time by which the objective will be achieved.
<b>Suppress</b>	In this context, to reduce the density or health of weeds at a location below thresholds at which they are having an ecological impact.
<b>Triage approach</b>	An approach based on the premise that effective conservation planning must avoid the allocation of scarce resources to areas/assets that will fail to persist regardless of actions taken to protect or manage them. Assigns action to one of three categories: 1. Those which can be helped by action, 2. Those which will probably persist without action, 3. Those which are likely to continue to decline regardless of the amount of action.
<b>Value</b>	The value placed by the community on ecosystem services provided by biophysical assets.

# Appendix 1: List of Public Land Management Agencies and Stakeholders

The following agencies have responsibilities for managing the environmental impacts of weeds on public land. See the Glossary for definitions of 'Public land' and 'Public land manager'.

**Table 4: Victorian Public Land and Water Managers**

Group	Agency
Department of Sustainability and Environment	<ul style="list-style-type: none"> <li>• DSE Divisions</li> </ul>
Other Public Land and Water Managers	<ul style="list-style-type: none"> <li>• Parks Victoria</li> <li>• Melbourne Water</li> <li>• VicRoads (local government when acting as an agent)</li> <li>• Committees of Management (including local government)</li> <li>• Alpine Resorts Coordinating Council</li> <li>• Catchment Management Authorities</li> </ul>
Land vested for utility (see note under 'Definitions')	<ul style="list-style-type: none"> <li>• Electricity, gas, grain, ports, rail, water utility managers</li> <li>• Rail track managers (Australian Rail Track Corporation, others relating to suburban lines)</li> <li>• Rural and Urban Water Authorities</li> <li>• Telecommunications (Telstra, Telstra Country Wide)</li> </ul>
Commonwealth land managers	<ul style="list-style-type: none"> <li>• Australian Defence Force</li> <li>• Airports (lessee)</li> </ul>

**Table 5: Stakeholders in Public Land Management**

Group	Agency
Department of Sustainability and Environment	<ul style="list-style-type: none"> <li>• DSE Divisions</li> </ul>
Parks Victoria	
Department of Primary Industries (DPI)	<ul style="list-style-type: none"> <li>• Catchment and Agriculture Services</li> <li>• Primary Industries Research Victoria</li> <li>• Biosecurity Victoria</li> </ul>
Victorian Catchment Management Council (VCMC)	<ul style="list-style-type: none"> <li>• Catchment Management Authorities</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Alpine Resorts Management Board</li> <li>• Local government</li> <li>• Municipal Association of Victoria</li> <li>• Essential Services Commission</li> <li>• VicForests</li> <li>• Victorian Environment Assessment Council (VEAC)</li> <li>• Coastal Boards</li> <li>• Indigenous communities</li> <li>• Representative bodies (e.g. National Parks Advisory Council, Victorian National Parks Association, Victorian Farmers Federation)</li> <li>• Urban Land Corporation</li> </ul>

# Appendix 2: Legislative and Policy Framework for Weed Management

## Victorian legislation

### Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act 1994* aims to establish a framework for the integrated and co-ordinated management of catchments which will maintain and enhance long-term land productivity while also conserving the environment. It aims (Section 4) to ensure that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced.

The Act establishes Catchment Management Authorities with responsibility for developing Regional Catchment Strategies. Section 26 requires that, in carrying out a function involving land management on behalf of the Crown; or under an Act, a Minister or public authority must have regard to any regional catchment strategy applying to the land.

This Act provides the power to declare plants as 'noxious' if the Minister is satisfied that it is, or has or may have the potential to become, a serious threat to primary production, Crown land, the environment or community health in Victoria.

Noxious weeds are weeds declared to be State prohibited, regionally prohibited, regionally controlled or restricted requiring action by the land owner, including the Secretary [DSE] as a land owner.

Section 20 specifies general duties of land owners (defined to include public authorities, occupiers of Crown land under a lease or licence, Roads Corporation, Director of National Parks) in relation to land management including eradication of regionally prohibited weeds and prevention of their growth and spread. Section 21 relates to specific duties of the Secretary in regard to State prohibited weeds and roadsides. The Act also has provisions to prevent the spread of declared noxious weeds.

"Section 20. General duties of land owners—

- (1) In relation to his or her land a land owner must take all reasonable steps to—
  - (d) eradicate regionally prohibited weeds; and
  - (e) prevent the growth and spread of regionally controlled weeds;
- (2) A land owner must take all reasonable steps to prevent the spread of regionally controlled weeds and established pest animals on a roadside that adjoins the land owner's land".

### Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* aims to guarantee that all Victoria's taxa of flora and fauna can survive, flourish and retain their potential for evolutionary development in the wild. This is achieved through conservation of (plant and animal) communities, managing potentially threatening processes and other methods. An Action Statement is prepared for each item listed under the Act. This Act is binding on the Crown. Public land managers should particularly note those Potentially Threatening Processes (PTP) listed under the Act relating to environmental weeds. At the present time these include 'The invasion of native vegetation by environmental weeds', 'Spread of *Pittosporum undulatum* in areas outside its natural range', 'Invasion of native vegetation by Blackberry *Rubus fruticosus* L. agg.' and 'Introduction and spread of *Spartina* to Victorian estuarine environments.' [a full list of PTP is published on the internet ([www.dse.vic.gov.au](http://www.dse.vic.gov.au)) or available from DSE].

Weeds are also mentioned as a threat in many other nominations and Action Statements (refer to DSE's Actions for Biodiversity Conservation [ABC] database – explained in the Information section of these Guidelines).

Section 49 of the Act states that "A person must not, except as prescribed, without the permit of the Secretary, abandon or release any prescribed flora into the wild."

## National Parks Act 1975

Section 17 2 (a) of the Act requires the Secretary to ensure that each national park and State park is controlled and managed, in accordance with the objects of this Act, in a manner that will—

- (i) preserve and protect the park in its natural condition for the use, enjoyment and education of the public;
- (ii) preserve and protect indigenous flora and fauna in the park;
- (iv) eradicate or control exotic flora in the park; [also Other parks, Section 18(2)(iv)]
- (aa) have regard to all classes of management actions that may be implemented for the purposes of maintaining and improving the ecological function of the park;

Section 17 2 (d) requires the preparation of a plan of management in respect of each national park and State park, which may include weed management plans.

Section 17D(3)(ii-iii) relates to prevention and eradication of exotic flora in marine national parks.

## Sustainable Forests (Timber) Act 2004

The main purpose of this Act is to provide a framework for sustainable forest management and sustainable timber harvesting in State forests.

Part 2 specifies what is meant by 'sustainable forest management' based on the principles of ecologically sustainable development (ESD) and including 5(3)(c) 'to protect biological diversity and maintain essential ecological processes and life-support systems'. The guiding principles of ESD include [Section 5(4) (a,b,c,g)]:

- Decision-making processes should integrate both long-term and short-term economic, environmental, social and equity considerations.
- If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- The need to consider the global dimension of environmental impacts of actions and policies.
- The need to facilitate community involvement in decisions and actions on issues that affect the community.

The Minister must determine criteria and indicators of sustainable forest management and may develop a Sustainability Charter to which VicForests must respond with initiatives and targets (Section 12). VicForests and others involved in timber harvesting and/or sale must comply with relevant Codes of Practice (Section 46) including the Code of Forest Practices for Timber Production (see page 9).

## Forests Act 1958

Section 18 - "Subject to this Act the Secretary [DSE] shall protect State forests and shall have the control and management of (a) State forests...".

The management of State forests is affected by Part 5 of the *Conservation, Forest and Lands Act 1987*, which defines the power of the Minister to create Codes of Practice including The Code of Forest Practices for Timber Production (see page 9).

The new *Sustainable Forests (Timber) Act 2004* inserted new clauses into the Forests Act 1958:

62A. Secretary may apply and use fire for land and resource management

- (1) Subject to this Act, the Secretary may, in a State forest or national park, or on protected public land, apply and use fire for the following purposes—
- (b) to control pest animals and pest plants in the State forest, national park or on protected public land;
- (c) to maintain, manage, protect or enhance the ecology of, or land or vegetation in, the State forest, national park or on protected public land.

## **Conservation, Forests and Lands Act 1987**

An object of this Act is to set up a legislative framework to enable the Minister—

- (a) to be an effective conservator of the State's lands, waters, flora and fauna;

The Act enables the Minister to create Codes of Practice (see page 9), which specify practical procedures for the carrying out of all or any of the objects or purposes of a relevant law.

32(2) A Code of Practice may relate to but is not limited to any of the following matters—

- (b) eradication and control procedures for pest plants and pest animals;...

