Joint Submission to the Parliamentary Inquiry into the Control of Invasive Animals on Crown Land

Department of Environment, Land, Water and Planning

Department of Economic Development, Jobs, Transport and Resources

Parks Victoria

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# Table of Contents

## Executive Summary

## Section One. Introduction

1.1 Overview  
1.2 Definitions  
  1.2.1 Crown land in Victoria  
  1.2.2 Invasive Animals

## Section Two. The Extent of the Problem

2.1 The Distribution and Density of Invasive Animals on Crown Land in Victoria  
2.2 Strategic Management Prospects  
2.3 Parks and Conservation Estate

## Section Three. Impact of Invasive Animals on Crown Land in Victoria

3.1 Biodiversity Impacts  
3.2 Marine and Freshwater Impacts  
3.3 Economic Impacts  
3.4 Social Impacts

## Section Four. Legislative and Policy Context

4.1 Legislative Frameworks  
  4.1.1 National Legislation  
  4.2.1 Victorian Legislation  
4.2 Roles and Responsibilities of the Victorian Government for Invasive Species in Victoria

## Section Five. Policy and Approach

5.1 Victorian Invasive Species Policy  
  5.1.1 Victorian Invasive Plants and Animals Policy Framework  
5.2 Victorian Species Policy Objectives  
  5.2.1 Landscape Scale, Nil-tenure Approach  
5.3 Other Policy Drivers  
5.4 The Inter-connection of Policy
Section Six. How the Problem of Invasive Animals on Crown Land can be Addressed

Best Practice Management on Crown Land

6.1 Principles of Investment in Invasive Animal Control by Government as Crown Land Manager
   6.1.1 Biodiversity Asset Protection
   6.1.2 Prioritising Effort and Determining Cost-Benefit
   6.1.3 Strategic Planning Frameworks
      6.1.3.1 Conservation Action Planning

6.2 Achievements in the Management of Invasive Animals on Crown land for the Protection of Biodiversity

6.3 Good Neighbour

Section Seven. Partnership with Parks Victoria and Community Shooting Organisations

Biodiversity Outcomes, Community Safety and Limitations.

7.1 Control of Deer Populations in Parks
7.2 Partnership Between Accredited Volunteer Shooters and Parks Victoria
   7.2.1 Alpine National Park Deer Control Trial
   7.2.2 Dandenong Ranges/Yarra Ranges Deer Control Program

Section Eight. Application of Accredited Volunteer Shooter Partnership Programs for Other Invasive Animal Species

8.1 Use of Accredited Volunteer Shooter Partnerships for the Control of Other Invasive Animals
8.2 Considerations with the application of accredited volunteer shooter partnership programs for other invasive animal species

Section Nine. Emerging Issues
Figures and Tables

Tables

**Table 1.** Victorian Crown land area by tenure (August 2013)  
1

**Table 2.** Summary of other pieces of legislation that may influence the management of invasive species in Victoria  
8

**Table 3.** General overview of the key roles and responsibilities provided by the Victorian Government for invasive species in Victoria  
9

**Table 4.** Other main policy drivers influencing the management of invasive animals in Victoria  
12

**Table 5.** The Victorian Government’s principles for investment in invasive animal control on Crown land to secure biodiversity protection outcomes  
16

Figures

**Figure 1.** Map of Victoria’s Crown land. 2013  
2

**Figure 2.** Strategic Management Prospects map showing modelled predictions of rabbit distribution  
4

**Figure 3.** Impacts of invasive animals in parks  
4

**Figure 4.** Trends in impact of pest animals in parks  
4

**Figure 5.** Generalised invasion curve showing actions linked to each stage of invasion  
11

**Figure 6.** Example Strategic Management Prospects map showing the most cost-effective management actions, including invasive animal control, to secure biodiversity outcomes (*draft map provided for example only*)  
18

Case Studies

**Case Study 1.** Deer in Victoria  
13

**Case Study 2.** Biological control of rabbits  
15

**Case Study 3.** Barry Mountain fox control program  
19

**Case Study 4.** Recovering rangelands: Mallee bounceback  
20

**Case Study 5.** The wild dog program on Crown land  
21

**Case Study 6.** Integrated approach to feral goat control in Mallee parks  
26

**Case Study 7.** Warby Range feral goat eradication project  
27

**Case Study 8.** Werribee Park rabbit control program  
27
Attachments

**Attachment 1.** Victorian Crown Land Area Statement

**Attachment 2.** Deciding Which Actions Best Help Nature - Decision-support Tools to Help Biodiversity Managers Protect Victoria’s Environment

**Attachment 3.** Community Consultation Draft: Protecting Victoria’s Environment – Biodiversity 2036

**Attachment 4.** A Summary of Relevant Invasive Plant and Animal Conventions, Agreements, Legislation, Strategies and Policies

**Attachment 5.** Invasive Species Legislation – Further Information

**Attachment 6.** Intergovernmental Agreement on Biosecurity (IGAB)

**Attachment 7.** National Threat Abatement Plan for Predation by Feral Cats

**Attachment 8.** Catchment and Land Protection Act 1994 – Further Information

**Attachment 9.** Catchment and Land Protection Act 1994 – An Overview of Landholder Responsibilities for Managing Invasive Species

**Attachment 10.** The Victorian Invasive Plants and Animals Policy Framework (IPAPF)

**Attachment 11.** The IPAPF Weeds and Vertebrate Pests Module

**Attachment 12.** Invasive Species Enforcement and Compliance in Victoria – Further Information

**Attachment 13.** Code of Practice and Standard Operating Procedure for Foxes in Victoria

**Attachment 14.** Draft Conservation Action Plan for Wilsons Promontory

**Attachment 15.** Victoria’s Wild Dog Action Plan

**Attachment 16.** Emerging Invasive Animal Issues – Further Information

**Attachment 17 and 18.** The Distribution and Expansion of Deer Populations in Victoria
Executive Summary

Invasive animals can be found in all terrestrial and aquatic environments in Victoria. They comprise both vertebrate and invertebrate animals. Invasive vertebrate animals include widespread species that have reached their likely extent, such as the European rabbit and the red fox, to species such as feral goats and feral pigs, which are still expanding into new areas. Invasive animals have significant biodiversity, agricultural and social impacts and management of these is critical to the environment, economy and to community health and wellbeing.

The roles and responsibilities provided by the Victorian Government for invasive species management in Victoria rest primarily with the Department of Economic Development, Jobs, Transport and Resources, the Department of Environment, Land, Water and Planning, and Parks Victoria.

The management of invasive animals in Victoria exists under a legislative framework, both federal and state, and a robust policy approach, that has the necessary flexibility to remain effective across a range of interconnected policy drivers.

The inter-connection of policy

It is important that the development and implementation of policy is collaborative and integrated to ensure a range of objectives can be met. Invasive species management can be complex. For example, the management of deer in Victoria requires a collaborative approach to achieve a number of outcomes. Deer are a valuable recreational hunting resource, and hunting represents a significant economic opportunity for local communities, generating expenditure, jobs and flow-on employment for regional Victoria. Deer are also known to have negative impacts on biodiversity and agricultural values. Further, emerging issues such as range expansion and disease management need to be considered.

The Victorian government is developing a Sustainable Hunting Action Plan to balance its commitment to maximise the benefits of safe, sustainable and responsible recreational hunting, while meeting its obligation to protect and conserve the state’s land, waters, plants and animals.

How the problem of invasive animals on Crown land is being addressed

The Victorian Government is committed to reducing the negative impact of invasive animals on assets of importance to all Victorians, be it vulnerable native plants or animals in parks and forests or supporting community action on adjoining private land to reduce the impact of invasive animals on productivity and other values.

The principles for Government’s investment in invasive animal control on Crown land to achieve biodiversity protection outcomes have been developed, tested and refined over the past decade. The investment is strategic and targeted to optimise cost-benefit. Unless invasive animal management programs are well planned and coordinated, efforts are unlikely to achieve long term outcomes.

The use of accredited volunteer shooters in the control of deer populations in parks - assessment of biodiversity outcomes, community safety and limitations

Parks Victoria engages with accredited volunteer shooters through partnerships with the Sporting Shooters’ Association of Australia and the Australian Deer Association. Through these programs, accredited volunteers act as agents of the Crown as part of a planned, coordinated and cooperative approach to the control deer (and other invasive animals) on Parks Victoria managed land. The partnerships have delivered targeted and controlled deer management programs in areas such as the Dandenong Ranges National Parks and Wilsons Promontory National Park.
Accredited volunteer shooters can provide a positive contribution to biodiversity outcomes where this contribution is managed in a strategic, systematic way and is integrated with other management actions. Opportunistic or ad hoc ground shooting is generally not an effective means of invasive animal control.

Animal welfare is a vital consideration in invasive animal programs implemented on Crown land. The humaneness of shooting as a control technique depends almost entirely on the skill and judgements of the shooter, highlighting the importance of appropriate accreditation and training of volunteer shooters.

There are mutual benefits to the Victorian Government and the community from the partnerships with accredited volunteer shooters including increased collaboration and relationship building, improving the understanding of different perspectives of deer on Crown land, and increased opportunities to make a meaningful contribution to conservation objectives.

