

Weeds and Vertebrate Pests

Module 1 within the invasive plants and animals policy framework



Main image

Horsetails (*Equisetum spp*), DPI Victoria

Small images

Boa constrictor, DSE Victoria

Salvinia, DPI Victoria

Karoo thorn, DPI Victoria

European fox, Parks Victoria

Horsetails, DPI Victoria

Green iguana, DSE Victoria

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Scope

The scope of this module of the Invasive Plants and Animals Policy Framework encompasses mammals, birds, amphibians, reptiles and both terrestrial and freshwater plants, corresponding to the types of organisms within the scope of the *Catchment and Land Protection Act 1994* (CaLP Act). In this module the terms 'invasive plants' and 'invasive animals' are synonymous with weeds and pest animals respectively and they are together abbreviated to IPA.

Specific actions

The actions described in this section are those that will be carried out by the Victorian Government in line with the roles of DPI and DSE detailed in Appendix D.

Preparedness and prevention

- Conduct risk assessments on IPA species present in Australia but not yet found in Victoria, incorporating the effects of climate change.
- Conduct active surveillance via inspection of wholesale and retail outlets and at locations linked to previous detections.
- Continue passive surveillance by recruiting and supporting a pool of trained people who will report high-risk species encountered during their normal activities.
- Improve and apply understanding of pathways by which high-risk species could be introduced to Victoria.
- Engage with industries involved in activities associated with incursions, with a view to developing risk management protocols.
- Pursue, through national arrangements, the goal of consistent legislative treatment of and operational responses to new high-risk species.
- Train staff and build capacity in incursion management.
- Develop and maintain incursion plans for individual high-risk species.
- Develop and maintain protocols for communication and collaboration with other jurisdictions for incursion management.
- Develop improved diagnostic methods, including methods for identification of invasive species from partial or immature specimens.
- Undertake predictive modelling to:
 - better understand the introductory pathways of high-risk invasive species into Victoria;
 - direct surveillance to locations where incursion of new high-risk IPA is most likely; and
 - predict the potential spread to guide delimiting surveys.

Eradication

- Conduct delimiting surveys of target species.
- Report annually on progress towards eradication of target species.
- Develop criteria to identify which IPA are appropriate future targets for eradication.
- Review current eradication programs and develop alternative approaches if eradication is no longer feasible.
- Develop and implement eradication plans that identify potential pathways of spread and management tools and consider the potential effects of climate change.
- Explore cost-sharing arrangements for eradication with Commonwealth and state governments or industries and other beneficiaries.
- Conduct research and development where necessary to provide techniques to rapidly achieve eradication.

Containment

- Survey current distribution of high-risk established IPA to identify those with large potential for further spread.
- Improve understanding of pathways of spread and feasibility of containment.
- Develop spatial models to predict spread and thus identify infestations where control will provide greatest benefits.
- Develop a decision support framework for selection of established IPA for containment, based on consideration of net public benefit.
- Communicate how and why:
 - some IPA species are selected for containment; and
 - particular infestations are prioritised for management.
- Implement containment programs, including managing pathways of spread, using awareness raising, extension, incentives or regulatory compliance as appropriate.
- Review progress of containment programs to determine whether continuing investment is justified or modifications are required.

Asset-based protection

- Provide data and advice to support assessments of IPA threats to state and regional assets, feasibility of control and contribution of control to improving asset condition.
- Develop biological control for IPA target species chosen according to the probable improvement in asset condition from reduced pest abundance.
- Contribute to the development and implementation of outcome-based monitoring, evaluation and reporting for asset-protection programs based on a statewide framework.
- Promote and support integration of landscape-scale IPA management with other actions addressing protection of assets with high social, economic and environmental values.

Partnerships

- Work with local government to identify effective future arrangements based on clear understanding of state and local government responsibilities.
- Implement effective cross-agency partnerships and programs that align with the biosecurity approach to pest management.
- Facilitate broader networks at local, regional and statewide levels that lead to landscape-scale programs delivered in partnership with key stakeholders, including traditional owners.
- Maintain and expand the collection and sharing between stakeholders of information relating to IPA management.
- Review the role of Community Pest Management Groups to optimise their contribution to the biosecurity approach and engagement with the community.

Policy and legislation

Policy tools

- Identify and examine the effectiveness of current and potential policy tools for IPA management.
- Develop and apply principles to select appropriate policy tools for IPA management that deliver policy goals most effectively, while recognising requirements such as protection of animal welfare and Aboriginal cultural heritage.
- Engage with national and jurisdictional reform processes with policy implications for IPA management in Victoria to ensure that policy direction remains relevant and effective.

Legislation

- Maintain a continuous improvement program of reform to existing legislation that affects IPA management to improve efficiency and effectiveness and ensure humaneness in implementing the biosecurity approach.
- Develop proposals for wider reform of Victorian legislation that will facilitate the efficient and effective achievement of IPA policy, including consideration of a permitted list approach.

Stakeholder engagement

- Inform stakeholders about the biosecurity approach and the shared roles and responsibilities of government, industry and community.
- Consult with the range of stakeholders acknowledging their priorities and expectations
- Involve stakeholders in information and knowledge exchange in the field of IPA
- Collaborate with stakeholders and the wider community to implement the biosecurity approach
- Empower stakeholders to participate in IPA management to achieve improved IPA program outcomes.

Monitoring, evaluation and reporting

- Contribute to developing and implementing a Monitoring, Evaluation and Reporting Framework (MERF) on a whole of Victorian Government basis.
- Develop effective information management systems to support the MERF, incorporating cross-agency integration.
- Implement an ongoing reporting process based on the MERF.
- Conduct an ongoing operational program review and improvement cycle utilising the MERF reporting outputs.
- Use the MERF outputs to inform the policy development, implementation and review cycle for IPA.

Research and development

- Model potential changes in distribution and effects of IPA, including the effects of climate change.
- Conduct analysis to identify pathways of invasion to target surveillance efforts to the most likely locations for incursions.
- Develop diagnostic tools, including DNA identification of taxonomically problematic taxa, to enable prompt identification of high-threat species.
- Develop research partnerships to investigate landholder and other stakeholder attitudes to IPA management.
- Develop methodology to measure long-term resistance to invasion and impacts of IPA on asset condition.
- Conduct cost-benefit analysis of current and new control techniques, including effectiveness and efficiency.
- Assess the threat to and vulnerability of identified asset types, including impact threshold levels and degree of reversibility.
- Develop biological control agents using a decision support system to prioritise investment.
- Continue to invest in developing humane methods of control of invasive animal species.

Background and rationale

Spread and impacts of invasive plants and animals

Human movement around the world has always resulted in plant and animal species being introduced to new areas, sometimes deliberately, sometimes accidentally. Many of these introduced species have established naturalised populations.

