2010-2015

Glenelg Hopkins
INVASIVE ANIMAL STRATEGY

Glenelg Hopkins CMA

Protecting our future - Naturally

Contents

ACKNOWLEDGEMENTS

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Photos courtesy of: Linda Jemmett, Bob McPherson, Jarred Obst and Department of Primary Industries.

Summary

Effective invasive animal management is a key element in improving the economic, social and environmental wellbeing of the Glenelg Hopkins community.

Prevention, early intervention and eradication, reduction and containment and asset based protection are the key strategies for invasive animal management that are outlined in the Strategy and reflected in the development of regional goals. The Strategy also highlights the need for integration of invasive animal management with sustainable agriculture and other natural resource management activities, and the importance of partnerships, co-investment and community capacity building in order to achieve these goals.

The key strategies involve a combination of species-led and site-led management approaches which aim to protect assets from both potential or emerging invasive animal threats and existing invasive animal populations. A biosecurity framework for preparedness, surveillance, risk assessment and response takes into account potential invasiveness and pathways to invasive animal establishment, and will equip the region to deal with any emerging invasive animal issues.

The *Glenelg Hopkins Regional Invasive Animal Strategy* includes key assets for protection as well as other assets that do not have such a high risk rating. The Strategy also provides guidance for stakeholders and the general community in tackling invasive animals, and outlines the investment principles which will guide government investment and determine the costs and benefits in implementing the various strategies.

The Strategy compliments other natural resource management strategies, and is aligned to the *Biosecurity Strategy for Victoria, Victoria's Invasive Plants* and *Animals Policy Framework* and *Glenelg Hopkins Regional Catchment Strategy* so that key sustainability and biosecurity goals can be met. It has incorporated public and private land manager views on invasive animal management through a stakeholder and community consultation process.

In determining the effectiveness of implementation of the Strategy, a monitoring and evaluation program is an integral part of the document and will assist in undertaking future opportunities for improvement in invasive animal management in the region.

***Photo:** Bob McPherson*

GSDM 10198 June 2011

1. Introduction

The Glenelg Hopkins Regional Invasive Animal Strategy is a sub-strategy of the Glenelg Hopkins Regional Catchment Strategy (RCS) that aims to improve the health of the region's natural assets.

In accordance with the *Invasive Plants and Animals Policy Framework*, the *Glenelg Hopkins Regional Invasive Animal Strategy* aims to:

1. prevent the introduction and establishment of new high risk invasive animals in the region, and;
2. reduce the impact of established invasive animals on key environmental, economic and social assets in accordance with the priorities of the Regional Catchment Strategy.

To achieve this, the Strategy contains a series of principles, goals and actions to guide government and community investment in invasive animal management. These have been developed in line with the Invasive Plants and Animals Policy Framework which describes the Victorian Government's objectives and biosecurity approach to invasive plant and animal management on public and private land.

The scope of the Strategy includes terrestrial and freshwater invasive animals that have impact upon environmental, economic and/or social assets with the Glenelg Hopkins region.

Species included within this Strategy are:

- Any organisms that are, or can be, declared under the *Catchment and Land Protection Act 1994 (CaLP Act)* and includes those not specifically mentioned in this Strategy
- Those that are an environmental or agricultural invasive and currently have a resourced control program. Refer to Appendix 1 for a detailed description of these species.

Species excluded from this Strategy are:

- Invertebrates and micro-organisms
  - most are managed through Victorian Government in accordance with the *Plant Health and Plant Products Act 1995*.
- All animal species that are Australian natives
- Animals that are listed under section 10(1) of the *Flora and Fauna Guarantee Act 1988* or declared to be threatened wildlife or notable wildlife under the *Wildlife Act 1975* - these cannot be declared under the *Conservation and Land Protection (CaLP) Act*.

The Strategy provides a framework to guide regional and local initiatives and activities that manage invasive animal problems and protect assets in the Glenelg Hopkins region. This Strategy recognises the vital role that industry and community play in the prevention and management of invasive animals. While primarily the Strategy serves to strategically guide government investment in invasive management both now and into the future, it is also an important guide for industry and community so that effective partnerships to tackle invasive animal management may be maintained and/or created.

The Strategy provides direction for all land managers in the catchment to aid them in meeting their duty of care in invasive animal management. This Strategy also recognises the legislative requirements of both private and public land managers for biodiversity protection and encourages a tenure blind approach to invasive animal management in the region (refer to Appendix 2 for a summary of legislation).