**Application of accredited volunteer shooter programs for other invasive animal species in partnership with crown land managers.**

Parks Victoria currently enters into agreements with accredited volunteer shooter organisations for the control of invasive animal species other than deer, such as goats, rabbits and foxes. However, there are practical limits to the types of invasive species that can be included in such an approach. For example, it would be inappropriate to target feral cats given the current restrictions on the destruction of cats in Victoria.

Developing partnerships with accredited volunteer shooters does come at a cost, to both the volunteers through accreditation, training and operational expenses, and to Parks Victoria through planning, supervision and compliance costs. It is therefore important that these types of programs are strategically targeted where management objectives can be met.

The application of partnerships with accredited volunteer shooters is likely to be variable depending on where it is practical and cost-effective for them to be involved. For instance, volunteer shooting organisations generally have a greater capacity to assist with programs in the metropolitan area, rather than in remote areas.

Opportunity may exist for expansion of the approach to other Crown land outside of the parks and conservation estate in recognition of the value of a landscape-scale approach to the control of invasive animals. However, the application of the approach also needs to consider potential conflict with other types of Crown land use.
Section One. Introduction

1.1. Overview

Invasive animals can be found in all terrestrial and aquatic environments in Victoria. They range from widespread species such as the European rabbit and the red fox that occupy their entire distribution range, to species such as feral goats and pigs, which are still expanding into new areas.

Invasive animals of concern on Crown land in Victoria include introduced predators like wild dogs, foxes and feral cats, large herbivores such as goats, feral cattle, feral horses and deer, omnivores such as feral pigs and graziers such as rabbits. Invasive aquatic species, such as the Northern Pacific seastar and Japanese wakame kelp are also a significant management issue.

The Victorian Government is committed to reducing the impact of invasive animals on assets of importance to all Victorians, be it vulnerable native plants or animals in our parks and forests or supporting community action on private land to reduce the impact of invasive animals adjoining Crown land on productivity and other values.

1.2 Definitions

1.2.1 Crown Land in Victoria

About one third of Victoria, or 7.916 million hectares is Crown land, allocated for a range of public uses, including National Parks and state forest. Crown land as defined by the Coastal Management Act 1995, includes the sea bed and coastal waters 3 nautical miles off Victoria’s coastline. There is approximately 66,000 kilometres of interface between Crown land and private land in Victoria. Table 1 shows the areas of different Crown land categories (tenure) in Victoria, and Figure 1 shows a map of Victoria’s Crown land.

Table 1. Victorian Crown land area by tenure (August 2013)

<table>
<thead>
<tr>
<th>Land Category</th>
<th>Area (hectares)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks and Conservation Reserves</td>
<td>3,982,000</td>
</tr>
<tr>
<td>State Forest</td>
<td>3,138,000</td>
</tr>
<tr>
<td>Other Crown Land</td>
<td>796,000</td>
</tr>
<tr>
<td><strong>Total Crown land</strong></td>
<td><strong>7,916,000</strong></td>
</tr>
</tbody>
</table>

*rounded to nearest 1,000 hectares

1 Victoria Crown Land Area Statement (2013). State of Victoria, Department, Environment and Primary Industries
2 Good Neighbour Program (2005), State of Victoria, Department of Sustainability and Environment
This submission directly relates to the management of invasive species on state forest, parks and conservation reserves.

The Minister for Energy, Environment and Climate Change is responsible for administration of the Acts which govern the management of Crown land. The Secretary, Department of Environment, Land, Water and Planning has responsibility as the Crown land manager for State Forest. Parks Victoria, established as a statutory authority under the *Parks Victoria Act 1998*, provides services to the state for the management of parks, reserves and other land under the control of the Crown. A range of bodies manage other Crown land, such as the Commonwealth Government, committees of management, local government, licence and lease holders. Traditional owners also play an important role in joint management arrangements. Attachment 1 provides more information on Crown land in Victoria.

1.2.2 Invasive Animals

The definition of an invasive species in Victoria, is a species occurring beyond its accepted normal distribution and which threatens valued environmental, agricultural or other social resources by the damage it causes. Invasive animal species can be terrestrial or aquatic, with the most common and widespread species being introduced to Australia. Invasive species policy in Victoria does not consider the negative impacts of native species.

Invasive animals of concern to Victoria are often, but not always, declared as pest animals under the *Catchment and Land Protection Act 1994* (CaLP Act). The CaLP Act is the main piece of legislation covering noxious weeds and pest animal management in Victoria. Declared pest animals include widespread species such as foxes and rabbits. Other invasive animals, such as feral cats and some species of deer, are not declared pest animals. It is a common misconception that an invasive animal species has to be declared under the CaLP Act in order for it to be controlled. Crown land managers for instance, who take an asset based, risk management approach to invasive animal control on Crown land in Victoria, seek to control a range of threats to the values they are protecting.

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3 Invasive Plants and Animals Policy Framework (2010). The State of Victoria, Department of Primary Industries
Section Two. The Extent of the Problem

2.1 The Distribution and Density of Invasive Animals on Crown Land in Victoria

It can be challenging to quantify the distribution and density of invasive animals on Crown land in Victoria. While no formal census has been conducted, due in large part to the cost and methodological challenges involved in conducting rigorous measurement of animal distribution and density, it is thought that invasive animals roam or occupy all terrestrial habitats on Crown land in Victoria\(^4\) and are common in aquatic environments.

Valuable data collected through research and management programs, citizen science and anecdotal evidence gives Crown land managers a degree of confidence in understanding the extent of the problem. Scientific monitoring programs, such as those undertaken in Victoria’s five ‘Arks’, ‘State of’ reporting (State of the Environment: State of the Parks, State of the Forests, State of the Bay), forest inventory studies, hunting logs, and ad hoc records has allowed us to develop a platform from which to reliably model the distribution of a suite of invasive animals in Victoria.

2.2 Strategic Management Prospects

The Victorian Government’s draft plan, *Protecting Victoria’s Environment – Biodiversity 2036*, recognises that knowledge and information are essential to good decision making and supports the use of spatial decision support tools to prioritise action. Consequently, the Department of Environment, Land, Water and Planning is developing Strategic Management Prospects (SMP), a decision-support tool based on the analysis of significant amounts of complex spatial information. SMP allows the government to better understand the impacts of invasive animals on biodiversity on Crown land in Victoria, using modelled habitat distribution of invasive species as a key input. Figure 2 illustrates a map showing modelled predictions of rabbit distribution.

SMP will also have an important role to play in prioritising effort by identifying areas and actions with the highest potential biodiversity benefit for cost. This is discussed more fully in Section 6.1.2.

The current version of SMP has a landscape-scale, terrestrial focus. It will be progressively complemented by the incorporation of other priority ecosystems such as aquatic, instream and wetlands. Further information on Strategic Management Prospects can be found in Attachment 2.

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Figure 2. A Strategic Management Prospects map showing modelled predictions of rabbit distribution

2.3 Parks and Conservation Estate

Parks Victoria conducts a program to evaluate condition of the parks network and effectiveness in meeting park management goals. In 2015, the State of the Parks Report found that of the 298 assessed parks, invasive animals were an issue in 87 per cent of parks. Red fox, European rabbits, feral cats and sambar deer were reported across the greatest number of parks and the greatest area.

Forty per cent of parks (54 per cent of the area of the parks network) reported that the impact of invasive animals was moderate, with 16 per cent of parks (30 per cent of the parks network area) reporting that the impact of invasive animals was major or severe. The majority of parks reported that the impact of invasive animals had increased since 2010. Less than 10 per cent of parks reported that the impact of invasive animals had decreased. Where programs were better planned and resourced, parks reported that their priority threats had stabilised or reduced.

Figure 3. Impacts of Invasive animals in parks

Figure 4. Trend in impact of pest animals in parks
Section Three. Impact of Invasive Animals on Crown Land in Victoria

3.1 Biodiversity Impacts

Victoria has a unique natural environment with distinct plants and animals which are highly vulnerable to invasive species. Invasive animals are a major threat to the health and resilience of Victoria’s land, water and biodiversity. Protecting Victoria’s Environment – Biodiversity 2036, recognises that introduced animals, competing with, or preying on, native animals are a primary cause of biodiversity decline. After habitat loss, predation by introduced species (mostly foxes and feral cats) is regarded as being the major threat to endangered terrestrial native animals. In 2004, the environmental impact of foxes alone was estimated at $190 million.

Introduced herbivores (such as rabbits, goats, and deer) can also significantly damage native vegetation and soils through trampling and digging, and can cause localised extinctions of plant populations through over-grazing. Invasive animals can carry and transmit disease. Cats, for example, can transmit the disease toxoplasmosis and tapeworm to native wildlife, livestock and humans.

Invasive animals also have an impact on the health and function of ecosystems which provide humans with ‘ecosystem services’ such as clean air and water, productive soils and carbon sequestration. Feral pigs, for example, have been identified as a nationally significant invasive animal by the Invasive Plants and Animals Committee, due to their impact on inland river systems (especially wetlands).

3.2 Marine and Freshwater Impacts

Victorian marine and freshwater environments are under threat from the impacts of invasive animals. More than 100 introduced marine species have become established in Port Phillip Bay alone, after arriving on either domestic or international ships, and now prey on or compete with native species.