Since the first European settlement in Australia, a large number of species has been deliberately imported and released – including, from the mid-1800s, the activities of ‘acclimatisation’ societies, whose aim was to make the Australian landscape more familiar and ‘useful’. The government played a large role in Victoria, as elsewhere in Australia, in promoting the introduction of new species. Many of the deliberately or inadvertently introduced species are now considered mainly beneficial, or simply accepted as part of the landscape because they are not seen as causing significant harm.

Some of these introduced species, however, have proven to be highly invasive and damaging, resulting in major problems. Experience has led to an appreciation of the risks from new species and importation of new plant and animal species to Australia is now subject to strict controls, including detailed risk assessments.

Origin and spread of invasive plants

It has been estimated that 30 per cent of the Victorian flora is naturalised non-native species.¹ Studies of introduced flora in Australia have found that the majority of naturalised species are the result of escapes from deliberate plantings in landscaping and gardens.² Only a minority of plant species that naturalise will go on to cause serious weed problems, but by the time these problems become evident it is usually too late for eradication to be possible.

Despite the large number of plants that have already naturalised, there is potential for many more species to do so. Thousands of plant species are present in Australia, but not yet naturalised in Victoria³. Many more, with high weed potential, are not yet present in Australia. The current rate of new plant naturalisations in Victoria is at least ten per year.

Origin and spread of invasive animals

Introduced animals have become established through escape from captivity and domestication, deliberate release (legal and illegal) and accidental importation in cargo. Those species that establish in the wild typically have high fecundity, a generalised diet, are adaptable to a modified landscape and have a climatic match between the place where they become established and the place where they occur naturally.⁴

There are at least 50 introduced species of vertebrates established on the Australian mainland,⁵ including 25 mammals, 20 birds, four reptiles and one amphibian. Of these, 19 mammals and 15 birds are present in Victoria. In addition to these widely established introduced species, other species are present in the wild known only as occasional escapees (including camels, ferrets, red eared slider turtles, Canada geese and Indian ring-neck parakeets). In the 1990s, efforts were made to eradicate an outbreak of Indian palm squirrels and this species is no longer thought to be present in Victoria.⁶

Most invasive mammals established in Australia have already established themselves to a greater or lesser extent in Victoria. Those that have yet to reach their potential distribution in Victoria are of most concern.



Wind-blown seeds are an important means of spread for many weed species (orange hawkweed seeds)

DPI Victoria

Impacts of invasive plants and animals

Invasive plants and animal species are recognised to cause a range of serious problems through impacts on one or more of the environment, economic activity, social values or human health.

Introduced predators – such as dogs, foxes and feral cats – threaten the survival of a wide range of native fauna, occur in virtually every terrestrial habitat across southern Australia and have contributed to the decline and, in some cases extinction, of numerous native fauna species. Ground-nesting birds and small- to medium-sized mammals (such as bandicoots and potoroos) and some reptile species are particularly vulnerable.

Other introduced species – such as rabbits, feral goats and pigs – have a significant impact on native vegetation. Weeds can compete with and displace native flora, which then affects habitat suitability and food resources for native fauna. Some weeds can increase fuel loads for fire, alter water flow through aquatic systems or lead to erosion problems.

The World Resources Institute, in conjunction with the World Conservation Union and United Nations Environment Programme identified alien species (weeds and pest animals) as the second greatest cause of biodiversity decline after habitat loss.⁷ Despite this, there is a lack of information on the biodiversity at risk from invasive plants and animals. The first attempt in Australia to quantify the impact of weeds on biodiversity across a broad range of taxa considered New South Wales only, but its conclusions are broadly applicable to Victoria.⁸ Weeds were found to pose a threat to 45 per cent of the biodiversity examined. The threat posed by weeds as a single factor was ranked second after land clearing; it was similar to that of altered fire regimes and was greater than that from invasive animals. Weeds also ranked highly when compared with broader threatening processes, such as the destruction and modification of native vegetation.

The draft Australian Biodiversity Conservation Strategy recognises invasive plants and animals as a major threat. Invasion of native vegetation by 'environmental weeds' is listed in Victoria as a potentially threatening process under the *Flora and Fauna Guarantee Act 1988*. Grazing by rabbits, predation by cats and foxes and a reduction in biodiversity of native vegetation by Sambar deer are also listed as potentially threatening processes. Parks Victoria assessed 282 parks in 2007 and found that weeds had negative impacts on park values in 87 per cent of them.⁹

Economic impacts include costs of control to land managers, decreased quality and quantity of agricultural products, loss of livestock and reduced land values. The cost of weeds to Australia was estimated as approximately \$4 billion in 2004;¹⁰ this includes yield loss, control costs and increased food costs passed on to the consumer. In 2006–07 an Australian Bureau of Statistics survey estimated the direct cost to agricultural businesses in Victoria of controlling weeds to be \$253 million. Once allowed to establish large infestations some weeds can be very difficult to remove and the cost may greatly exceed the value of production from the land.

In 2004, the Invasive Animals Cooperative Research Centre (IACRC) conservatively estimated the economic and environmental impacts of 11 of Australia's major pest animal species to be over \$720 million annually.¹¹ Social impacts were not quantified. The IACRC has published a more recent report that estimated the direct economic impacts of six pest animal species (wild dogs, foxes, mice, pigs, rabbits and starlings).¹² This report estimated an annual economic impact of \$743.5 million for agricultural losses and expenditure on management, administration and research.

Social impacts of invasive species are difficult to quantify. However, it is clear that they are considerable, including:

- stress for farm businesses due to the financial consequences of IPA;
- conflict between neighbours and between sections of the community with differing attitudes to IPA management;
- when IPA interfere with recreational activities or damage infrastructure or culturally important sites;
- distress caused to farmers when invasive animals injure or kill livestock; and/or
- when IPA decrease the aesthetic value of the Australian landscape.

Feral goats are widespread in parts of Victoria
DSE Victoria





Use of a scent
attractor and
automated camera
in a survey of fox
numbers

Parks Victoria

Existing IPA management

The Victorian Government has responded to the threat posed by invasive plants and animals by investment in management and research, through raising public awareness, by providing coordination and information and regulating certain activities through legislation. Total government investment has increased substantially in the last ten years to over \$50 million in 2008–09, largely by provision of fixed-term initiative funding for specific purposes. While prevention and early intervention are widely recognised as the most cost-effective actions possible, historically there has been significant community pressure to deal with pests that are widespread and clearly visible.

Many other agencies and organisations also contribute to invasive species management through both legislated and non-legislated activities.