2. Invasive Animal Management in the Glenelg Hopkins Region

Invasive animal - an animal that has, or has the potential to have, a detrimental effect on economic, social or environmental assets.

Invasive animals declared under the *CaLP Act* such as rabbits and foxes are well established in the Glenelg Hopkins region. Feral goats, carp and pigs are also present in the region, yet in smaller isolated populations. These declared invasive animals in the region have caused widespread economic and environmental impact and have significant potential for further impact.

Aquatic invasive species will be covered in greater detail in Glenelg Hopkins Catchment Management Authority's regional strategy for Healthy Rivers and Wetlands.

Other invasive animals not declared under the *CaLP Act* such as feral cats and feral deer are also impacting negatively on specific environments and native fauna and flora species in the region.

Collectively these species cost many millions of dollars per year in lost production and degradation of the environment. Further millions are spent by landholders and government authorities in attempts to minimise the impacts of these invasive species. Appendix 3 contains information regarding current government funded programs and the delivery agency. This information is not exhaustive but demonstrates that active intervention is occurring and also provides opportunities for complimentary works on public and private land.

Not yet established in the wild in Victoria, the Red-eared slider turtle is a High Risk Invasive Animal that has the potential to become a significant environmental pest.

Responsibility for Managing Invasive Animals

Land owners, waterway managers, public land managers, industry, local government, catchment management authorities, Victorian Government and the community all have a legislated role to play in combating invasive animals in the region.

The most relevant piece of legislation is the *CaLP Act* where one of the main objectives of this legislation is to protect primary production, Crown land, the environment and community health from the effects of invasive animals. Specifically, the *CaLP Act* states that land managers of both public and private land are responsible for managing invasive animals on their land by taking all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;
- Prevent the spread of, and as far as possible eradicate, established invasive animals.

Declared established invasive animals are those animals that have established in the wild and pose a threat to the environment, primary production and community health in Victoria. Established invasive animals in Victoria are rabbits, hares, foxes, wild dogs, feral pigs and feral goats.

The *Act* also contains restrictions that apply to the importation, keeping, sale and distribution of declared invasive animals in Victoria. Declared invasive animals as well as undeclared high risk invasive animals pose a threat to the environment, primary production and community health, e.g. reptiles, cane toads and monkeys.

Apart from established invasive animals, there are three other categories of declared invasive animals to which these restrictions apply – prohibited, controlled and regulated. See the Glossary for definitions of each of these invasive animal categories.

3. Principles and Approaches to Invasive Animal Management

The series of principles, goals and actions detailed in the following sections are to guide government and community investment in invasive animal management.

These have been developed in line with the *Biosecurity Strategy for Victoria* and the Invasive Plant and Animals Policy Framework which describes the Victorian Government's objectives and biosecurity approach to invasive plant and animal management on public and private land.

Policy Principles

Principle 1

The Glenelg Hopkins Regional Invasive Animal Strategy aligns with the RCS and the Invasive Plants and Animals (IPA) Policy Framework. The Strategy also aligns with other relevant state policies and current national strategies for invasive management.

Principles consistent with the IPA Policy Framework are:

- Managers of land and water resources have a significant role in invasive management;
- The effective management of invasive species requires an integrated approach as part of the broader management of land and water resources;
- Prevention and early intervention provide the most cost-effective means of invasive management;
- A duty of care operates for all land and water managers;
- Invasive management should occur within a biosecurity risk management framework.

Scientific Management Principles

Principle 2

The highest priority for invasive management is the prevention of, and early intervention in, the establishment of new and emerging invasive species.

Principle 3

An asset-based approach must be adopted for widespread invasive species.

Principle 4

Transparent, scientific, evidence-based decision making tools or criteria for setting priorities, including risk management, must be employed.

Principle 5

A 'whole of landscape approach' must be taken to ensure coordinated action across land tenures.

Principle 6

Effective long-term solutions must address the cause of invasive invasion, not just the symptoms.

Principle 7

Invasive management programs must be integrated with the broader management of land and water resources.

Principle 8

An outcomes-based approach to monitoring, evaluation and reporting should be adopted.

Principle 9

Management responses should be guided by consideration of the role of government, industry and community. This includes consideration of:

- Existence of market failure (public goods, externalities and potential spill-over benefits).
- Whether the level of private and government co-investment reflects the potential beneficiaries of the response,
- Whether the economic, environmental and social benefits of the proposed project significantly outweigh the costs.

Stakeholder Engagement Principles

Principle 10

The roles and responsibilities of key stakeholders, including both public and private land and water resource managers, must be clearly identified.