3.3 Economic Impacts

On agricultural land, impacts of invasive animals include predation of livestock, competition for resources, and destruction of pastures and crops. Invasive animals also confer direct control and management costs. In Victoria, the cost of invasive animals has been estimated at $900 million per year. The cost of managing invasive animals on farms is estimated at $12, 198 per 1000 hectares. Feral cats, rabbits and feral pigs each cost the nation over $100 million per year.

Victoria’s tourism and agriculture industries, among others, are strongly reliant on the overall health of our native plants and animals. According to the Valuing Victoria’s Parks (2015) study, $1.4 billion per year in spending is generated by tourist visits to Victoria’s parks. This generates $1 billion gross value added and supports 14,000 jobs. The impacts of invasive species must therefore also be managed appropriately to ensure degradation of Victoria’s native plants and animals does not impact on the enjoyment of our parks and natural areas for members of the public.

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3.4 Social Impacts

The social impacts of invasive animals include stress for farm businesses and distress to farmers when invasive animals injure or kill livestock and conflict between neighbours over differing attitudes to invasive animal management. Invasive animals can also cause a nuisance and safety risk in urban and rural residential areas, such as the creation of dangerous driving conditions.
Section Four. Legislative and Policy Context

4.1 Legislative Framework

The management of invasive animals in Victoria needs to be considered within a comprehensive legislative framework, that incorporates both national and state responsibilities. A comprehensive summary of relevant invasive plant and animal conventions, agreements, legislation, strategies and policies are provided in Attachment 4. Further information on invasive species legislation can be found in Attachment 5.

4.1.1 National Legislation

The main national legislation that may influence the control of invasive animals in Victoria includes:

- **The Intergovernmental Agreement on Biosecurity (IGAB).** Victoria operates within a national biosecurity system, in which federal, state and territory governments work in partnership to protect agricultural production and natural resources from invasive species (Attachment 6). The Australian Government’s role in managing biosecurity focusses on national pre-border and border biosecurity, along with a coordination and leadership role for achieving national biosecurity outcomes. States and territories manage the risks of the spread of invasive species across state borders, as well as surveillance and response within their borders.

- **National Environmental Biosecurity Response Agreement (NEBRA).** Victoria is also a signatory to the NEBRA, which sets out emergency response arrangements, including cost-sharing, for responding, in the public good, to biosecurity incursions that impact on the environment and/or social amenity.

- **Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).** The EPBC Act is the Australian Government’s central piece of environmental legislation, and provides for the recognition of invasive species as threats to native animals and plants. Once a threat is listed under the EPBC Act, a threat abatement plan can be put into place. All jurisdictions, including Victoria, inputs into the development of national threat abatement plans. An example of a national threat abatement plan can be found in Attachment 7.

- **The National System for the Prevention and Management of Marine Pest Incursions (the National System).** The National System has been developed to deal with the marine pest problems in Australia. Under the National System, introduced marine pests that are established in Australia, are having a significant impact and are not amenable to eradication, will be addressed under the ongoing management and control component. The key initiative under this component is the development and implementation of National Control Plans (NCPs), which reflect an agreed national response to reduce impacts and minimise spread of agreed pests of concern.

4.1.2 Victorian Legislation

There are multiple pieces of legislation that play a role in preventing or responding to terrestrial and aquatic invasive animal threats in Victoria

- **Catchment and Land Protection Act 1994 (CaLP Act)** The CaLP Act is the main piece of legislation that regulates the control, importation into the state, keeping, movement, trade and release of noxious weeds and pest animals in Victoria. The Minister for Energy, Environment and Climate Change and the Minister for Water formally administer the CaLP Act jointly and severally. The Minister for Agriculture, is responsible for state-wide invasive plant and animal policy and direction setting and has delegated responsibility for the enforcement of the noxious weed and pest animal provisions of the CaLP Act. The CaLP Act specifies that a land owner is to take all reasonable steps to prevent the spread of, and
as far as possible, eradicate established pest animals. The CaLP Act excludes the declaration of fish and invertebrates as pest animals. Further information on the CaLP Act can be found in Attachment 8 and an overview of landholder responsibilities for managing invasive species is provided in Attachment 9.

- **Fisheries Act 1995.** The Fisheries Act provides the legislative framework for the regulation, management and conservation of Victorian fisheries. This Act includes limited provisions to declare noxious aquatic species which may impact on fisheries resources. It includes powers to prevent the taking, possession, trade or movement of aquatic species declared noxious under the Act, and provides for the development of declared noxious aquatic species management plans.

- **Plant Biosecurity Act 2010 (PB Act).** The main purpose of the PB Act is to a) provide for the prevention, monitoring, control and eradication of plant pests and diseases b) provide the packaging, labelling and identification requirements of plants and plant products and c) facilitate the movement of plants, plant products, used packages, used equipment and earth material within, into and out of Victoria. This Act is used to manage the risk of certain invasive invertebrate animal threats to Victoria, such as Red imported fire ants.

- **National Parks Act 1975 (NP Act).** The NP Act makes provisions in respect of National Parks, state parks, marine National Parks and marine sanctuaries. In doing so, it requires the relevant Minister to undertake invasive species management in national and marine parks to preserve and protect indigenous flora and fauna.

- **Flora and Fauna Guarantee Act 1988 (FFG Act).** The FFG Act is the primary Victorian legislation for the conservation of threatened species and ecological communities and management of processes threatening Victoria’s native flora and fauna. Under the FFG Act, the introduction of exotic organisms into Victorian marine waters, predation of native wildlife by foxes and impacts on native vegetation through grazing by the rabbit have all been listed as a potentially threatening process.

### Table 2. Summary of other legislation that may influence the management of invasive species in Victoria

<table>
<thead>
<tr>
<th>Act</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Livestock Disease Control Act 1994</strong></td>
<td>Prevent, monitor and control livestock (&quot;non-human animal and any fish, bird, whether wild or domesticated, egg intended for hatching or bee&quot;) diseases to protect domestic and export markets and public health.</td>
</tr>
<tr>
<td><strong>Emergency Management Act 1986</strong></td>
<td>Provides for the organisation of emergency management in Victoria. Includes emergencies (plagues, epidemics or contamination) that endanger or threatens to endanger the environment or an element of the environment in Victoria. The state emergency response plan identifies responsibility for biosecurity incursions, including marine, freshwater.</td>
</tr>
<tr>
<td><strong>Agricultural and Veterinary Chemicals (Control of Use) Act 1992</strong></td>
<td>Outlines the requirements for the control and use of chemicals and poisons. This particularly relates to the safe and appropriate use of vertebrate poisons such as sodium fluoroacetate (1080) or 4-aminopropiophenone (PAPP).</td>
</tr>
<tr>
<td><strong>Prevention of Cruelty to Animals Act 1986</strong></td>
<td>Sets out animal welfare requirements and conditions on control measures (e.g. trapping) for the management of invasive animals.</td>
</tr>
<tr>
<td><strong>Domestic Animals Act 1994.</strong></td>
<td>Promotes animal welfare, the responsible ownership of dogs and cats and the protection of the environment.</td>
</tr>
<tr>
<td><strong>Wildlife Act 1975</strong></td>
<td>The purpose of the Wildlife Act 1975 is to establish Establishes procedures to promote the protection and conservation of wildlife; help ensure species of wildlife do not become extinct; provide for the sustainable use of and access to wildlife; and to prohibit and regulate the conduct of persons engaged in activities concerning or related to wildlife.</td>
</tr>
<tr>
<td><strong>Conservation, Forests and Lands Act 1986</strong></td>
<td>To provide for the effective conservation of the State’s lands, waters, flora and fauna. The CF&amp;L Act provides a head of power in terms of administrative powers and functions such as authorising officers for the management of pest plants and animals under the CaLP Act</td>
</tr>
<tr>
<td><strong>Forests Act 1958</strong></td>
<td>To protect native flora and fauna in state forests.</td>
</tr>
<tr>
<td><strong>Occupational Health and Safety Act 2004</strong></td>
<td>Sets out requirements to secure the health, safety and welfare of employers, employees and contractors, to eliminate sources of risks and to ensure that members of the public are not put at risk.</td>
</tr>
</tbody>
</table>
4.2 Roles and Responsibilities of the Victorian Government for Invasive Species in Victoria