The CaLP Act

The main legislation relating to IPA is the CaLP Act, which provides for the identification of certain species as noxious weeds or pest animals and declaration of these in a number of categories. Landowners are required by the CaLP Act to take all reasonable steps to eradicate Regionally Prohibited weeds, prevent the growth and spread of Regionally Controlled weeds and prevent the spread of and – as far as possible – eradicate Established pest animals. The government is responsible for taking all reasonable steps to eradicate State Prohibited weeds from all land in the state.

The CaLP Act also has provisions to prevent the spread of declared noxious weeds, including by banning the sale or trade of them. Similarly, it is prohibited to bring into Victoria, keep, sell or release declared pest animals.

The majority of IPA management in Victoria is carried out by private landowners dealing with well-known established species. Some of this action is motivated by the benefit they get from reducing the interference from IPA with their use of the land. Control also occurs

because landowners recognise a responsibility to act even when it does not immediately benefit them.

Provisions of the CaLP Act are enforced in some cases where landowners do not meet their legislated responsibilities. Enforcement is concentrated on high-risk species where landowner inaction will jeopardise the efforts of the surrounding community. There is a widespread expectation that enforcement of responsibilities to control established weeds and pest animals should be the major focus of government investment and that it should be provided universally. Some stakeholders are dissatisfied with what they see as an inadequate level of enforcement. Currently landowners are required to control a large number of weeds declared in the Regionally Controlled category. Many of these weeds are already present at some level across all or most of their potential range in Victoria. The public benefit from government action to achieve control of them on private land appears to be low and such action is now seldom undertaken. Alternatives to make the status of such species clearer include revoking their declaration or amending legislation to reduce requirements so that landowners must only take reasonable measures to prevent the spread of these species from their land.

There is a high risk of new problem species becoming established through deliberate or inadvertent keeping or trading of pest animals or noxious weeds. This risk is managed by increased preventive action, including nursery inspections, investigation of online trading and seizure of exotic pets, together with ongoing engagement of industry and the community to raise awareness of the threat from new invasive species.

Community participation in IPA management is promoted by means including community weed and wild dog management groups, activity through Landcare and 'Friends of' groups and training of volunteers as 'Weed Spotters'.

Precautions during surveillance – all equipment and clothing is thoroughly cleaned after a property inspection for branched broomrape

DPI Victoria

Case study 1

Prevention – Branched broomrape

Branched broomrape (*Orobanche ramosa*) is a parasitic plant. Many broad-leaved plants (including crop and pasture species) are suitable hosts. It can cause large yield losses and would have major impacts on market access for Victorian produce if it became established in the state. Infestations are only visible for about two weeks per year, when the plant is flowering; the remainder of its life is lived underground.

Branched broomrape is a declared noxious weed under the CaLP Act (State Prohibited) and also a declared exotic disease under the *Plant Health and Plant Products Act 1995*.

An infestation was discovered in the Murray Bridge region of South Australia in 1992. Further sites were then discovered with approximately 7,450 hectares known to be infested to date.

The South Australian government, with some industry support, initially attempted eradication on its own. Since 2001, the eradication effort has been funded through a national cost-shared program. The Commonwealth pays 50% of the costs and each state pays a proportion of the remaining costs according to how much of the state would be at risk from the weed. In 2008–09, Victoria contributed \$350 457 (15%). No infestations have been found in Victoria, though 34 properties with links to the South Australian sites are being monitored.



Many weeds impacting on the environment have not been declared under the CaLP Act. For these weeds, management is sometimes required to protect the environment as specified in Acts including the *Flora and Fauna Guarantee Act 1988*, *National Parks Act 1975* and *Sustainable Forests (Timber) Act 2004*.

Public land

Public land covers approximately 8.5 million hectares of Victoria with 60,000 kilometres of interface between public and private land. Public land provides a wide range of environmental services to the community and is home to a range of significant natural values, including almost 90 per cent of the state's threatened flora, fauna and vegetation communities and 91 per cent of Victoria's internationally recognised Ramsar wetlands.

On public land, responsibility for invasive plants and animals lies with public land and water managers with support from community-based committees of management, community organisations and volunteers. Victoria's public land is subdivided among numerous tenures and has considerable spatial diversity – from small to extensive parcels and coastal to alpine regions. Around one million hectares of public land is leased to private landholders. As noted above, the interface between public and private land is extensive. The Good Neighbour Program administered by the Department of Sustainability and Environment (DSE) provides a coordinated and prioritised approach to treating pest plants and animals on public land managed by DSE and Parks Victoria that adjoins private land. However, there is continuing widespread concern from adjoining neighbours about the impacts of weeds and pest animals spreading from public land.

Investment in management of IPA on public land in recent years totals approximately \$19 million annually. Determining a precise figure is difficult because some IPA management is done as a part of other activities, such as replanting, and is not identified separately. An additional amount (at least \$6 million in 2008–09) is expended by waterway managers in removing willows and other invasive plants as one of a number of measures to improve river health. Aquatic weed management is an issue that is seen as requiring increased attention, including clarification of responsibilities.

Investment is at a much higher level on land managed by Parks Victoria than on other public land. Current investment aims to reduce the impact of a limited range of invasive species and the rate at which new high-threat species establish. However, despite these efforts, invasive plants and animals continue to cause deterioration in public land values. Government also invests to protect biodiversity on private land via Landcare grants and the Bush Tender market-based approach, both of which often involve an element of IPA management.

Prevention and early intervention

Government investment has in the past concentrated on well known and long established widespread weeds and pest animals. In recent years there has been an increased recognition of the benefits of using prevention and early intervention to avoid future problems from new IPA rather than just continuing to manage existing pests. A risk management approach is increasingly being applied to IPA management. An example of this is the use of the Victorian Weed Risk Assessment to inform both prioritisation of action against weeds and a review to determine appropriate categorisation of weeds declared under the CaLP Act.

Attempts to eradicate Mexican feather grass involve removing plants from private gardens

DPI Victoria

Case study 2

MFG: prevention and eradication



Mexican feather grass is a State Prohibited weed with similar appearance and potential impacts to serrated tussock.

In Victoria, Mexican feather grass has been found being sold from nurseries on a number of occasions, most recently in early 2008 when large numbers were sold and planted in private gardens. On each occasion, the Victorian Government acted to prevent further sale of this species, conducted surveillance, sales-tracing and awareness-raising to detect plants then remove them and monitor the sites where they were found to prevent the species recurring from seeds. Both prevention and eradication have been required for this species at different stages.

The large effort to deal rapidly with Mexican feather grass required the deferral of lower-priority operations. Rapid response operations to deal with high-risk IPA by prevention and eradication are likely to become more frequent and will take precedence over addressing more widespread species.