Principle 11

Activities for improving regional coordination and the engagement of all stakeholders in the ownership of invasive management and partnership opportunities should be described.

4. General Invasive Animal Management Approaches

During their establishment, invasive animals typically follow a form of the biological invasion curve (Figure 1). This invasion curve is useful in determining the purpose of an invasive animal management program.

Preventing the introduction and spread of invasive animals into a region is the most cost effective technique for managing invasive animals. For this situation, a "species-led" approach should be applied. The control of restricted invasive animals falls into this management approach.

As an invasive animal infestation enlarges, it is less likely that the species will be able to be eradicated. At this point, containment of the species to limit its further spread may provide the best value for investment. Containment involves the suppression of the core infestation, whilst eliminating satellite infestations and may also involve management of spread pathways.

For widely established invasive animals in the region, the focus for management is on reducing their impact on high value assets (this is done in alignment with the priorities of the regional asset plans, e.g. native vegetation, river health, wetlands, etc). This is known as "asset based protection". This management approach is appropriate when the invasive animal infestation becomes widely established and it is not cost-effective (or feasible) to manage the infestation across the entire region.

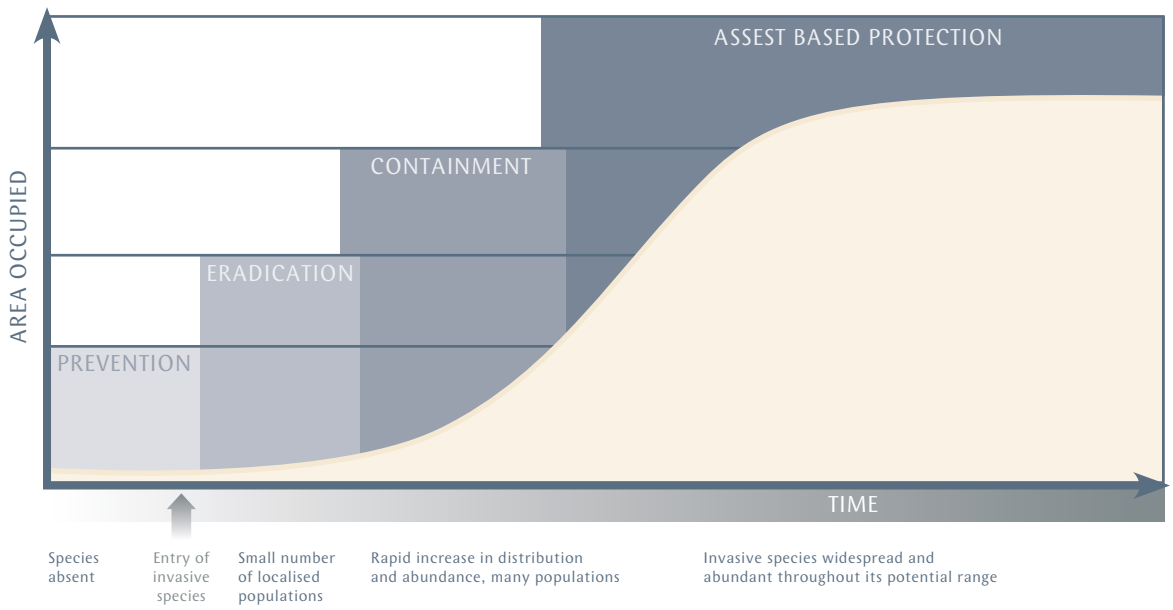

Figure 1. *Invasion graph indicating stages of expansion of a new species*

5. Principles for Government Investment in Invasive Animal Management

Victoria's Invasive Plants and Animals Policy Framework follows a "biosecurity" approach to prioritising and funding invasive animal management programs. Under the biosecurity approach the prevention of new and emerging invasive species is the highest priority identified for management within this Invasive Strategy. This approach seeks to optimise community benefit by producing the best return for government investment. Generally, priority will be given to programs preventing the introduction or eradication of newly establishing species, over containment programs to reduce the impact of established species on priority assets, as this approach provides the greatest public benefit.

The Asset-based Protection approach is adopted once a species has become so widespread, that prevention, eradication or containment are no longer feasible options. Efforts are focused on the protection of high value assets from the degrading impacts of the invasive animal.

There are many invasive animal species which pose an unacceptable risk due to their ability to adapt to Australian environmental conditions, and their breeding capacity. Their accidental or deliberate release could subsequently cause significant environmental and economic damage as well as threatening public health and safety.