The roles and responsibilities provided by the Victorian Government for invasive species management in Victoria rest primarily with the Department of Economic Development, Jobs Transport and Resources, the Department of Environment, Land, Water and Planning, and Parks Victoria. Table 3 below provides a general overview of the Victorian Government’s key roles for invasive species in Victoria.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Area</th>
<th>Roles and Responsibilities</th>
</tr>
</thead>
</table>
| Department of Economic Development, Jobs, Transport and Resources | Biosecurity Branch | • Setting state-based policy for invasive species  
• Incursion response to new priority invasive species in Victoria  
• Policy and funding for strategic invasive species research  
• Representing Victoria on national invasive species issues  
• Policy oversight of animal welfare and domestic animals  
• Policy lead on other biosecurity matters including animal and plant diseases, and agriculture and veterinary chemical management. |
| Agriculture Services and Biosecurity Operations | | • Delivery of enforcement and compliance services of the Noxious weeds and pest animal provisions of the CaLP Act on behalf of the Minister Environment and Climate Change  
• The eradication of State prohibited weeds and the control of restricted pest animals on all land in the State on behalf of the Secretary DELWP. |
| Department of Environment, Land, Water and Planning (DELWP) | Biodiversity Division | • Policy development for the protection of biodiversity from the impacts of invasive species  
• Investment into the strategic management and control of priority invasive species on Crown land for biodiversity asset protection and as part of the Good Neighbour program  
• Policy, investment, research and regulation to support healthy natural ecosystems, including the protection of threatened species. |
| Land Management Policy Division | | • Setting state-based policy for the sustainable, effective and efficient management of Crown land  
• Facilitate appropriate use of and access to the public land estate  
• Provide a linkage between government land management policy and the variety of Crown land managers (for example, Parks Victoria, committees of management). |
| Water and Catchments Group | | • Coordinating and delivering water policy  
• Overall accountability for administration of the Catchment and Land Protection Act 1994.  
• Development of state-wide strategies, policies and programs to improve the health of Victoria’s catchments and waterways  
• Governance of the Catchment Management Authorities and the Victorian Catchment Management Council. |
| Forest, Fire and Regions Group | | • Management of forests, fire and other emergencies  
• Service delivery of departmental priorities in DELWP regions  
• Management of invasive species in state forest and other Crown land as land manager.  
• Consult with and listen to communities in respect to invasive species that impact on private land  
• Inform invasive species policy formulation  
• Develop operational policy for department priorities. |
| Parks Victoria | | • Land manager for the parks and reserves estate on behalf of the Secretary DELWP  
• Manages invasive plants and animals to reduce their impacts on biodiversity, cultural heritage and other values of the Victorian parks estate  
• Applied research and monitoring of the effectiveness and humaneness of control. |
Section Five. Policy and Approach

5.1 Victorian Invasive Species Policy

5.1.1 Victorian Invasive Plants and Animals Policy Framework

The Invasive Plants and Animals Policy Framework (IPAPF) (Attachment 10) provides the overarching whole-of-Victorian-Government approach to the management of existing and potential invasive species. Since the potential expenditure on invasive animals in Victoria is effectively unlimited, the IPAPF emphasises a risk management approach to identify threats and assesses their relative risk to determine the most appropriate intervention that maximises public benefit. The policy framework relates to both public and private land thereby having a comprehensive whole-of-government nil-tenure approach to the issue.

The IPAPF is supported by a Weeds and Vertebrate Pests module (Attachment 11) which details current arrangements, identifies current and potential future management actions, and sets out roles and responsibilities for invasive species including mammals, birds, amphibians and reptiles.

5.2 Invasive Species Policy Objectives

Victoria’s invasive species policy comprises four objectives for invasive species management that underpin a risk management approach. The four objectives for invasive species management in Victoria are:

- **Prevent the entry and spread of invasive species.** Preventing the introduction of invasive species is considered the most cost-effective approach. Monitoring and surveillance to confirm absence, risk and pathway analysis, education and awareness and entry controls are important tools to ensure that no new high risk invasive species are introduced.

- **Eradicate.** This approach seeks to eradicate those species that are at an early stage of establishment from the whole of Victoria, through rapid response and on-ground action. Early detection through surveillance and monitoring and effective reporting processes are essential.

- **Contain.** Contain the distribution and/or limit the density of species that are beyond eradication beyond a defined containment line.

- **Asset Protection.** Protect high value natural assets (e.g. native plants and animals, neighbouring agricultural land) from the impacts of widespread invasive species by strategically reducing population densities.

This approach enables the Victorian Government to identify invasive species threat, assess their relative risk to the environment, agriculture or the community and select the most appropriate intervention. This risk-management, cost-benefit approach is applied in Victoria as it is not feasible for government to enforce or fund the control of all invasive species across the state.

The generalised invasion curve (Figure 5) indicates how the policy objectives are linked to the invasive species’ stage of invasion. The graph also provides an indication of the likely economic returns from action taken to counter invasive species at different stages. This shows that, while such actions can be expected to be cost-effective at all stages of the cycle and benefit can fluctuate depending on the value of the asset being protected, the level of cost effectiveness tends to decline progressively as the invasive species moves toward becoming more established.
5.2.1 Landscape-scale, Nil-tenure Approach

Invasive species do not recognise boundaries of land tenure. Invasive species will freely move between Crown Land and private property. The IPAPF advocates for a nil-tenure approach to management, where the species and their impacts are managed regardless of land tenure.

A good example of the nil-tenure approach, is where Trust for Nature and Parks Victoria have been coordinating their rabbit control programs in the Murray Sunset region of northwest Victoria, including collaborative planning and the coordinated sharing of resources such as equipment and contractors.

5.3 Other Policy Drivers

The control of invasive species in Victoria is influenced by a range of other policy drivers, as summarised in Table 4.
<table>
<thead>
<tr>
<th>Act</th>
<th>Objective</th>
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<tbody>
<tr>
<td><strong>Biodiversity Policy</strong></td>
<td><em>Protecting Victoria’s Environment - Biodiversity 2036</em> represents a draft state wide plan for managing Victoria’s biodiversity, and represents a new direction for Victoria’s natural environment. The draft plan represents the need to update renew and modernise biodiversity policies and strategies in response to continuing changes in built and natural environments, and to make improvements in our knowledge base. The goals of the plan are to encouraging more Victorians to value nature and to ensure that Victoria’s natural environment is healthy. The plan will be complemented by a review of the <em>Flora and Fauna Guarantee Act 1988</em> and <em>Native Vegetation Clearing Regulations</em>.</td>
</tr>
<tr>
<td><strong>Hunting and Game Policy</strong></td>
<td>The Victorian Government is currently developing the <em>Sustainable Hunting Action Plan</em> to promote responsible hunting in Victoria. It will improve access to information for Victorian hunters as well as improving education to ensure hunting activities are safe and legal. The <em>Sustainable Hunting Action Plan</em> seeks to maximise the benefits of hunting and game management by setting a clear strategic direction for the sector and by improving coordination between government agencies and stakeholders. In 2013, the total expenditure for hunting game animals was estimated to be $282 million. Forty two per cent was on off-trip expenditure items and 58 per cent on on-trip expenditure items. Forty per cent of expenditure occurred in metropolitan local government areas (LGAs) and 60 per cent in regional Victoria. What this means is that hunting represents a significant investment into regional Victoria, leading to jobs and growth. There were an estimated 1,115 jobs (full-time equivalent) generated directly by hunting-related expenditure with a further 1,268 jobs stemming from flow-on employment, giving a total employment impact of 2,382 jobs. In some local government areas, this can represent up to 2.5 per cent of the local economy. Given this level of economic contribution to local communities, Government has an enabling role to support and enhance these opportunities.</td>
</tr>
<tr>
<td><strong>Animal Welfare Considerations Associated with Invasive Species Control</strong></td>
<td>Ethical invasive animal control includes recognition of and attention to, the welfare of all animals affected directly or indirectly by control programs. Unnecessary animal suffering associated with pest management should therefore be minimised, regardless of the status of a particular invasive species or the extent of damage or impact created by that species. The welfare of all animals in Victoria is regulated by the <em>Prevention of Cruelty to Animals Act 1986</em> (POCTAA) and subordinate legislation. Animal welfare and cruelty aspects of invasive species management is covered by POCTAA. For example, the use of cage and leg hold traps is restricted to certain species (i.e. leg hold traps for wild dogs, rabbits and foxes) and limitations and requirements are in place on their use by certain people, trap design and construction, and supervision when set. Codes of practice, including the code of practice for the welfare of animals in hunting, have been developed to help ensure animal welfare considerations are met. Whatever methodology is used it must be humane and must comply with POCTAA (as well as other legislation) and other licence conditions. The person should be adequately trained, educated and competent to humanely kill the animal. <em>The Domestic Animals Act 1994</em> (DAA) imposes requirements about surrendering captured dogs and cats to local council for identification and processing. Section 30 of the DAA makes provisions for the immediate destruction of a cat or dog found at large near livestock. DEDJTR and DELWP have officers authorised under POCTAA to enforce animal welfare, as do local councils, the Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the Game Management Authority. Local councils, the RSPCA, department staff and wild dog control officers are also authorised under the DAA. These officers may be involved in pest management or investigating allegations of cruelty around those activities.</td>
</tr>
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</table>
5.4 The Inter-connection of Policy

It is important, given the range of inter-connected policy drivers, that the development and implementation of policy as it relates to the management of invasive species across government departments and its agencies is collaborative and integrated to ensure a consistent framework where respective business needs have been robustly considered and the potential unintended consequences of a course of action are avoided. The management of deer in Victoria (Case Study 1) is an example of complex inter-connected policy

Case Study 1. Deer in Victoria

Deer provides a valuable hunting resource for the community. In 2016 there were more than 48,000 licensed game hunters in the State, contributing $439 million annually to the economy and providing almost 3,500 jobs (Department of Environment and Primary Industries, 2014, Estimating the economic impact of hunting in Victoria 2013).