Case study 3

Eradication – red-eared slider turtles



The red-eared slider turtle is a North American species that is a popular aquarium pet overseas. Red-eared sliders have established populations in many locations around the world and they are recognised as a major environmental pest.

It is illegal to keep red-eared slider turtles in Australia. Within Victoria, the red-eared slider turtle is listed as a Controlled pest animal under the *Catchment and Land Protection Act 1994*.

It is an aggressive species and could become the most common turtle in our creeks and rivers, replacing our native turtles. Of additional concern is the potential for red-eared sliders to carry new diseases and pathogens that could endanger our native turtles and other aquatic wildlife.

Red-eared slider turtles have been found in Queensland, New South Wales and Western Australia as a result of escapes from captivity and/or deliberate release.

There have been a number of sightings of red-eared slider turtles in Victoria since the 1990s. As there have been confirmed sightings (and one recent capture) of these turtles in the wild, the Victorian Government is conducting an eradication program and raising public awareness through the media and local 'Friends' groups to gain further information about other possible occurrences. Advances in detection technology in other states are being monitored closely.

**Red-eared slider
turtle captured in
a Melbourne lake**
DPI Victoria

Victoria's approach to prevention and early intervention for weeds, currently delivered through the Weed Alert Program, is recognised internationally for its innovation and effectiveness. Significant progress has been made in applying preventive approaches to IPA management. This progress has led to a better understanding of the risks posed by new and emerging species and the pathways through which invasive plants and animals are spreading into and within the state. Work to date has also highlighted the need for Victoria to develop a new range of tools and approaches to managing new biosecurity threats.

Despite the government's successes in developing new approaches to prevention and early intervention, major challenges still exist for Victoria to 'close the door' on the future invasion of new species. There are limited mechanisms currently in place to evaluate the pest risk associated with the importation of new plants and animals or to trigger precautionary approaches to manage the threat of new incursions.

Community weed groups

Three community weed groups exist in 2010, dealing separately with gorse, serrated tussock and blackberry. Each involves DPI and a wide range of other stakeholders. These weeds have been given a high priority in recent years. This is in part due to the community concern expressed via these groups. The groups provide large gains in IPA management outcomes with relatively modest government activity. The groups vary in history, in nature and in the amount

of support provided by the Victorian Government. Two of the weeds (gorse and blackberry) are long-established and already occupy a large proportion of their potential distribution on a state scale, while serrated tussock is subject to a statewide containment effort. The groups develop statewide strategies that include priorities for investment.

A single-species focus – as adopted by the community weed groups – is clearly appropriate to support a statewide containment approach, encompassing reduction in the abundance and extent of core infestations, prevention of spread and eradication of small outlying infestations.

The asset-based protection approach – managing all invasive species threats rather than concentrating on a single species – is the preferred approach for widespread weeds. However, single species (such as blackberry or gorse) can sometimes be the dominant weed problem over large areas. Land managers and the wider community may have legitimate concerns about such a species and be understandably reluctant to adopt the asset based protection concept until they can see progress in the management of the dominant weed. Single-species community weed groups may therefore sometimes be an appropriate means to achieve effective management of widespread weeds. Continued government support for community weed groups must meet the criteria for government investment outlined in 'The case for government investment'.

The nearest equivalent groups for pest animals are two wild dog management groups, which operate on a different basis, having been appointed specifically to provide advice for different parts of the state to the Minister.

Case study 4



Containment – serrated tussock

Serrated tussock is considered to be one of the worst weeds in Australia and is a Weed of National Significance because of its invasiveness, potential for spread and economic and environmental impacts. It is a drought-tolerant perennial tussock grass with low nutritional value that can reduce both the biodiversity of native grasslands and the carrying capacity of agricultural land. Serrated tussock is managed in partnership with the Victorian Serrated Tussock Working Party – one of the three community weed groups supported by DPI. A core infestation is present in the Port Philip and Westernport and Corangamite CMA regions. Small satellite populations occur in the Glenelg-Hopkins, North Central, Goulburn Broken, West Gippsland and East Gippsland CMAs.

The approach taken to managing this weed is now being explicitly recognised as an example of a statewide containment program. The aim is to:

- prevent further spread of the core infestation and reduce it;
- where possible, eradicate satellite populations; and
- prevent establishment in all places that are currently free of serrated tussock.

Sustained effort has resulted in a decrease in the infested area from 130,000 hectares in 1995 to 82,000 hectares in 2007. Without coordinated action there would undoubtedly have been further spread during that time.

Serrated tussock can quickly spread throughout an area, rapidly forming a monoculture

DPI Victoria

A Forestech student releases a potoroo after monitoring – part of the Southern Ark project

DSE Victoria

Public benefit

Action against widespread species is now being directed more specifically to the situations where it will provide the greatest public benefit, as opposed to attempting a general reduction in particular species across their whole range. Despite these changes, a large proportion of government investment continues to be directed towards established pests wherever they occur. Much of it is directed to widespread established species of longstanding concern, including support for some control which has limited strategic value.

Weed and pest management is not always integrated sufficiently with other land management activities. Control of pest animals that are already widespread provides greatest benefit when carried out in a coordinated way on a large scale and sustained over time. Projects such as the Glenelg and Southern Arks have begun to implement this approach, but much pest animal management does not yet meet these criteria.

Monitoring, evaluation and reporting

Monitoring, evaluation and reporting of IPA management is improving, but it is not yet sufficient to provide a sound basis for investment decisions. Basic information on state or regional presence, extent and abundance of many pests is lacking. Datasets held by different agencies for various purposes are not well integrated to provide accessible and standardised information. Reporting has tended to concentrate on measuring outputs, such as properties inspected or hectares treated, rather than the longer term outcomes of these activities, which are harder to quantify.

Case study 5



Asset protection – Glenelg and Southern Arks

The Southern Ark and Glenelg Ark are two large-scale projects funded by the Victorian Government that illustrate the application of large-scale asset protection.

The Southern Ark project area covers approximately one million hectares in East Gippsland. Glenelg Ark covers 100,000 hectares in the south-west of Victoria. Both projects aim to protect native mammals, birds and reptiles and allow populations to recover.

Red foxes have been identified as the greatest threat to the native species in these Ark regions. They are being managed by large-scale ongoing fox-control programs. Southern Ark was established following the success of Project Deliverance (1998–2003), which monitored the response of medium-sized native mammals to fox control.

The Southern and Glenelg Ark projects use Fox-off baits to poison foxes. The baits are buried deep within specially constructed bait stations, which are positioned at one-kilometre intervals along forest tracks. The bait stations are checked and rebaited regularly. Monitoring of small mammal populations is part of measuring the success of the programs. Sustaining the benefits of such programs will require continued effort because complete fox eradication is not feasible.