## **Crown Land (Reserves) Act 1978**

The *Crown Land Reserves Act 1978* provides for the permanent or temporary reservation and management of Crown lands. Land may be reserved for a range of public purposes including preservation of areas of ecological significance, the preservation of species of native plants, for wildlife, public gardens, archaeological and coastal protection.

Committees of Management [Section 15(1)(a)] appointed under the Act 'shall manage improve maintain and control the land for the purposes for which it is reserved ...'

## **Land Act 1958**

Perpetual lessees of Crown land, are required, under Section 55(1)(b), to eradicate and control noxious weeds.

Holders of Agricultural Licenses under the *Land Act 1958* (Section 130) are required to "2.4.1.1 Keep the licensed land free of pest animals and weeds;".

## **Coastal Management Act 1995**

This Act establishes a process for co-ordinated coastal planning (Sections 1, 4). It establishes the Victorian Coastal Council (Part 2, Div 1) responsible for preparation of a Victorian Coastal Strategy (Part 3, Div 1) and Regional Coastal Boards (Part 2, Div 2) responsible for preparation of Coastal Action Plans (Part 3, Div 2).

(1) The Victorian Coastal Strategy must provide for the long term planning of the Victorian coast—

- (a) to ensure the protection of significant environmental features of the coast; and...
- (d) to ensure the sustainable use of natural coastal resources.

Land managers must take Coastal Action Plans into account (S29). Management plans may also be prepared for areas of coastal Crown land [S30, (1)].

## **Rail Corporations Act 1996**

This Act establishes Victorian Rail Track (VicTrack) as a body corporate and public authority that does not represent the Crown. The principal objective of Rail Track is to perform its functions in an efficient and commercial manner. Section 11 defines the functions of Rail Track which include (1)(a) to establish, manage and maintain railways and rail infrastructure.

## Road Management Act 2004

Part 4, Div 1, 20 outlines the principal object and management of roads including that “road reserves are available for other appropriate uses”. Section 25 provides for the making of Codes of Practice for road management, facilitates the making of voluntary Road Management Plans and covers management responsibility for roads. General functions of road authorities (Section 34) include: 1 (b) “to manage the use of roads having regard to the principle that the primary purpose of a road is to be used by members of the public and that other uses are to be managed in a manner which minimises any adverse effect on the safe and efficient operation of the road and on the environment”. Section 5 (1) discusses the application of the Act not affecting landholder responsibilities under Section 20(2) of the CaLP Act 1994 to manage regionally controlled weeds. Section 38 (1)(e) requires the road authority to have regard to policies and priorities in relation to transport, the environment and other matters determined by the Government of Victoria and 38 (2)(d)(iii) requires a co-ordinating road authority to ‘protect the environment’. Schedule 7, Part 2, 14 Principles applying to infrastructure managers and works managers — (3) Without limiting the generality of sub-clause (2), authorised uses must be managed so as to—(g) protect and preserve existing significant roadside vegetation and sites of biological significance within the road reserve.

At least nine Acts make provision for the management of weeds along roadsides including the *Forests Act 1958*, *Transport Act 1983* and the *Country Fire Authority Act 1958*.<sup>56</sup>

## Water Act 1989

A purpose of the Water Act 1989 is [Section 1 (j)] “to provide formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses; and (k) to provide for the protection of catchment conditions”. In addition, “an Authority that has the management and control of any environmental or recreational areas may, in accordance with sections 160 and 161, make by-laws applying to any or all of those areas for the following purposes—(e) the control of the introduction of any new flora or fauna to the area; (f) the control of the numbers of any flora or fauna in the area [Division 3 (107) (5)]”.

“An Authority must perform its functions in an environmentally sound way” [Part 8 (163)(2)] “having regard to the need to preserve aspects which have landscape and fauna and flora values”. Its functions include “(a) to identify and plan for State and local community needs relating to the use and to the economic, social and environmental values of land and waterways; (b) to develop and to implement effectively schemes for the use, protection and enhancement of land and waterways”.

## Other

The *Local Government Act 1989* and the *Planning and Environment Act 1987* provide opportunities for local councils to become involved in and enforce weed control through the creation of local laws and planning permit conditions.

The *Planning and Environment (Planning Schemes) Act 1996*, which amended the *Planning and Environment Act 1987*, provided for the Minister to prepare a set of standard provisions for planning schemes called the Victoria Planning Provisions (VPP). The Victoria Planning Provisions<sup>57</sup> include native vegetation retention controls with some specific exemptions relating to weeds and pests.