Deer are known to have significant impacts on native biodiversity and agricultural values. Increases in the impacts of deer on high-value environmental assets across Victoria have been observed over the last decade, an example of this is damage to Alpine Sphagnum Bogs and associated ferns, an endangered ecological community listed under the EPBC Act and the FFG Act. Deer can cause a number of other environmental impacts through browsing and grazing, antler rubbing, trampling, trail creation, and wallowing. Primary production is impacted by deer through loss of crops, damage to farm infrastructure and increased risk of livestock disease including foot and mouth (Deer in Victoria's Parks and Reserves Management Framework 2013-2018, Parks Victoria).

The government is committed to maximising the benefits of safe, sustainable and responsible hunting, while meeting its requirement under the National Parks Act 1975 to preserve and protect indigenous flora and fauna in the park; exterminate or control exotic fauna in the park and under the Forests Act 1958 and the Conservation, Forests and Lands Act 1987, to effectively conserve the state's lands, waters, flora and fauna.

Deer in Victoria exist in a complex regulatory space. Seven species of deer (sambar, red, sika, rusa, chital fallow and hog deer) are listed as game and are consequently protected wildlife under the Wildlife Act 1975. It is an offence under the Wildlife Act 1975 to take or kill protected wildlife without an authorisation to do so. Reduction in biodiversity of native vegetation by sambar deer is also listed as a potentially threatening process under the FFG Act. All other species of deer are declared pest animals under the CaLP Act.

Game hunting is provided for under the Wildlife Act 1975, Wildlife (State Game Reserve) Regulations 2014, and the Wildlife (Game) Regulations 2012. It is regulated by the Game Management Authority, created in 2014 through the Game Management Authority Act 2014 which is responsible for issuing game licences, managing open and closed seasons for game species, enforcing game hunting laws and the education and information provided to hunters. Parks Victoria is responsible for managing State Game Reserves.

In response to community concern about the impact of deer on private land, a Governor in Council Order was made under the Wildlife Act 1975 to unprotected deer on all private land. This allows landowners to control deer on their property without the need for a game licence or an Authority to Control Wildlife, thereby reducing the costs, administrative burdens and time delays that may hinder efficient and timely control of deer.

Deer remain protected on public land in Victoria, and there is concern from Crown land managers that the status of deer as protected wildlife is at odds with their mandate to control them as a key threatening process.

There is a lack of consensus across sectors around the need to declare all species of deer in Victoria as pest animals and the revocation of their protection status under the Wildlife Act 1975. There is concern that the declaration of deer as pests will reduce the amount of public land available for hunting, impact on the protection of deer as a hunting resource and deregulate the hunting of deer, creating safety concerns.

The Victorian Government is proposing to develop a deer management strategy to help balance the need to manage deer across a range of conflicting goals.
5.5 The Case for Government Intervention in Invasive Species

The Invasive Plants and Animals Policy Framework outlines the case for government investment in invasive animal control. In short, the policy outlines that government needs to intervene to meet its obligations as a land and water manager, which include the protection of high-value assets and managing adverse effects of pests on adjoining landholders, or where there is market failure and it is in the public interest for the government to intervene.

The general principle of government investment in invasive species management is that government invests to maximise public benefit. Intervention will usually only occur when the benefits outweigh the costs. How government determines the cost benefit of the control of invasive animals on Crown land is further discussed in Section 6.1.2.

The following are key roles for government in invasive animal management in Victoria

- **Enforcement and Compliance of Invasive Animals.** Agriculture Victoria (DEDJTR) has delegated responsibility for enforcement of the noxious weeds and pest animal provisions of the CaLP Act. More information on the enforcement and compliance of the control of invasive animals in Victoria can be found in Attachment 12.

- **Provision of Public Goods.** Government also has a role to play in the provision of public goods. The commissioning or generation of research by the Victorian Government, important as the basis of evidence-based policy and strategic management, is an example of the provision of a public good. The support of biological control programs (Case Study 2) is another role for government.

- **Regulating safe and appropriate standards.** Control work undertaken by and on behalf of the Victorian Government on Crown land is managed under codes of practice and associated standard operating procedures. Code of practice outline the legislative authorising environment under which vertebrate pest control is undertaken in Victoria. They also guide managers and participants in control programs on public land on the most appropriate, efficacious, cost effective, humane, target specific and environmentally suitable technique for reducing the negative impact of vertebrate pests and the Occupational Health and Safety (OHS) requirements associated with implementing control programs. Standard operating procedures prescribe the minimum standards to implement specified control techniques and procedures. An example of a code of practice and standard operating procedure for foxes can be found in Attachment 13.
Case Study 2. Biological control of rabbits

Rabbits are Australia’s most destructive agricultural pest animal, costing $200 million in lost agricultural production every year. Less than one rabbit per hectare is enough to stop the growth of some native species and negatively affect biodiversity leading to further loss of native species of plants and animals.

Australian governments and industry have joined forces in a global search for a new rabbit haemorrhagic disease virus (RHDV) strain to boost rabbit biocontrol effectiveness in Australia. The search and evaluation has led to a naturally occurring RHDV variant from Korea (RHDV K5) being selected. It is currently under assessment by government regulators. The national release will be coordinated by the Invasive Plants and Animals Committee in consultation with Australian Wool Innovation and Meat and Livestock Australia.

Rabbit biocontrol can be beneficial if applied as part of an integrated and complementary pest management approach. An improved biological control agent in conjunction with a community-led response, using best practice rabbit management principles, is an opportunity to mitigate the negative impacts of rabbits.
Section Six. How the Problem of Invasive Animals on Crown Land is Addressed

Best Practice Management on Crown Land

This section outlines how the Victorian Government addresses the problem of invasive animals on Crown land.

6.1. Principles of Investment in Invasive Animal Control by Government as Crown Land Manager

The Victorian Government principally invests in invasive animal management on Crown land for the protection of key natural values (biodiversity asset protection) or in ‘Good Neighbour’ principles - to reduce the impact of invasive animals on adjoining private land.

Best practice invasive species management utilises humane, strategic and targeted approaches aimed at achieving enduring, cost-effective outcomes. An integrated approach involving a variety of techniques that can be modified in light of experience and on-ground feedback has proven to be the most effective. Unless invasive animal management programs are well planned and coordinated at a relevant spatial and temporal scale, efforts are unlikely to achieve long term control10.

6.1.1 Biodiversity Asset Protection

The principles for Government’s investment in invasive animal control on Crown land to achieve biodiversity protection outcomes have been developed, tested and refined over the past decade, are summarised in Table 5.

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10 Code of Practice for fox control in Victoria, 2013, Department of Primary industries
6.1.2 Prioritising Effort and Determining Cost-Benefit

The development of Strategic Management Prospects is a key element in modernised conservation planning and investment processes. It will provide land managers with a powerful decision-support tool to assist in the prioritisation of effort to address threats. It will help direct where Crown land managers should concentrate their efforts to control invasive animals for the greatest benefit to biodiversity. Strategic Management Prospects will also provide a method for integrating information on expected biodiversity benefits and costs to help compare and select management options.

Another tool, Strategic Biodiversity Value, identifies the relative priority of areas for protection based on the importance of the values found there. Other decision-making tools allow examination of individual values and threats.

The following Strategic Management Prospects map (Figure 6) is an example output from this decision-support tool:

**Applying a Cost-effective Biosecurity Approach.** Using an understanding of where the invasive animal threat sits on the invasion continuum (eradication, containment, asset protection - Figure 4), to target the most effective management response. This helps to ensure that planned action maximises the return on investment.

**Asset-based.** The ‘why’ Crown land managers intervene to control invasive animals centres around the asset protection outcomes being sought. Contemporary approaches to invasive animal control recognise the importance of focusing on the values being protected as the key measure of success, as opposed to a reduction in pest numbers.

**Strategic and Targeted.** Prioritise effort. Direct investment into areas of high value, where we can achieve strong, cost-benefit.

**Landscape-scale.** Invasive animal programs are planned and delivered at the most appropriate spatial and temporal scale to best protect the asset. This often requires nill-tenure collaboration between a range of public and private stakeholders.

**Evidenced-based Decision Making and Adaptive Management.** Use the best information possible and decision-support tools to help navigate and solve complex problems and refine management approaches based on lessons learnt.

**Collaborative Management.** The approach presupposes common planning, standardised monitoring and reporting and ongoing communications between land managers. It delivers a plan of action for a group of stakeholders, as distinct from the more traditional management approaches which often guide the actions of individual land managers.
Figure 6. Example Strategic Management Prospects Map showing the most cost-efficient management actions, including invasive animal control, to secure biodiversity protection (draft map provided for example only).

The map shows an example of the spatial distribution of cost beneficial actions to control invasive species for the protection of biodiversity across Victoria as a tool to help Crown land managers to prioritise effort.

6.1.3 Strategic Planning Frameworks

Crown land managers plan and deliver the control of invasive animals within the context of a range of strategic planning frameworks. These include Regional Catchment Strategies, Management Plans and Conservation Action Plans.

The draft, Protecting Victoria’s Environment – Biodiversity 2036, identified the need to reform Victoria’s conservation planning and investment framework to better focus on biodiversity conservation priorities and promote regional partnerships and consistent reporting. Preliminary conversations with stakeholders, during the development of the Protecting Victoria’s Environment – Biodiversity 2036 plan, identified support for a 5-year regional strategy and annual implementation plan and investment prospectus. Importantly, these documents would consider and inform agency and community based planning, such as conservation action planning.