Long-term, large-scale asset protection programs are likely to result in significant benefits to biodiversity and will continue to be supported under a biosecurity approach to management of IPA.

Emerging changes in the operating environment

The environment in which invasive plant and animal biosecurity policy development and service delivery operate will continue to undergo major changes in the coming decade. To address these changes effectively, new policy responses and innovative and collaborative measures are required.

Climate change

While the actual impacts are uncertain, climate change represents a substantial challenge for invasive plant and animal management. It will alter the geographic range of invasive species, favouring the establishment of many new incursions – some of which may become major threats – and reducing the potential for others. Changes in temperature and water availability and extreme weather events will directly affect crop and pasture production, animal health and productivity and will affect the ability of plants to resist pests and diseases.

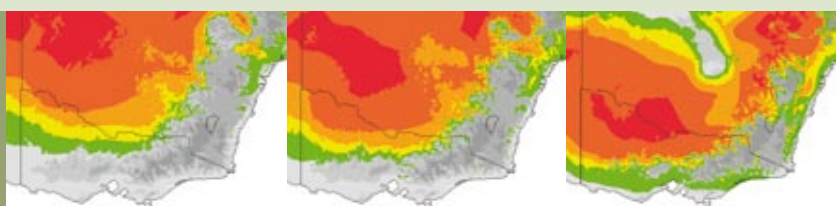
Protection of biodiversity from the impacts of invasive plants and animals will be greatly complicated by the effects of climate change – both directly on the invasive species and also on the resilience and long-term viability of natural ecosystems. Changes in the frequency of extreme events such as droughts, intense fires and floods may prove more influential than changes in average conditions; they are likely to create ideal conditions for the establishment of new incursions and the subsequent displacement of native and commercial species.

Globalisation

Globalisation and the expansion of overseas travel and trade have increased Victoria's exposure to biosecurity risks and increased the rate of new incursions. The movement of people and goods is becoming faster and easier as technology improves, personal wealth increases, consumer preferences change and new economies emerge. The increased volume of these movements and the diversity of countries involved leads to a higher risk of both deliberate and accidental introductions of new invasive plants and animals. Expanded opportunities for information exchange and trade via the internet (especially illegal trade and introduction) has also resulted in increased risks to Victoria's natural and productive resources from new species.

Case study 6

A. Victoria's climate is predicted to become more suitable for *Acetosa vesicaria* (Bladder dock).



1. Potential distribution based on historical climate records

2. Potential distribution based on predicted climate in 2030.

3. Potential distribution based on predicted climate in 2070.

B. Victoria's climate is predicted to become less suitable for *Senecio jacobaea* (Ragwort).



1. Potential distribution based on historical climate records

2. Potential distribution based on predicted climate in 2030.

3. Potential distribution based on predicted climate in 2070.

Land use and demography

Changing land use and demography in rural and regional Victoria has significant implications for the incursion and management of invasive plants and animals. Urban environmental preferences and 'tree-change' migration are increasing the price of land in amenable and accessible parts of the rural landscape. Farm sizes in these areas are decreasing and enterprises are intensifying. This trend has led to an increased density of smaller properties whose owners' knowledge, skills, attitudes and aspirations for land management vary tremendously. This poses significant new biosecurity risks. A number of social issues emerge as landowners with vastly different values, aspirations and uses for their land and the environment around them are brought together.

Other parts of the state have seen the rise of highly efficient, large-scale agriculture, which has reduced the demand for local labour and shifted services to larger regional centres, with consequences for how IPA management is organised and delivered. The development of new agricultural industries, including biofuels and the cultivation of non-traditional crops, may also present a high risk of new IPA incursions.

Altered expectations

Changing consumer preferences and expectations about the variety and availability of food, pets and garden species have led to potential new pathways for the emergence and spread of invasive plants and animals. Urban environments and gardens are already major sources of new weed incursions. Changing community attitudes and aspirations are increasingly affecting the methods used in the control of invasive species. This is likely to result in increased pressure to prohibit or reduce use of herbicides and of pest animal control techniques that are seen as inhumane.

The above changes in the operating environment will require substantial adjustment to government programs, regardless of whether or not there are also changes in policy objectives.

Climate change and weed distribution

Future changes in temperature and rainfall are likely to change the distribution of plants in Australia, including weeds. Government investment in many aspects of weed management needs to take account of possible changes in the vigour or extent of weeds already present and of possible increases in risk of invasion of new weeds.

Recent modelling¹³ of potential distributions of 20 weed species under climate change identified a number that are likely to be better able to establish in Victoria in the future. It identifies others that are likely to become less invasive and still others that may not have a noticeable response to climate change. There is considerable uncertainty about what may happen because weed responses to climate change will also be affected by how climate change affects competing plant species, natural enemies and land management practices.

Examples of weeds with a northern distribution that will become an increased risk to Victoria include *Asparagus aethiopicus* (basket asparagus), *Acetosa vesicaria* (Bladder dock) and *Bidens pilosa* (cobbler's pegs), though not all weeds from the north will pose a risk to Victoria under climate change.

Species with more southern distributions are likely to become less of a problem under climate change. While conditions across a large part of the state will remain suitable for their survival in the short term, over the next 50 years there is likely to be a large decline in area of suitable climatic conditions for some widespread weeds such as *Senecio jacobaea* (ragwort). Similarly, less widely distributed weeds such as *Billardiera heterophylla* (bluebell creeper), and *Nassella trichotoma* (serrated tussock) may become easier to control as their range and vigour is reduced under climate change. Modelling climate change effects on weed distribution will be a necessary part of weed risk assessment in future. It also may lead to further refinement of the noxious weeds list as well as informing regional weed plans and selection of biological control targets.