Government support to a species-led management program may be available for programs that:

- achieve preparedness, prevention and eradication
- achieve containment of the invasive animal population in the targeted area
- are well coordinated and community-driven and;
- provide significant public benefit

Government investment in asset-based protection is based on a comparison of the costs and benefits associated with each site.
This analysis involves identifying the:

- value of the assets to be protected
- level of risk to the assets
- practicality of completing the desired level of control and;
- return for government investment

It is also appropriate for Government to intervene in situations to address market failure.

6. Identified Assets for Invasive Animal Management

The assets identified are naturally occurring resources that occur at a specific location. They provide an economic, environmental or social service for the people, plants or animals living with the Glenelg Hopkins CMA region. For example threatened flora and fauna or water quality rather than the location it exists within, however for the purposes of this Strategy, these assets are referred to by the location.

Not all assets can be considered within this Strategy due to limited time frames and financial resources. To enable a smaller subset to be considered a working group undertook identification and assessment of assets throughout the region. The working group who assisted with identifying assets had representatives from the Department of Sustainability and Environment (DSE), Department of Primary Industries (DPI), Parks Victoria (PV) and Local Government (for a limited time).

Forty assets were identified through consideration of the documented threats posed by invasive animals and assessment of the level of risk if no action was to be taken in the next five years. For example these assets can include, but not limited to, threatened fauna or flora at threat of predation, high priority watershed catchments where rabbit grazing exacerbates soil erosion increasing sediment and nutrient levels in the waterways or heritage rivers threatened by erosion or sedimentation caused by carp.

This has not been a detailed assessment and will require more interrogation in future reviews of this Strategy however the assets within this Strategy have been included with confidence by experts within the region.

It is not possible to invest in all 40 assets under threat with the current levels of funds available, however, in the shorter term, it is possible to direct resources to those assets that were considered key asset areas within the region. To assist with identifying key assets within the region an assessment of all 40 assets under threat from invasive animals was undertaken.

6. Identified Assets for Invasive Animal Management (continued)

Prioritisation of these assets involved a scoring system based around three criteria that have been adopted from the East Gippsland process of prioritisation for their Invasive Plants and Animals Strategy.

The criteria were:

1. Significance of the asset/management unit: Is the asset of exceptional, very high or high value? The value of an asset was based on the level of recognition of its importance, e.g. international, national, state, regional or local level.
2. The level of threat to that asset, and the anticipated impact of those threats: To what extent will the values of the asset be impacted by invasive animals if there is no active management in the next five years?
3. The feasibility of managing those threats: Are there known actions that can be implemented immediately to reduce the impact of the invasive animal?

The outcome of the process described above was the identification of six key assets. These are Belfast Coastal Reserve (Hooded Plover, Orange Bellied Parrot and shorebird nesting sites), Eumerella or Yambuk Coastal Reserve including Yambuk Lake area, Grampians National Park, Black Range State Park, Long Swamp and Lower Merri Estuary.

Rather than describe and spatially map all assets, including those listed above, they are grouped according to type and their broad geographic location which also loosely fits with basins described in the RCS. These groups are Glenelg River (sections) and its' tributaries, Greater Grampians, North West Glenelg Public Land, Far South West Public Land, Coastal Zone and Upper Hopkins Catchment. The associated assets and key assets are described in the tables below.

Dispersed assets are those assets that are either too small for meaningful spatial representation or are many and fragmented and spread widely throughout the landscape. Dispersed assets of high value at risk from invasive animals will be considered for protection on a 'case by case' basis in response to reports of invasive animal impact. Dispersed assets could include high value flora and fauna species and communities such as Natural Temperate Grasslands in the Victorian Volcanic Plains, wetlands or other environmental assets.

Figure 2 (below) provides an overall spatial representation of all 40 assets identified including the six key priority assets within the region.