The State Planning Policy Framework (Section 1), 15.09 ‘Conservation of native flora and fauna’, states “15.09-1 Objective – To assist the protection and conservation of biodiversity, including native vegetation retention and provision of habitats for native plants and animals and control of pest plants and animals...15.09-2 General implementation decision-making by planning and responsible authorities should: Address potentially threatening processes identified under the *Flora and Fauna Guarantee Act 1988*” (see page 6).

The Particular Provisions (Section 5), clause 52.17 state “Native vegetation – a permit is required to remove, destroy or lop native vegetation. This does not apply ‘Weeds and vermin’.” They contain a number of specific exemptions that include noxious weeds and bracken and, in some instances, *Kunzea ericoides* and *Leptospermum scoparium*. There is also an exemption relating to notices under the *CaLP Act 1994* and to access burrows for vermin control. Refer to the Provisions for specific information.

Under Section 75(1) of the *Fisheries Act 1995*, the Governor in Council may, by Order in Council, declare any aquatic species to be noxious. This may apply to species of aquatic flora.

<sup>56</sup> Victorian Weed Management Strategy (NRE 2002b)

<sup>57</sup> <http://www.dse.vic.gov.au/planningschemes/VPPs/index.html>

Victoria's *Biological Control Act 1986* mirrors the Commonwealth's *Biological Control Act 1984* and provides uniform national standards for the biological control of pests in Victoria. The Department of the Environment and Heritage and the Australian Quarantine Inspection Service (AQIS) jointly regulate the import, testing, and release of biological control agents under the *Quarantine Act 1908*, *Wildlife Protection (Regulation of Exports and Imports) Act 1982* and *Biological Control Act 1984*.

The Commonwealth's *Agricultural and Veterinary Chemicals (Control of Use) Act 1992* imposes controls in relation to the use, application and sale of agricultural and veterinary chemical products, fertilisers and stock foods and the manufacture of fertilisers and stock foods, for the purpose of Part 1, 1(a)(ii) 'protecting the environment'. The *Agricultural and Veterinary Chemicals (Victoria) Act 1994* mirrors the Commonwealth's *Agricultural and Veterinary Chemicals Act 1994* and applies the Agvet Code and Agvet Regulations in Victoria.

The *Rail Corporations Act 1996*, *Electricity Industry Act 2000* and *Gas Industry Act 2001* relate to utilities and the *Melbourne Water Corporation Act 1992* to Melbourne Water.

The *Plant Health and Plant Products Act 1995* deals with plant pests and diseases including quarantine issues associated with their transfer.

## **Victorian Codes of Practice, guidelines and policy**

### **Code of Practice for Timber Production 2007**

The *Code of Practice for Timber Production 2007* (DSE 2007) provides direction and guidance to forest managers and operators to deliver sound environmental performance when undertaking commercial timber growing and harvesting operations.

The Code Principles (1.1) express the broad outcomes of the intent of the Code for each aspect of sustainable forest management. Principle 3 states "3. Forest ecosystem health and vitality is monitored and managed to reduce pest and weed impacts. The Operational Goal is that Forest or plantation health is monitored and maintained by employing appropriate preventative, protective and remedial measures.

A mandatory action in Forest Planning (2.1.1) is to "identify and mitigate against potential threats such as weeds, pests and pathogens;"

Other clauses in the Code relate to screening or treatment of seed and nursery stock used in regeneration to ensure that the risk of spreading weeds, pathogens or pests is minimised; washing of machinery and equipment when moving between forest areas to assist in the control of the spread of some pathogens and weeds; and the overall promotion of forest health (2.3.4).

### **Environmental Policy for Victoria's State Forests**

The *Environmental Policy for Victoria's State Forests* (DSE 2004) states that "our goal is to improve stewardship of State forests while ensuring that they are managed sustainably from economic, social and environmental perspectives".

"We will continue to ensure the provision of a range of products and services including:

- conservation of native flora and fauna through maintenance of biodiversity and habitat;
- maintenance of productive forest capacity and ecosystem health and vitality (including the use of prescribed fire activities and wildfire suppression);
- protection of assets, including water and soils, from threats;...
- social, cultural and indigenous heritage values, recreation and tourism opportunities;..."

The policy commits DSE to: "meeting or exceeding our legislative or regulatory requirements, government policy and Departmental guidelines in the performance of our activities."