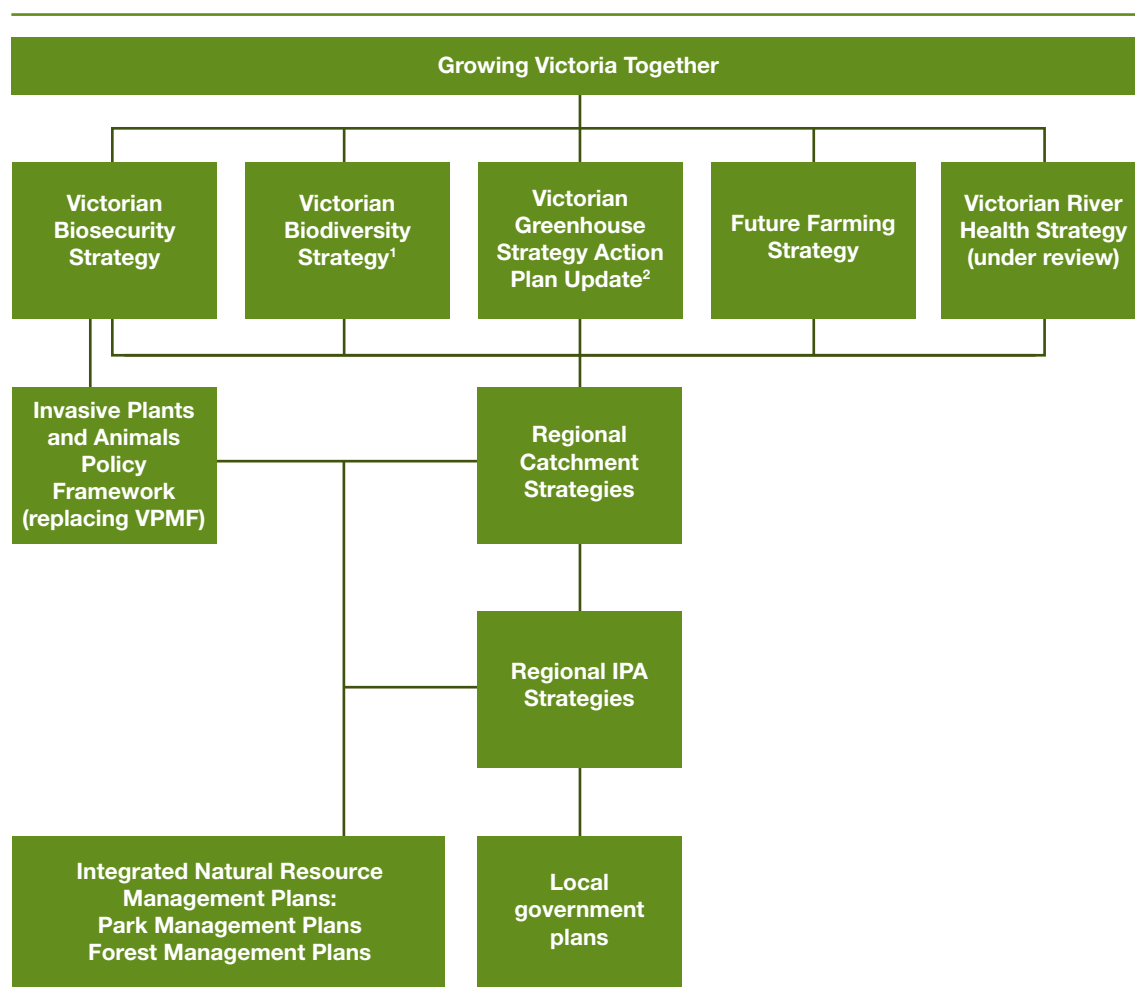
Context

State policy context

Invasive species management since 2002 has been guided by *Victorian Pest Management – A Framework for Action* (VPMF) and its sub strategies. Figure 3 shows how this document, as the successor of the VPMF, operates in the context of other strategies policies and plans operating in Victoria. Only the most important relationships are included in Figure 3.

The ten catchment management authorities are responsible for developing Regional Catchment Strategies under which sit Regional IPA Strategies. The Regional IPA Strategies set direction for all land managers in the catchment to aid them in the management of IPA.

Figure 3: The Victorian policy and planning context



¹ This document may be replaced as a result of the Land and Biodiversity White Paper

² This document may be replaced as a result of the Climate Change White Paper

National policy context

This framework is complementary to the directions provided by a number of national committees, policies and organisations. Of particular relevance are the Australian Weeds Committee and the Vertebrate Pest Committee, both of which coordinate national policy direction for invasive plants and animals. These committees, respectively, prepared the Australian Weeds Strategy and Australian Pest Animal Strategy.

Other relevant organisations and committees involved in setting the national policy direction include the National Biosecurity Committee, the Environmental Biosecurity Committee, the Natural Resource Management Ministerial Council (NRMMC), the Primary Industries Ministerial Council and their associated Standing Committees.

Recently the Australian Government commissioned a review of biosecurity (the 'Beale Review'¹⁴) that made far-reaching recommendations about future arrangements. It recommended that the Commonwealth should increase its resources to support the monitoring, surveillance, investigation and, where appropriate, prosecutions associated with post-border biosecurity detections. The Australian Government response to these recommendations is likely to significantly alter the context of IPA management in Victoria in the future.

Australian Weeds Strategy

The Australian Weeds Strategy (AWS)¹⁵ was endorsed by the NRMMC in November 2006 following drafting by the Australian Weeds Committee (a subcommittee of the Council) and public consultation with the input of all key stakeholders.

The AWS vision is that Australia's economic, environmental and social assets are secure from the impacts of weeds. The AWS mission is to provide guidance for national leadership so all Australians can work together against the serious impact of weeds.

Weeds of national significance

One of the major national actions for weed management has been the selection of 20 weeds of national significance (WoNS). The assessment process to select the WoNS commenced in 1997 and all states and territories agreed to the final 20 in early 2000. These are subject to coordinated national action as described in the strategies prepared for each species. These strategies are endorsed by the NRMMC and the Australian Weeds Committee oversees the implementation. Each program has a national coordinator hosted by a state government department and is managed by a national committee. Victoria hosts the national coordinators for willows, Chilean needle grass and blackberry.

Weedy willow species can invade many different habitats, including alpine regions as shown here

Parks Victoria



The importance of WoNS has been recognised in the 2009–10 business plan of the Australian Government's Caring for our Country Initiative via the target:

To reduce the impact and spread of Weeds of National Significance over the next two years. Priority will be given to collaborative activities that address outliers, containment lines and strategic management of core infestations where appropriate.

While the Australian Government's focus on WoNS does not preclude high priority being given to additional species in Victoria, the nationally coordinated WoNS programs are influential. The list of WoNS is subject to any changes that may be endorsed through NRMCC as part of the implementation of the Australian Weeds Strategy.

National Weed Incursion Plan

The National Weed Incursion Plan (NWIP) (draft) aims to provide a nationwide consistent guide for the prevention, preparation and then response to weed incursions. The Department of Primary Industries, as the lead state agency in Victoria, has clear jurisdiction to prepare and respond to weed and invasive animal incursions in support of the national approach to surveillance, early detection and response.

DPI, as an active member of the Consultative Committee on Exotic Plant Incursions (CCEPI), adopts the NWIP through the implementation of the Weed Alert Plan Victoria, including its risk analysis of species, incursion planning, surveillance of pathways, operational response to priority species and engagement with CCEPI members.