Figure 2. *High value assets identified as being at threat from pest animals within the Glenelg Hopkins region.*

Sections of Glenelg River and its Tributaries

Asset	The priority sections of the Glenelg River are from the Rocklands Reservoir to Casterton, and Dartmoor to the sea including the Glenelg Estuary. The priority tributaries are the Wannon River from Dwyers Creek to Falls, Bryan Creek, Mathers Creek, Wando Creek and the lower sections of the Crawford and Stokes Rivers. No key assets are within this area.
Land tenure	Private and public land.
Values under threat from invasive animals	Flagship area (as identified by State Government), Heritage River, water quality, riparian and remnant vegetation, economic and recreational.
Threats	Within the waterway catchment rabbit grazing exacerbates soil erosion increasing sediment and nutrient levels in the waterways. Rabbit grazing also reduces the quality of riparian vegetation which results in impacts upon native species diversity and abundance as well as water quality. Carp increase turbidity and compete with native fish for food and habitat.
Actions	Undertake rabbit control in catchment areas and areas of high value riparian and remnant vegetation. Continue carp monitoring and carp control.
Monitoring	Monitor each invasive animal control project to asses its' success against performance indicators and targets. These results are to be used to prepare CMA reports on the progress of the Glenelg Hopkins Invasive Animal Strategy to inform future management actions to improve resource condition.

Glenelg River Mouth

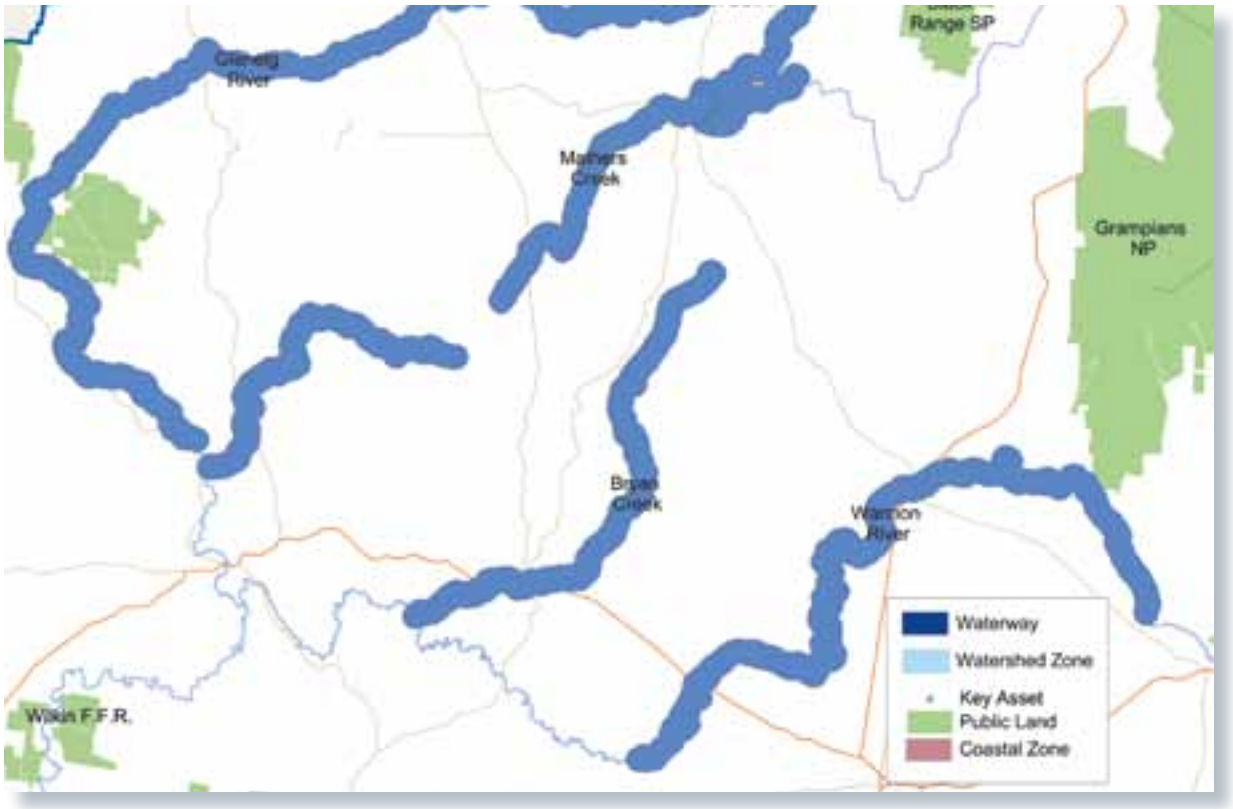

Figure 3. Rocklands Reservoir to Casterton, Bryan Creek, Mathers Creek and Wando Creek identified as priority waterways of the Glenelg catchment within the Glenelg Hopkins region.