### **Sustainability Charter for Victoria's State Forests**

Objective 3 of the Charter is to promote healthy forests by actively managing disturbance including by pest plants.

## Code of Practice for Fire Management on Public Land

The *Code of Practice for Fire Management on Public Land (Revision No 1 February 2006)* provides a basis for establishing and maintaining a consistent standard of fire management on public land in Victoria.

The Environmental Management Principles (section 1.10.5) include:

(67) “fire regimes and fire management activities to be appropriate for maintaining and enhancing the vigour and diversity in populations of species and communities of the State’s Indigenous terrestrial and aquatic flora and fauna;”

(72) “the possible introduction and spread of pest plants and animals, plant diseases, insect pests and biological contaminants to be avoided wherever possible or addressed within appropriate timeframes, by effective machinery hygiene practices;”

(74) “Fire management will aim to minimise impacts on natural and cultural values, where protection of human life and property is not compromised.”

Community Partnership Principles (1.10.6) include seeking and respecting community knowledge, and working cooperatively with public and private landholders.

Section 4 recognises the potential risk due to disturbance and Section 47 states that the Code accommodates other departmental guidelines including weed guidelines.

(297) “When planning other operations (such as ploughing, mulching, herbicide application, chaining, rolling) to reduce the flammability of fuels, the Department must consider the impacts on the environment, particularly soil, water, weed spread, flora, and habitat for fauna as well as impact on historic and Indigenous cultural values.”

Section 396 recognises the risk of promoting weeds via inappropriate fire control operations and Section 499 requires fire ecology strategies to map areas of known weed infestations and risk.

Section 599 requires the Department to follow appropriate guidelines to ensure care is taken to prevent the introduction and/or spread of disease or insect and plant pests during fire suppression. Sections 99, 428 and 434 address weed issues in fire management planning, revegetation and rehabilitation.

## Victorian strategies

**Victorian Pest Management — A Framework for Action** (VPMF, NRE, 2002a) provides a whole-of-government consistent approach across all pest management programs on public and private land and water.

The vision for pest management in Victoria is:

“Pests no longer threaten the State’s natural assets, its social values and productive capacity of its land and waters.”

The **Weed Management Strategy** (NRE, 2002b) has been developed within the VPMF and deals with weed management in Victoria. It contains five goals for weed management (1) Prevent new weed problems, (2) A significant reduction in the impact of existing weed problems, (3) A Victorian community that is fully aware of the economic, social and environmental impacts and threat of weeds, and has the knowledge to act to minimise their damage, (4) Effective working partnerships built for progressive weed management and (5) Continuous improvement through review and evaluation.

### Victoria’s Native Vegetation Management: A Framework for Action 2002

This Framework establishes the strategic direction for the protection, enhancement and revegetation of native vegetation across the State. The Framework addresses native vegetation management from a whole-of-catchment perspective but necessarily focuses primarily on private land where the critical issues of past clearing and fragmentation exist. The government has adopted a policy of achieving a net gain in the extent and quality of native vegetation. The negative effects of weeds and pests on habitat quality are considered as part of the reporting framework. The minimum outcome for public land is a net gain overall with varying outcomes for vegetation of differing conservation significance. For example, the Framework specifies “no losses” for vegetation of “Very High Conservation Significance”.

**Healthy Rivers, Healthy Communities and Regional Growth: Victorian River Health Strategy 2002** – aims to achieve healthy rivers, streams and floodplains which meet the environmental, economic, recreational and cultural needs of current and future generations. The Strategy recognises the need to manage weeds that threaten riparian and riverine values (p98).

**Victoria's Biodiversity: Directions in Management 1997** - outlines the government's goal for conserving biodiversity including a net gain in the extent and quality of native vegetation. The Strategy is developed under the auspices of the *Flora and Fauna Guarantee Act 1988*.

**Regional Catchment Strategies** outline directions for natural resource management within each of Victoria's ten Catchment Management Area boundaries. They have legal status under the *Catchment and Land Protection Act 1994*.

The **Strategy for Aboriginal Managed Lands in Victoria (SAMLIV) 2003** describes issues facing, and strategic directions for, aboriginal managed land.

## Other

*Guidelines and Procedures for Ecological Burning on Public Land in Victoria 2004* provide a cross-tenure strategic framework for the management of ecological fire on public land. They provide guidance to public land managers on how to determine and implement ecologically appropriate fire regimes.