National Weeds Research Centre

The Australian Government funded two consecutive cooperative research centres for weed management from 1995–96 to 2007–08. Following the decision not to continue to invest in weed research through the CRC program, the Australian Government has committed \$15 million over four years from 2008–09 to 2011–12 to establish a National Weeds Research Centre. The Centre will be part of a program to investigate the most serious invasive plant problems in Australia. The aim is to unite national experts, land managers and stakeholders to improve the understanding of how to manage the risks associated with invasive plants. The aim is also to ensure better coordination and information exchange between researchers, land managers and regulatory agencies for the management of invasive plants.

National Threat Abatement Plans

National threat abatement plans may be produced for processes that threaten or may threaten the survival, abundance or evolutionary development of a native species or ecological community. National threat abatement plans relevant to this policy include:

- Competition and land degradation by unmanaged goats, 2008;
- Competition and land degradation by rabbits, 2008;
- Predation by European red fox, 2008;
- Predation by feral cats, 2008; and
- Predation, habitat degradation, competition and disease transmission by feral pigs, 2005.

DPI and DSE participate in the development these plans and undertake action as appropriate to support their implementation as resources become available.

Parks Victoria works with recreational shooters to help control feral animals such as goats and pigs in national parks

Park Victoria



Australian Pest Animal Strategy

The Australian Pest Animal Strategy¹⁶ (APAS) was published in 2007 by the Vertebrate Pests Committee for the NRMCC. The goals of the APAS are to provide leadership and coordination for the management of pest animals, prevent establishment of new pest animals and manage the impacts of established pest animals. One of the actions under the strategy is to identify pest animals of national significance; similar to WoNS, these would be subject to nationally coordinated management action.

Invasive Animals Cooperative Research Centre

The Australian Government has invested close to \$100 million in the Invasive Animals Cooperative Research Centre from 2005 to 2011. The purpose of this CRC is to counteract the impact of invasive animals through the application of new technologies and by integrating approaches across agencies and jurisdictions.

Australian Animal Welfare Strategy

The Australian Animal Welfare Strategy (AAWS)¹⁷ was endorsed by Primary Industries Ministerial Council in 2004 and is guiding the development of new, nationally consistent policies to enhance existing animal welfare arrangements in all Australian states and territories. The strategy covers the humane treatment of all animals in Australia including invasive animals. The AAWS vision is that: 'The welfare of all animals in Australia is promoted and protected by the development and adoption of sound animal welfare standards and practices.' These activities include: 'Promoting the development and use of humane and effective methods to control pest animals in Australia.' An example of the work supported by AAWS is the development of a 'Model for assessing the relative humaneness of pest animal control methods'.

Feral pigs cause significant damage when rooting for food

Parks Victoria



Roles and responsibilities

Commonwealth Government

The Commonwealth Government's role in managing biosecurity is mainly in relation to national pre-border and border biosecurity, with a coordination and leadership role for achieving national biosecurity outcomes. This is likely to include cost-sharing arrangements for nationally significant incursion management. In the past, states and territories dealt with established weeds and pest animals and there was a gap between border protection and treatment of established weeds. The gap is now being addressed more fully by states and territories applying a risk-management approach.

Victorian Government

The Victorian Government's role is to:

- establish and maintain a statewide strategic direction for invasive species;
- provide preparedness, prevention, eradication and containment for those invasive species that are not yet present across their full potential range and for which government intervention can be justified;
- provide pre-border and border biosecurity on a state level;
- engage with industry to minimise the risks of new incursions and to maximise protection from biosecurity risks;
- act where required as a regulator and enforcer in relation to invasive species and the techniques used to manage them by providing appropriate legislation and resources to achieve compliance;
- manage IPA on public land including where necessary to protect adjoining land, and as required to fulfil responsibilities under relevant legislation (see Appendix C);
- manage State Prohibited weeds wherever they occur;
- provide policy and funding for strategic research;
- engage with the community in pursuing coordinated action against widely established invasive plants and animals; and
- engage with Catchment Management Authorities (CMAs) and regional communities in community education, pest management planning, implementation and reporting on both private and public land and in freshwater environments.

The Victorian Government's roles and responsibilities in managing biosecurity are primarily delivered by DPI and DSE, with the management of parks and reserves directed through Parks Victoria. The division of responsibilities between DPI and DSE was affected by a machinery of government change in November 2007. Details of the new arrangements are provided in Appendix D.

Victorian Catchment Management Council

The Victorian Catchment Management Council's responsibilities include a statutory function to advise the Minister on:

- matters relating to catchment management which apply throughout the State;
- the condition of the land and water resources of the State;
- priorities for catchment management throughout the State; and
- priorities for research and investigation on matters related to catchment management that apply throughout the State.

Catchment Management Authorities

Under the CaLP Act, catchment management authorities' responsibilities include:

- preparing a regional catchment strategy, coordinating and monitoring its implementation and making recommendations to the Minister about funding for the strategy; and
- advising the Minister on any matter referred to it by the Minister, including advice on any proposal to declare or revoke a pest plant.

Catchment management authorities are also responsible for:

- developing regional invasive plant and animal strategies to address IPA in private and public lands in accordance with the regional catchment strategy and any relevant state policy, framework, strategy, plan or guideline; and
- prioritising action needed to address IPA and monitoring, evaluating and reporting (to the extent achievable given available resources) on delivery of these actions by relevant agencies; and
- manage IPA associated with waterways (provided by Melbourne Water in Port Philip and Westernport).

Local government

Local government is responsible for:

- meeting all responsibilities as a land manager in relation to declared weeds and pest animals; and
- ensuring that its actions do not spread or exacerbate IPA problems.

These responsibilities need to be met in accordance with the CaLP Act, guided by established state and regional priorities.

Local government can also add value by:

- addressing local weed issues in whatever manner it sees fit, including local laws, provided that they do not duplicate or conflict with the CaLP Act or other relevant legislation;
- ensuring that planning decisions do not exacerbate weed and pest problems; and
- providing education and incentives to improve land management in the municipality and being an advocate for effective IPA management.

The future role of local government with respect to roadside weed and pest animal management has yet to be resolved. Developing effective long term arrangements for this matter is recognised as a major concern of local government.

Landholders

Landholder responsibilities (both private and public) are to address their obligations under the CaLP Act and any local laws with respect to declared weeds and pest animals. Public land managers also have obligations under other Acts that must be met by undertaking further IPA management.

Working with adjoining landholders to achieve effective local coordination will greatly increase landholder's capacity to achieve good outcomes from IPA management.

* * *

Current arrangements for IPA management issues involve up to four levels of government. Gorse management, for example, is coordinated and potentially funded by the national WoNS program and Caring for our Country; addressed by DPI via support for the Gorse Taskforce community weed group, enforcement and research into biological control; prioritised through Regional IPA Strategies and CMA advice on its status under the CaLP Act; and actively managed by some local councils. This situation appears to be inefficient and opportunities for simplification will be considered.