6.1.3.1 Conservation Action Planning.

Parks Victoria is currently developing Conservation Action Plans for park landscape across Victoria. Parks Victoria has identified 16 park landscapes, areas which are classified according to a combination of ecological attributes, land forms and administrative boundaries. Park landscapes form a logical unit for planning and delivery of specific operational activities in a group of parks and reserves. The Conservation Action Plans, which complement existing parks management plans, identify conservation priorities, and then develop strategies to address the key threats to those assets. The plans will enable operational activities to be
implemented and monitored for success and further refined. The draft Conservation Action Plan for Wilsons Promontory has been included as Attachment 14.

6.2 Achievements in the Management of Invasive Animals on Crown land for the Protection of Biodiversity

The Victorian Government currently delivers strategic invasive animal control on over 1.5 million hectares of Crown land annually. The programs range from employing innovative new approaches to manage emerging invasive animal issues to the delivery of landscape-scale asset protection programs. The following case studies illustrate a range of successful invasive animal control programs on Crown land in Victoria.

Case Study 3. Barry Mountain fox control program

The Barry Mountains control program, in north-east Victoria, aims to protect the endangered long-footed potoroo from predation by foxes. The program is nil-tenure as the area occupied by long-footed potoroos is distributed approximately equally between the Alpine National Park and State Forest, and is consequently co-funded by DELWP and Parks Victoria, while being managed by Parks Victoria.

DELWP’s Arthur Rylah Institute for Environmental Research conducts a monitoring study as part of the program, looking at the impact of reducing fox densities through 1080 baiting and the response in the long-footed potoroo population. It has been found that after an initial knock-down of foxes through high levels of bait take, bait take was then able to be maintained at a consistently low level over many years.

A monitoring and evaluation program also showed that while numerous factors influenced the occurrence of foxes in the Barry Mountains including elevation, aspect and proximity to bait sites, the primary factor influencing the presence of long-footed potoroos was the occurrence of foxes. The study demonstrated that there was a significant inverse relationship between the occurrence of foxes and distance from bait lines. Foxes were less likely to occur close to bait lines, this relationship extended out for many kilometres from bait lines. The study also demonstrated that the occurrence of long-footed potoroos was inversely correlated with the occurrence of foxes, meaning that when foxes were controlled, potoroos were more likely to be present.
Case Study 4. Recovering rangelands: Mallee bounceback

More than 88,000ha of semi-arid woodlands and 82,000ha riverine and floodplain communities are reserved in the Mallee national parks, providing a total of over 170,000 hectares of grazing sensitive communities across these parks.

A large-scale and continuous rabbit control program has been implemented since 2003, targeting areas identified as most at risk, especially semi-arid woodlands. The program was implemented as the effectiveness of Rabbit Haemorrhagic Disease Virus (RHDV) declined due to increasing resistance to the disease.

The primary aim of rabbit control in the Mallee is to maintain rabbit numbers at very low densities to permit regeneration of native vegetation. Rabbit control is most cost-effective if conducted when populations are low, otherwise the rate of population growth negates the effects of control treatments. It hence becomes critically important to identify any increase in populations at an early stage. Williams., et al (1995) notes that “rabbit management becomes progressively cheaper as repeated maintenance treatments achieve higher levels of control”.

A joint initiative with DELWP, Trust for Nature and the Mallee Catchment Management Authority ‘Recovering rangelands: Mallee bounceback’ adopts a landscape-scale approach to rabbit control across 233,000 ha in the Mallee region.

The objectives of the existing rabbit control program, as detailed in the total grazing management plan, are to protect the tree regeneration that occurred during the time when the RHDV was most active; to achieve broader recovery of semi-arid woodlands and to reinstate a woodland ecosystem that provides habitat for endemic fauna. To achieve these objectives, rabbit abundance must be maintained below a target range of 1-3 rabbits per spotlight kilometre and one active warren entrance per hectare.

A study undertaken by William and Moore (1995) compared the cost efficiency and effectiveness of the three different control techniques (baiting, ripping and fumigating). The study found that the most cost efficient means of controlling rabbits in eastern Australia required repeated treatments that both kill rabbits and disrupt their shelter with ripping and follow up maintenance being the most long-lasting, cost efficient combination.

In the last two and a half decades, effective control strategies have been implemented by Parks Victoria staff and contractors, to maintain rabbit populations at <1 rabbit per spotlight kilometre across large areas of the three national parks. Treatment methods have included warren ripping, baiting with 1080 or Pindone laced oats, shooting, fumigation and warren implosion.

An extensive 1080 baiting program, followed by ripping and fumigation, saw rabbit numbers plummet and finally dip below 1 rabbit per spotlight kilometre in 2013. This is a strong example of how an on-going, integrated approach can maintain consistently low population numbers and avoid the significant effort and cost required to bring large numbers back under control.
Case Study 5. The wild dog program on Crown land

The primary objective of the Victorian Wild Dog Program is to support community action to reduce the impact of wild dogs on livestock. In Victoria, a legislative framework has been established, that ensures the protection of dingo populations in remote areas of public land while allowing the feral and wild populations of wild dogs to be controlled where it is justified for livestock protection. Wild dog control can occur on the following lands where the dingo was declared unprotected wildlife under a Governor in Council Order on 1 October 2010:

- on all private land in Victoria;
- on public land within 3km of any private land boundary in defined areas in the east and north west of the state (known as the livestock protection buffer); or
- where a wildlife management authorisation has been issued.


The program is based around both proactive control using wild dog baits and reactive control using trapping, which is utilised following reports of wild dog attacks by farmers. The Wild Dog Program has 16 Wild Dog Management Zones. Plans that identify wild dog control in each of the Wild Dog Management Zones are developed in conjunction with community input and signed off by DELWP’s Regional Director, public land managers and Parks Victoria.

Furthermore, from 2011 to July 2015 the Victorian Government managed a Wild Dog Bounty system, administered by DEDJTR. Approximately 2000 scalps were handed in during this period.

Private landholders currently have access to a ‘baiting on public land’ program for wild dog control in areas adjacent to their properties. This involves landholders signing up as DELWP volunteers who are managed by Wild Dog Program staff. Baiting can only occur within the 3km livestock protection buffer and participants must adhere to all rules governing the safe use of poison baits and follow DELWP procedures when laying baits. Participants must undergo an application process and sign an indemnity prior to commencement. Any baiting proposal must be approved by the public land manager, must demonstrate a strategic value and be integrated into and coordinated with the DELWP Wild Dog Program.

Whilst not widely patronised, this program has had some success with participants feeling an increased sense of well-being through empowerment to act in a responsible way to help protect their enterprises. Financial benefits of this program have not been assessed. Costs involved include supply of poison baits and indirect costs associated with wild dog program staff coordinating the participants.

6.3 Good Neighbour Program

The ‘Good Neighbour Program’ deals with invasive species issues occurring on the boundary of public and private land. The program’s aim is to support community action in protecting private land values from the impacts of pest movement at the interface. Through the Good Neighbour Program, Crown land managers work in partnership with the community to tackle shared problems along common boundaries including reducing the impacts of certain invasive plants and pest animals. Opportunities for the control of invasive species that are coordinated with action being undertaken by adjoining private landholders are given priority.

The program has the clear role of protecting private land from public land pest incursions and not vice versa. The lack of a program to encourage ‘reverse good neighbour’ principles, where private landholders adjoining Crown land work in partnership with Crown land managers to control the threats impacting on high biodiversity values, could be considered a gap in the way interface issues are managed.
Section Seven. Partnership with Parks Victoria and Community Shooting Organisations.

– Biodiversity Outcomes, Community Safety and Limitations.

7.1 Control of Deer Populations in Parks

Obligations to manage deer in areas managed under the National Parks Act 1975 are established under section 17(2)(a)(iii).

Direct management of deer is a relatively new area of business for Parks Victoria. Coordinated control programs targeting deer have been implemented since 2013 in response to increasing environmental impacts and community concerns. Control methods available to control deer include mustering, exclusion fencing, use of repellents, ground shooting and aerial shooting.

Although time consuming and labour intensive, ground shooting is considered to be the most effective technique currently available for reducing deer populations when used in a strategic manner as part of a coordinated program designed to achieve sustained, effective control. Deer control must be undertaken in accordance with relevant standard operating procedures.

Deer control programs are conducted as part of long-term control strategies for reducing negative impacts on native flora and fauna and Parks Victoria is working towards determining improvements to biodiversity as a result of these programs. For instance, the pilot deer control program, which uses accredited volunteer shooters as part of a coordinated program on the Bogong High Plains (within the Alpine National Park), will help determine the most efficient and effective means for reducing the impacts of deer on biodiversity values, such as alpine peatlands.

7.2 Partnerships Between Accredited Volunteer Shooters and Parks Victoria

Parks Victoria engages with accredited volunteer shooters through partnership programs with the Sporting Shooters’ Association of Australia and the Australian Deer Association. Through these programs, accredited volunteers act as agents of the Crown as part of a planned, coordinated and cooperative approach to the control deer (and other invasive animals) on Parks Victoria managed land. The intent of these programs is to conserve, protect and enhance environmental and cultural assets, through targeted and controlled invasive animal programs.