*Regional Forest Agreements* are 20-year plans for the conservation and sustainable management of Australia's native forests. Victoria's State Forests Environmental Management System 2004 provides management quality assurance.

The '*Indigenous Partnership Strategy*' (currently under review) aims to build effective relationships with indigenous communities including in the area of land management.

'*Our Water Our Future*' aims to achieve significant improvements in the ecological condition of Victoria's rivers by 2010 along with dynamic and capable management of all aspects of river health.

## National legislation

The focus of national legislation is on the regulation of import and export of plants and plant material into and around Australia. The Australian Quarantine and Inspection Service has a major role in prevention at this level<sup>58</sup>.

### Environment Protection and Biodiversity Conservation Act 1999

The Environment Protection & Biodiversity Conservation Act 1999 (the EPBC Act) provides a national framework for environment protection through a focus on protecting matters of national environmental significance and on the conservation of Australia's biodiversity. It covers Commonwealth land and actions taken by the Commonwealth.

Under the assessment and approval provisions of the EPBC Act, actions that are likely to have a significant impact on a matter of national environmental significance are subject to a rigorous assessment and approval process. An action includes a project, development, undertaking, activity, or series of activities.

The Act provides for the identification of key threatening processes and preparation of various plans including Recovery Plans, Threat Abatement Plans and Bioregional Plans.

Division 6A - Control of non-native species, 301A Regulations for control of non-native species

- provide for the establishment and maintenance of a list of species, other than native species;
- regulate or prohibit the bringing into the Australian jurisdiction of members of a species
- regulate or prohibit trade in members of a species
- regulate and prohibit actions
- provide for the making and implementation of plans to reduce, eliminate or prevent the impacts of members of species

As at May 2007, no Key Threatening Processes listed under the EPBC Act 1999 specifically relate to the environmental impacts of weeds. The EPBC Act provides protection for World Heritage Properties, Ramsar wetlands, Biosphere reserves, Commonwealth Reserves and Conservation zones.

<sup>58</sup> visit [http://www.austlii.edu.au/au/legis/cth/consol\\_act/toc.html](http://www.austlii.edu.au/au/legis/cth/consol_act/toc.html) or <http://scaletext.law.gov.au/home.htm>

## Quarantine Act 1908

The Commonwealth *Quarantine Act 1908* contains provisions to control the importation of plant material by means of schedules prohibiting certain weeds and weed seeds. The responsibility for administering this Act rests with the Australian Quarantine and Inspection Service (AQIS), a statutory authority responsible to the Federal Minister for the Department of Agriculture, Fisheries and Forestry (DAFF).

AQIS uses quarantine policies for the import of live plant material based on the development of scientific protocols (or conditions that are applied to imports). An analysis of risk assessment is conducted as part of protocol development.

## Other

Other relevant Commonwealth legislation includes: *Biological Control Act 1984* and *Agricultural and Veterinary Chemicals Act 1994*, *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, *Archaeological and Aboriginal Relics Preservation Act 1972*, *Native Title Act 1993* and *Native Title Amendment Act 1998*.

## National agreements

Victoria is signatory to a number of national strategies, three of which are particularly relevant to weed control: the *National Strategy for the Conservation of Australia's Biological Diversity* (1995); the *National Strategy for Ecologically Sustainable Development* (1992); and the *National Weeds Strategy* (1997).

### National Strategy for the Conservation of Australia's Biological Diversity 1996

The stated goal of the *National Strategy for the Conservation of Australia's Biological Diversity* is to protect biological diversity and maintain ecological processes and systems.

One objective of the Strategy with particular relevance to the control of invasive plants is to:

- 3.3 Control the introduction and spread of alien species and genetically modified organisms and manage the deliberate spread of native species outside their historically natural range.

The Strategy requires that well resourced programs be developed and implemented to:

- (d) ensure effectiveness and consistency of regulations governing the control of alien species, including their deliberate or unintended release or spread;
- and
- (e) develop contingency plans and have the capacity to ensure rapid eradication of any newly established and unwanted alien species or populations.

### National Strategy for Ecologically Sustainable Development 1992

The *National Strategy for Ecologically Sustainable Development* requires that signatories (Part 3 Chapter 9)

- protect biodiversity and maintain essential ecological processes,
- (Objective 9.1) develop effective mechanisms for minimising human, pest plant and animal impacts on ecological systems; and
- ameliorate existing impacts so that nature conservation values are maintained and enhanced.