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Appendix A

List of stakeholders

The organisations below are the stakeholders engaged by DPI – Biosecurity Victoria (Invasive Plants and Animals Branch), DSE – Biodiversity and Ecosystem Services and Parks Victoria with respect to IPA management.

Aboriginal Affairs Victoria	Landscape Industries Association of Victoria
Alpine Resort Management Boards	Marine Aquarium Society of Victoria
Animals Australia	Meat and Livestock Australia
Aquarium Society of Victoria	Municipal Association of Victoria
Arthur Rylah Institute for Environmental Research	Municipal Councils
Birchip Cropping Group	North East Wild Dog Management Group
Birds Australia	Nursery and Garden Industry of Victoria
CMAAs: Corangamite, East Gippsland, Glenelg-Hopkins, Goulburn Broken, Mallee, North Central, Port Phillip and Westernport, North East, West Gippsland, Wimmera	Organic Federation of Australia
Country Fire Authority	Royal Botanic Gardens Melbourne
DPI Agriculture and Natural Resource Division, Policy and Strategy Group	RSPCA
DPI Biosecurity Victoria (Bureau of Animal Welfare)	South Gippsland Community Weeds Taskforce
DPI Fisheries Victoria	Sporting Shooters Association of Australia (Victoria)
DSE Environmental Policy and Climate Change Division	Sustainable Gardening Australia
DSE Office of Water	Vertebrate Pest Management Association Victoria
DSE Public Land Division	VicRoads
Environment Protection Authority	Victorian Blackberry Taskforce
Farmed Rabbit Industries Australia	Victorian Catchment Management Council
Four Wheel Drive Victoria	Victorian Farmers Federation
Future Farms Industries Cooperative Research Centre	Victorian Hunting Advisory Committee
Gippsland Wild Dog Management Group	Victorian National Parks Association
Gorse Taskforce	Victorian Serrated Tussock Working Party
Greening Australia (Victoria)	VicTrack
Heritage Victoria	Water Authorities: Barwon Water, Central Highlands Water, City West Water, Coliban Water, East Gippsland Water, Gippsland Water, Goulburn Valley Water, Grampians Wimmera Mallee Water, Lower Murray Water, Melbourne Water, North East Region Water, South East Water, South Gippsland Water, Wannon Water, Western Water, Westernport Water, Yarra Valley Water
Horticulture Australia Limited.	Weeds Society of Victoria
Invasive Animals Cooperative Research Centre	WWF (Threatened Species Network)
Invasive Species Council	Zoos Victoria
Landcare (Regional Coordinators): Corangamite, East Gippsland, Glenelg-Hopkins, Goulburn Broken, Mallee, North Central, North East, Port Phillip and Westernport, West Gippsland, Wimmera	

Appendix B

Abbreviations

APAS	Australian Pest Animal Strategy
AusBIOSEC	Australian Biosecurity System for Primary Production and the Environment
AWS	Australian Weeds Strategy
AWC	Australian Weeds Committee
CaLP Act	<i>Catchment and Land Protection Act 1994</i>
CCEPI	Consultative Committee on Exotic Plant Incursions
CMA	Catchment Management Authority
CRC	cooperative research centre
DPI	Department of Primary Industries
DSE	Department of Sustainability and the Environment
IPA	invasive plants and animals
MER	monitoring, evaluation and reporting
MERI	monitoring, evaluation, reporting and improvement
NRMMC	Natural Resource Management Ministerial Council
NWIP	National Weed Incursion Plan
POCTA	<i>Prevention of Cruelty to Animals Act 1986</i>
PV	Parks Victoria
R&D	research and development
VPMF	<i>Victorian Pest Management – A Framework for Action</i>
WONS	weeds of national significance

Appendix C

Relevant legislation

<i>Aboriginal Heritage Act 2006</i>
<i>Agricultural and Veterinary Chemicals (Control of use) Act 1992</i>
<i>Agricultural and Veterinary Chemicals (Victoria) Act 1994</i>
<i>Catchment and Land Protection Act 1994</i>
<i>Coastal Management Act 1995</i>
<i>Conservation Forests and Lands Act 1987</i>
<i>Crown Land (Reserves) Act 1978</i>
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
<i>Environment Protection Act 1970</i>
<i>Fisheries Act 1995</i>
<i>Flora and Fauna Guarantee Act 1988</i>
<i>Heritage Act 1995</i>
<i>National Parks Act 1975</i>
<i>Parks Victoria Act 1998</i>
<i>Prevention of Cruelty to Animals Act 1986</i>
<i>Road Management Act 2004</i>
<i>Sustainable Forests (Timber) Act 2004</i>
<i>Wildlife Act 1975</i>

Appendix D

Allocation of roles and responsibilities between DPI and DSE

Policy responsibility for IPA as well as wild dog operations was transferred from DSE to DPI in November 2007.

This transfer had two primary purposes:

- 1 To enable a stronger focus on prevention and early intervention, allowing the department to take a 'biosecurity approach' to pest management.
- 2 To facilitate a closer alignment between pest management and land tenure responsibilities of both departments. While DPI will be responsible for overall weeds and pest animals policy, DSE will be responsible for implementing pest management activities on public land, and DPI on private land.

DPI's Biosecurity Victoria division now has responsibility for policy and investment; the Farm Services Victoria (FSV) and Biosciences divisions will be responsible for service delivery. The transfer aligns responsibility for pest management with land tenure responsibilities of both departments with DPI taking a lead role for overall weeds and pest animals policy.

As a result of the transfer, DSE has responsibility for:

- overall accountability for administration of the *Catchment and Land Protection Act 1994* to the responsible Minister;
- administration of the Good Neighbour program;
- management of established pests and weeds on public land;
- management of stakeholders relating to public land; and
- communications relating to public land.

DPI has responsibility for:

- biosecurity policy direction and policy oversight for established pests on public and private land, including a consolidated approach to prevention and early intervention;
- overall policy for weeds and pest animals and for wild dog operations. This will include a consolidated approach to prevention and early intervention;
- policy and funding for strategic research;
- established weeds and pests on private land;
- management of stakeholders relating to private land; and

Jointly, DPI and DSE have responsibility for:

- establishment of a committee to ensure an integrated policy and investment framework for state government involvement in pest management and biosecurity as it relates to environmental protection. This group would report to both Ministers, with overall priority setting and direction being the responsibility of the Minister for Water, Environment and Climate Change;
- developing a joint biosecurity policy direction across all land tenure;
- managing investment and funding into weed and pest animal control; and
- engaging catchment management authorities in program development and pest action plans. This aspect would be primarily a DPI responsibility as the investor.



Volunteers helping to
search for orange
hawkweed in the Alpine
National Park, 2009

DPI Victoria