Other deer control projects are being delivered in several parks including the Dandenong Ranges National Park and Wilsons Promontory National Park. In partnership with the Sporting Shooters’ Association of Australia, the Australian Deer Association, the Game Management Authority and DEDJTR, a successful hog deer control program has been delivered to reduce impacts on environmental values at Wilsons Promontory National Park. Forty-two hog deer were removed as part of the program. Spotlight counts revealed a significant decrease in the index of deer per kilometre, indicating a considerable reduction in the density of the population post control. Anecdotal evidence indicates a reduction in impacts on wetlands and a decrease in the number of game trails in the area. However, more data from similar control programs will be required to draw any strong and significant conclusions about the effectiveness of control. While the program was run safely and efficiently, it is not yet known whether this level of reduction is sufficient to reduce impacts on environmental values such as riverbanks and riparian vegetation.

The partnership program also contributed 1,332 volunteer hours to the control of sambar deer at Mitchell River National Park for the protection of restoration areas. This program was also run in collaboration with the Australian Deer Association and the Trust for Nature Regional Deer Management Group. A vegetation monitoring program was conducted as part of this program to determine the biodiversity outcomes of the
deer control program. The monitoring indicated that areas of revegetation have been responsive to browsing management, demonstrating the effectiveness of the program.

### 7.2.1 Alpine National Park Deer Control Trial

Alpine environments are under increasing pressure from a range of threats, including invasive plants and animals. Parks Victoria is working to improve the condition and resilience of these alpine environments, particularly the high value alpine peatlands, by mitigating the impact of key invasive species.

A significant expansion of the population and the area deer occupy has been observed in the Alpine National Park over the past decade. Increasing signs of deer activity in the open areas of the alps is particularly concerning, as this corresponds with increased impacts to the endangered alpine peatlands. Deer are therefore one of the key invasive species being targeted by Parks Victoria.

Little is known about controlling deer to maintain or improve the condition of alpine peatlands in the Alpine National Park as it has not been attempted before. Parks Victoria is implementing a deer control trial to gain a greater understanding of the impacts of deer on alpine peatlands and to determine the best methods of mitigating those impacts.

The aim of the Alpine National Park Deer Control Trial is to investigate whether ground shooting can reduce the impacts of deer on the alpine peatlands in the Alpine National Park, and if so, what the most efficient and effective techniques of control are. The biosecurity objective is asset protection, aimed at improving the condition of alpine peatlands.

The short-term trial program is being implemented in stages across approximately 4000 ha within the Alpine National Park. It involves baseline monitoring prior to the control program, followed by three years of deer control and finally post-control monitoring to determine the levels of deer abundance and associated impacts in the Alpine National Park. At the conclusion of the trial, the results and lessons learned will be used to provide future directions for ongoing deer control in the park.

Trial sites have been established on the Bogong High Plains, near Falls Creek, and have been extended to include the Howitt-Wellington Plains, north of Heyfield. The program involves a comparison between sites where targeted control efforts are being made through a coordinated program of ground shooting by Parks Victoria, volunteers and contractors. These sites will be compared to control sites that do not have a targeted deer control program. In the Southern Alps a similar comparison will be made in areas where recreational hunting is permitted within the trial sites. The trials in the Southern Alps are anticipated to begin in 2017.

Parks Victoria, in conjunction with contracted professional shooters, the Sporting Shooters’ Association of Australia and Australian Deer Association, are in the process of trialling the most effective control techniques for this particular landscape. Several of the ground-shooting methods available, including glassing, stalking, stalking with gundogs, hound hunting, deer drives and spotlighting are being trialled and assessed. The efficiency and effectiveness of each method is being measured using catch per unit effort data collected by the volunteers and contractors. This information will be used to assist in planning for future management programs.

Nine planned deer control operations have been conducted to date under the supervision of skilled Parks Victoria staff. All contractors and volunteers are appropriately qualified and authorised to undertake control operations. Opportunities to train volunteers to undertake coordination roles are being explored as the trial moves forward. All involved in the control program work to an operational plan provided by Parks Victoria. A debrief is also conducted at the conclusion of each operation, with outcomes and knowledge gained documented and used to guide subsequent operations.

Little was known about the movement of deer on the Bogong High Plains prior to the start of this program. As a result, the early operations had poorer results, however 42 deer have been removed from the park so far. This will be considered in the planning phase of the 2017 program.
Pre-control monitoring has been completed at six of the eight treatment areas within the Bogong High Plains and Howitt Wellington Plains. This includes a total of 48 alpine peatlands which have been monitored so far. The project is ongoing at this stage, and is following an adaptive management approach based on the ongoing evaluation of incoming results.

7.2.2 Dandenong Ranges / Yarra Ranges Deer Control Program

Parks Victoria conducts an ongoing deer management program in the Yarra Ranges across the Dandenong Ranges National Park, Yellingbo Nature Conservation Reserve and Warramate Hills Nature Conservation Reserve. The impacts from the deer population in the Yarra Ranges include antler rubbing and browsing on remnant vegetation and areas of revegetation and destroying under-storey and middle-storey vegetation. These areas provide critical habitat for the threatened helmeted honeyeater and Leadbeater’s possum. The deer population also impacts on waterways through wallowing and trampling, creating areas of erosion and soil compaction.

The program is based around asset protection, recognising that containment or eradication is not possible in this particular landscape. The specific biodiversity objective is to reduce the impacts of deer to enhance endangered vegetation communities that support threatened flora and fauna species including Leadbeater’s possum and helmeted honeyeater.

Ground shooting is used in a strategic and controlled way with a focus on safety. Skilled Parks Victoria staff oversee the partnership program run in collaboration with the Australian Deer Association and Sporting Shooters’ Association of Australia. An operational plan is used for all programs which ensures a strategic approach, outlines safety and communications plans, ensures all shooters are accredited, authorised and attend a safety briefing, as well as ensuring that the program is efficient and humane. Other safety measures that are in place include a Parks Victoria Operational Controller to run all operations, shooters carrying GPS tracking devices, designated “shoot zones” and a strong focus on communications during all operations. Parks are also closed to all visitors while the operation is being carried out with staff and volunteers stationed at entry points to ensure the program is carried out in a controlled environment.

While ground shooting of deer is labour intensive, the deer control program at the Yarra Ranges is particularly resource heavy due to the level of visitation within the program area. The program runs every week with the exception of school holidays between April and November. Parks Victoria staff spend approximately one day per week planning operations, and an additional four staff days per week are spent in operational roles. Staff are also required to operate outside of usual business hours which can affect other park operations. In the 2015-16 financial year, the Sporting Shooters’ Association of Australia, in combination with the Australian Deer Association, volunteered 1,525 hours to this project.

Recent data from spotlight counts indicate that a reduction in the deer population density is being achieved in both Yellingbo Nature Conservation Reserve and Warramate Hills Nature Conservation Reserve, however, deer populations at the Dandenong Ranges National Park (Sherbrooke) remains relatively stable. A reduction in the density of the population suggests a reduction in the impacts of the deer population. Anecdotal evidence from local staff indicates a reduction in impacts on waterways and vegetation communities in the area.
Section Eight. Application of Accredited Volunteer Shooter Partnership Programs for Other Invasive Animal Species

8.1 Use of Accredited Volunteer Shooter Partnerships for the Control of Other Invasive Animals

Parks Victoria currently enters into agreements with accredited volunteer shooters organisations for the ground shooting of invasive species in addition to deer, such as foxes, rabbits, pigs and goats. These programs follow a similar approach as the deer programs as they are applied in a targeted and strategic way as part of larger integrated control programs. Other techniques used to control pest species as part of planned and integrated programs include baiting, trapping, aerial shooting and warren and harbour destruction.

The humaneness of shooting as a control technique depends almost entirely on the skill and judgement of the shooter. If properly carried out, it is one of the most humane methods of killing feral animals. On the other hand, if inexpertly carried out, shooting can result in wounding which may cause considerable pain and suffering.

To ensure safety, humaneness and efficacy, partner volunteers must demonstrate certain skills such as marksmanship through an accreditation program. Volunteers are also trained in firearm safety and handling, wildlife appreciation and management, map reading, navigation, ethical hunting and first-aid. Members of community hunting organisations must also be authorised to use firearms within areas managed under the National Parks Act 1975.

In the 2015-16 financial year, government funding supported the Sporting Shooters’ Association of Australia’s contribution of 5,259 volunteer hours in pest animal control programs at Plenty Gorge Park, Point Cook Coastal Park, Werribee Park, the Dandenong Ranges National Park, Sherbrook Forest, Warramate Hills Nature Conservation Reserve, Yellingbo Nature Conservation Reserve, Point Nepean National Park, Murray Sunset National Park, Bendigo Reserves, Wallaby Gully Nature Conservation Reserve, Barmah National Park, the You Yangs Regional Park, Serendip Sanctuary, Mt Napier State Park, Jervis Creek Regional Park, Mt Mittamatite Regional Park, Wilsons Promontory National Park, the Alpine National Park, and Warrandyte-Kinglake Nature Conservation Reserve. The programs were predominantly focused on the control of rabbits, feral goats, foxes and deer.