## Australian Weeds Strategy 2006

*Australian Weeds Strategy: A National Strategy for Weed Management in Australia* (2006) provides the framework to establish consistent guidance for all parties, and identifies priorities for weed management across the nation with the aim of minimising the impact of weeds on Australia's environmental, economic and social assets.

The goals of the Strategy are threefold.

1. prevent new weed problems;
2. reduce the impact of existing priority weed problems; and
3. enhance Australia's capacity and commitment to solve weed problems.

## Other

The *Intergovernmental Agreement on the Environment* outlines roles and responsibilities of the Commonwealth and States in relation to the environment and land use decision-making.

Two of the principal objectives of the *National Forest Policy Statement* are the maintenance of an extensive and permanent native forest estate in Australia and the protection of nature conservation values in forests.

The *National Framework for the Management and Monitoring of Australia's Native Vegetation* (ANZECC 1999) sets out best practice principles for vegetation management and monitoring.

## International agreements

### **World Trade Organisation Agreement on the Application of Sanitary and Phytosanitary Measures (1995), International Plant Protection Convention (1995) and Australia-United States Free Trade Agreement (2005)**

The *Agreement on the Application of Sanitary and Phytosanitary Measures* (SPS Agreement), to which Australia is a signatory, defines the basic rights and obligations of member countries to take:

- "sanitary and phytosanitary measures to protect human, animal or plant life or health, taking into account risk assessment techniques developed by the relevant international organisations such as the International Plant Protection Convention (IPPC)."

One of the main objectives of the IPPC is to secure common and effective action to prevent the spread and introduction of pests and diseases of plant and plant products and to promote measures for their control.

The Australia-United States Free Trade Agreement contains measures to support the SPS Agreement.

### **Convention on Biological Diversity 1992**

The *Convention on Biological Diversity* was negotiated in the lead-up to the United Nations Conference on Environment and Development in June 1992. The Convention recognises the importance of biodiversity for evolution and for maintaining life sustaining systems of the biosphere. The Convention came into force in December 1993 and has been ratified by more than 130 countries, including Australia. The Convention obliges signatory nations to conserve biodiversity and to promote the recovery of threatened species and ecosystems. The Convention binds the Australian Crown, and thus the Crown in right of the State of Victoria.

Two provisions in Article 8 of the Convention are particularly relevant to the introduction and spread of invasive plants:

- "...establish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity;"

and;

- "...prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats and species."

## Ramsar Convention 1975

The *Convention on Wetlands of International Importance* (RAMSAR) is an international treaty that aims to stop the global destruction of wetlands and to conserve those that remain. Included among management measures required under the Convention is an:

- obligation to refrain from introducing invasive alien species, and to take preventative measures to minimise the risk of accidental introductions.

## Other

Australia is also a signatory to a number of other agreements that include the:

- *Convention for the Protection of the Natural Resources and Environment of the South Pacific*,
- *Convention on Conservation of Nature in the South Pacific*, and the
- *China-Australia Migratory Birds Agreement* and *Japan-Australia Migratory Birds Agreement*.

These multilateral and regional agreements oblige Australia to protect its natural environments, which includes the conservation of flora and fauna. Australia is therefore required to ensure that controls, including quarantine policies and procedures, are adequate to manage the threat of exotic pests and diseases that could damage natural environments.

# Appendix 3: Key Principles for Managing the Environmental Impacts of Weeds on Public Land (Summary List)

## Scientific and Management Principles

Principle 1: Prevention is better than cure.

Principle 2: Programs should endeavour to address the cause and source of weed invasion.

Principle 3: Programs should manage to promote the health of systems (*eco-systems*) and support the application of sound ecological management principles.

Principle 4: Programs should adopt an asset-based risk management approach.

Principle 5: A holistic, tenure-blind and consistent approach to natural resource management should be applied.

Principle 6: Environmental weed projects must be planned to achieve explicit, demonstrable and measurable ecological management objectives.

Principle 7: Ecologically Sustainable and 'Triple Bottom Line' (TBL) approaches should be used.

Principle 8: Evidence-based decision-making must be a feature of program development, so as to demonstrate that planning and prioritisation is based on sound and up-to-date scientific and technical information including conceptual frameworks.

Principle 9: Control programs should be based on an adaptive management approach to ensure continuous development and improvement based on a framework incorporating monitoring, evaluation, feedback and change.

Principle 10: If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

## Social and Economic Principles

Principle 11: Public funding will be invested in public good outcomes.

Principle 12: Funding should be directed to cost-effective activities that provide the best return on investment.

Principle 13: Investment should be directed to leverage fundamental resource condition change.

Principle 14: The community should be engaged in the strategic planning and management of public land.

Principle 15: Legislation and government policy in regard to social issues must be followed (e.g. non-discriminatory, provision of access, inter-generational equity, consultation about matters affecting communities including indigenous communities).

Principle 16: In managing land under their jurisdiction, land and water managers need to take account of the broader social and economic implications and issues for land potentially affected by weeds.

# Appendix 4: Acronyms

AM	Adaptive Management
ANZECC	Australian and New Zealand Environment and Conservation Council
APVMA	Australian Pesticides and Veterinary Medicines Authority
AQIS	Australian Quarantine and Inspection Service
AVW	Atlas of Victorian Wildlife
CaLP Act	Catchment and Land Protection Act 1994
CAMS	Catchment Activity Management System
CAS	Catchment and Agriculture Services, (Department of Primary Industries, Victoria - Service provider for Land and Catchments DSE))
CBD	Convention on Biological Diversity 1992
CMA	Catchment Management Authority
CRC	Cooperative Research Centre (CRC for Australian Weed Management, Weed CRC)
DAFF	Department of Agriculture, Fisheries and Forestry (Commonwealth)
DEH	Department of Environment and Heritage (Commonwealth)
DPI	Department of Primary Industries (Victoria)
DSE	Department of Sustainability and Environment (Victoria)
ENRC	Environment and Natural Resources Committee of the Victorian Government
ERC	Expenditure Review Committee of the Victorian Government
ESD	Ecologically Sustainable Development
EVC	Ecological Vegetation Class
EWVG	Environmental Weeds Working Group
FFG Act	Flora and Guarantee Act 1988
FIS	Flora Information System
GNP	Good Neighbour Program
IPMS	Integrated Pest Management System
NPAC	National Parks Advisory Council
NRE	Department of Natural Resources and Environment, Victoria (now DSE & DPI)
PIRVic	Primary Industries Research Victoria
PMCC	Pest Management Coordinating Committee
SPS	Agreement on the Application of Sanitary and Phytosanitary Measures
VEAC	Victorian Environmental Assessment Council
VCMC	Victorian Catchment Management Council
VFF	Victorian Farmers Federation
VNPA	Victorian National Parks Association
VPMF	Victorian Pest Management — A Framework for Action (NRE 2002a)
VWMS	Victorian Weed Management Strategy (NRE 2002b)
WAP	Weed Action Plan
WARR	Weed Alert Rapid Response Program
WoNS	Weeds of National Significance

# Appendix 5: Areas of Public Land<sup>59</sup>

**Table 6: Areas of Public Land in Victoria, June 2007.**

Category	Area (ha)	% of Victoria
National Parks (including Wilderness Zones)	2 540 858	11.2
State Parks	239 745	1.1
Coastal Parks	52 800	0.2
Regional Parks	72 755	0.3
Reference Areas	109 477	0.5
Wilderness Areas (other than Wilderness Zones)	202 050	0.9
Water Production	144 280	0.6
Nature Conservation Reserves (includes Flora Reserves, Flora and Fauna Reserves)	187 565	0.8
Coastal Reserves	5 150	0.02
Natural Features Reserves (includes public land water frontage reserves, streamside reserves, River Murray Reserve, lake reserves, bushland reserves, natural features and scenic reserves, caves, geological reserves, highway parks)	418 700	1.8
Historic and Cultural Features Reserves (includes historic areas, historic reserves)	39 800	0.2
Community Use Areas (includes education areas, recreation reserves)	45 470	0.2
Alpine Resorts	10 580	0.05
State Forest	3 314 680	14.6
Plantations	139 070	0.6
Earth Resources (previously minerals, coal and stone)	44 950	0.2
Services and Utilities (previously utilities and survey)	601 720	2.6
Uncategorised Public Land (includes township land, other reserves and public land, and revegetation areas)	167 318	0.7
Land not required for public purposes (previously termed Agriculture)	132 667	0.6
Forest Park	39 265	0.2
<b>TOTAL</b>	<b>8 508 900</b>	<b>37.4</b>

<sup>59</sup> Source: Victorian Environmental Assessment Council, June 2007. Note that this table comes with a range of caveats. Contact VEAC for details.

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