The case study examples below illustrate an integrated approach to pest animal control using both accredited community hunting organisations and individuals in the control of invasive animals on Crown land.
Case Study 6. Integrated approach to feral goat control in the Mallee parks

The Murray Sunset National Park in the state’s north-west is Victoria’s largest national park at 666,000 hectares. Over the years, there have been a number of goat control programs conducted in the Mallee parks. During this time a variety of methods have been trialled to determine the most effective method of control. Some of these techniques include ground shooting by contractors or Parks Victoria staff which proved prohibitive financially and in terms of available resources. Mustering by contractors has previously been trialled with limited success due to inaccessible terrain, the size of target area and an unsuitable goat density. Trapping by staff and contractors has also been trialled. This method has proved useful to capture Judas goats to assist with other control techniques but has shown to be otherwise too labour intensive.

Ground shooting by the Sporting Shooters’ Association of Australia accredited volunteers in conjunction with Parks Victoria staff has previously been effective in easily accessible areas of park, removing 7000 goats between 2002 and 2014. The collaborative effort between the two organisations has delivered strong results, is cost effective and has strengthened the partnership between the two organisations.

The limitations of ground shooting in this instance were that it was labour intensive and ineffective in remote areas of the park. Given the remote landscape and inaccessibility of large areas of the park; it became evident after several years that ground shooting alone could not address the threat from goats to threatened woodland communities.

Aerial shooting was then introduced to complement the ground shooting program. A commercial operator that met the requirements of the State Aircraft Services Unit and standard operating procedure was required to conduct the aerial operation. Utilising aerial control was considered effective within remote and inaccessible areas of the Mallee parks. A well planned integrated approach that included aerial shooting, ground shooting and the use of Judas goats to track remaining herds, has been the most effective way to reduce grazing pressure on susceptible vegetation types.

Future aerial surveys as well as vegetation condition assessments will determine the overall effectiveness of the program. A Feral Goat Strategy is also being developed for the cost-effective, long term control of feral goats on public land in the north west of the state. The strategy aims to identify preferred control methods, target areas and options to monitor goat impacts as well as population survey methods.

Parks Victoria intends to continue the integrated approach, including the partnership program in the Murray Sunset National Park and aims to extend the program into nearby Hattah-Kulkyne National Park.
Case Study 7. Warby Range feral goat eradication project

Recently Parks Victoria conducted a feral goat control program in the Warby Range for the specific biodiversity objective of protecting the Granitic Hill Woodlands vegetation community from grazing and associated impacts on she-oak recruitment. The aim of the Warby Range Goat Control program was eradication. Localised eradication was considered achievable given the knowledge of the population’s extent and relatively small size. Eradication often requires the intense management of a small number of remaining individuals, with a relatively high cost per animal. However, this up-front cost is offset by not requiring any future investment, other than monitoring to ensure re-incursion has not occurred, to manage the impacts of an increasing or expanding population.

Ground shooting through both professional shooters and accredited volunteer shooters with Sporting Shooters’ Association of Australia members was trialled over a number of years. It was successful in reducing the number of goats however it proved difficult to achieve eradication with effort per kill increasing as goat numbers decreased. Remote camera surveillance was then undertaken to gain intelligence of goat numbers and movements.

A feasibility study was commissioned into potential techniques and aerial shooting was recommended as the most appropriate once numbers had been reduced and estimated at <30. The relative openness of the stringybark dominated canopy allowed shooting to be successful from the air.

NSW National Parks and Wildlife Service were engaged to undertake the aerial shooting based on their experience in delivering similar programs in NSW. The program was successful and after two years of monitoring following the program, the initial aim of localised eradication was considered achieved.

Case Study 8. Werribee Park rabbit control program

The aim of the rabbit control program at Werribee Park is to significantly reduce the rabbit population to manageable levels. The objective was based around the biosecurity approach of asset protection to protect the historical formal gardens and surrounds at Werribee Park.

Between 2006 and 2012 a rabbit baiting program, considered to be the most effective form of rabbit control at the time, was conducted. Pindone laced carrots and oats were laid throughout all areas of the park twice a year.

The baiting program was very limited in terms of where baiting could occur due to safety implications for park visitors. Due to visitation increasing significantly over the years, the associated risk to park visitors grew, diminishing the effectiveness of the program. Rabbit control during this period was not effective and rabbits continued to cause significant damage.

Since 2012, a number of alternatives to baiting were adopted. These included the removal of all known rabbit warrens, harbour destruction within the park, the introduction of rabbit proof fencing, ferreting and trapping, and a ground shooting program conducted in collaboration with the Sporting Shooters’ Association of Australia. This integrated approach has proved to be far more effective to reduce rabbit numbers, more cost effective and able to cover a greater area of the park. The shooting program is conducted when the park is closed without visitors present, ensuring the safety of the general public.

Overall, the integrated control strategy has proved highly successful in reducing the rabbit population to a level well below the period in which Pindone baiting was carried out alone. Rabbit densities are now very low, and as a result, the risk to heritage assets has been significantly reduced and the safety risk of the operation to the public has now been diminished. The program and partnership between Parks Victoria and the Sporting Shooters’ Association of Australia at Werribee Park has been successful in significantly reducing rabbit numbers and asset destruction.
8.2 Considerations with the Application of Accredited Volunteer Shooter Partnership Programs for other Invasive Animal Species

The ground shooting of invasive animals on Crown land by accredited volunteer shooters in partnership with Parks Victoria is effective in achieving biodiversity outcomes when it is strategic, targeted and part of an integrated management approach. Generally, opportunistic or ad hoc ground shooting is an ineffective means of invasive animal control.

Developing and implementing partnerships with accredited volunteer shooters does come at a cost, to both the volunteers through accreditation, training and operational expenses, and to Parks Victoria through planning, supervision, monitoring and compliance costs. It is therefore important that these types of programs are strategically targeted where management objectives can be met.

The application of partnerships with accredited volunteer shooters is likely to be variable depending on where it is practical and cost-effective for them to be involved. For instance, volunteer shooting organisations generally have a greater capacity to assist with programs in the metropolitan area, rather than in remote areas. Contracted professional shooters may be required to control invasive animals on Crown land in certain situations that require specific skills or where accredited volunteer shooters are unavailable. The Snowy River goat eradication program is an example of where professional shooters were engaged for their specific skill to control goats in remote areas of steep and difficult terrain.

The use of accredited volunteer shooters in partnership with Parks Victoria has been expanded effectively to other invasive species such as goats, rabbits and foxes. However, there are practical limits to the types of invasive species that can be included in such an approach. For example, it would be inappropriate to target feral cats given the current restrictions on the destruction of cats in Victoria.

The application of the approach also needs to consider potential conflict with other types of Crown land use. For example, with visitor safety being paramount, Wilsons Promontory National Park was closed for three days in August 2015 to conduct the ground shooting of deer. For the national parks estate, management plans are typically used as the instrument by which, following comprehensive consultation with the community, the complexities of differing land use requirements are resolved.

Accredited volunteer shooters currently operate in partnership with Parks Victoria on the parks and conservation estate. Opportunity may exist for application of the approach on other Crown land, such as state forest, in recognition of the value of a landscape scale approach to the control of invasive animals.
Section Nine. Emerging Issues

This section summarises the key emerging invasive animal issues in Victoria. Further detail of the emerging issues can be found in Attachment 16

- **Range expansion of fallow deer in Victoria.** The distribution and expansion of deer populations in Victoria has been documented (Attachments 17 & 18). These reports identify how different species of deer have spread with time. They also highlight that a biosecurity approach would suggest that interventions are required to stop fallow deer becoming established in multiple locations across the state (particularly in western Victoria) and that the translocation of species is a problem.

- **Feral pigs.** Feral pigs have a significant impact on the natural environment, and are considered to be expanding their range in Victoria.

- **Feral goats.** Feral goats cause considerable environmental impacts in Victoria. The control of feral goats for the protection of biodiversity values is relatively new business for Crown land managers. Discrete populations of feral goats may be eradicable using a range of integrated control techniques.

- **Feral cats.** There is increasing recognition of the impact of feral cats on threatened wildlife and biodiversity in Victoria. DELWP is coordinating a cross departmental review of Victoria’s jurisdictional arrangements that may support the management and control of feral cats in Victoria for the protection of threatened wildlife and key biodiversity values.

- **Invasive marine species.** Crown land also includes the marine and freshwater environments, and these habitats are susceptible to the negative impacts of invasive species. Increasing trade, transport and tourism, have greatly expanded the numbers of marine organisms that are moved around the world.

- **Invertebrates.** DEDJTR manages the risks and incursions of both vertebrate and invertebrate invasive species. For example, globalisation of trade and commerce has accelerated the spread of a subset of seven species of ants – the ‘tramp’ ants – widely beyond their areas of origin.

- **Reptiles and amphibians.** Reptiles and amphibians, such as the cane toad, are typically, successful invaders as they are small or secretive, which allows undetected movement in transportation networks.

- **Feral horses.** The impacts of feral horses in Victoria is being investigated to identify the nature and scale of any response required to manage any impacts and the appropriate control techniques available. This work is being completed in recognition of the place feral horses hold in Australian folklore and our obligations to protect National Parks for current and future generations.