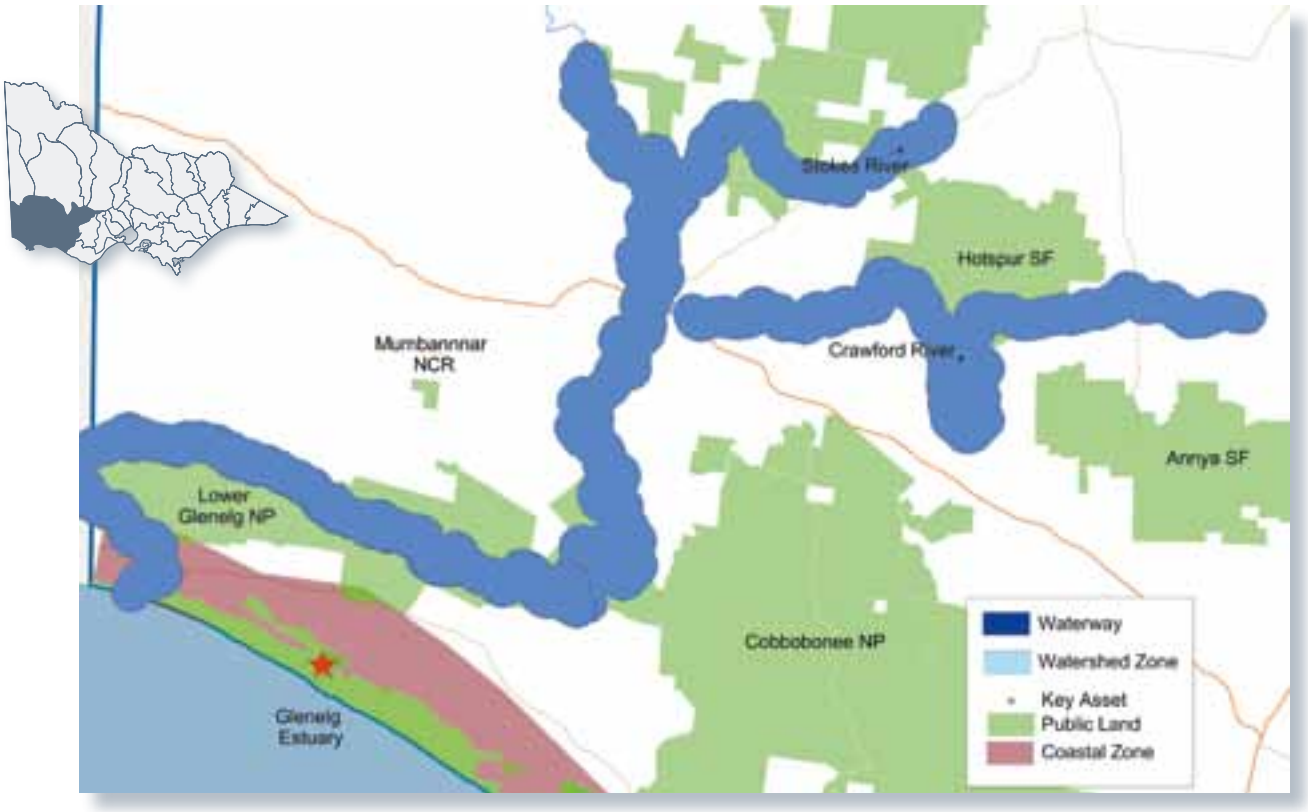

Figure 4. Glenelg River (Dartmoor to the sea), lower sections of Crawford and Stokes Rivers identified as assets of Glenelg catchment within the Glenelg Hopkins region.

Greater Grampians

Asset	The Greater Grampians assets are within the northern Glenelg area and include Grampians National Park, Black Range State Park and Victoria Valley. The Grampians National Park and Black Range State Park are Glenelg Hopkins key assets identified for protection from the impact of invasive animals.
Land tenure	Private and public land.
Values under threat from invasive animals	Flagship area, Victoria Valley Biolink area, large areas of intact vegetation providing a wide range of habitats and a dependent diverse range of fauna including threatened species. Threatened Ecological Vegetation Communities (EVCs).
Threats	Fox predation on critical weight range fauna. Rabbit and goat grazing reducing regeneration of threatened EVCs. Carp increase turbidity and compete with native fish for food and habitat.
Actions	Undertake fox control in Grampians National Park and Black Range State Park. Support fox control in Victoria Valley. Undertake rabbit and goat control to protect threatened EVCs.
Monitoring	Monitor each invasive animal control project to assess its' success against performance indicators and targets. These results are to be used to prepare CMA reports on the progress of the Glenelg Hopkins Invasive Animal Strategy to inform future management actions to improve resource condition.

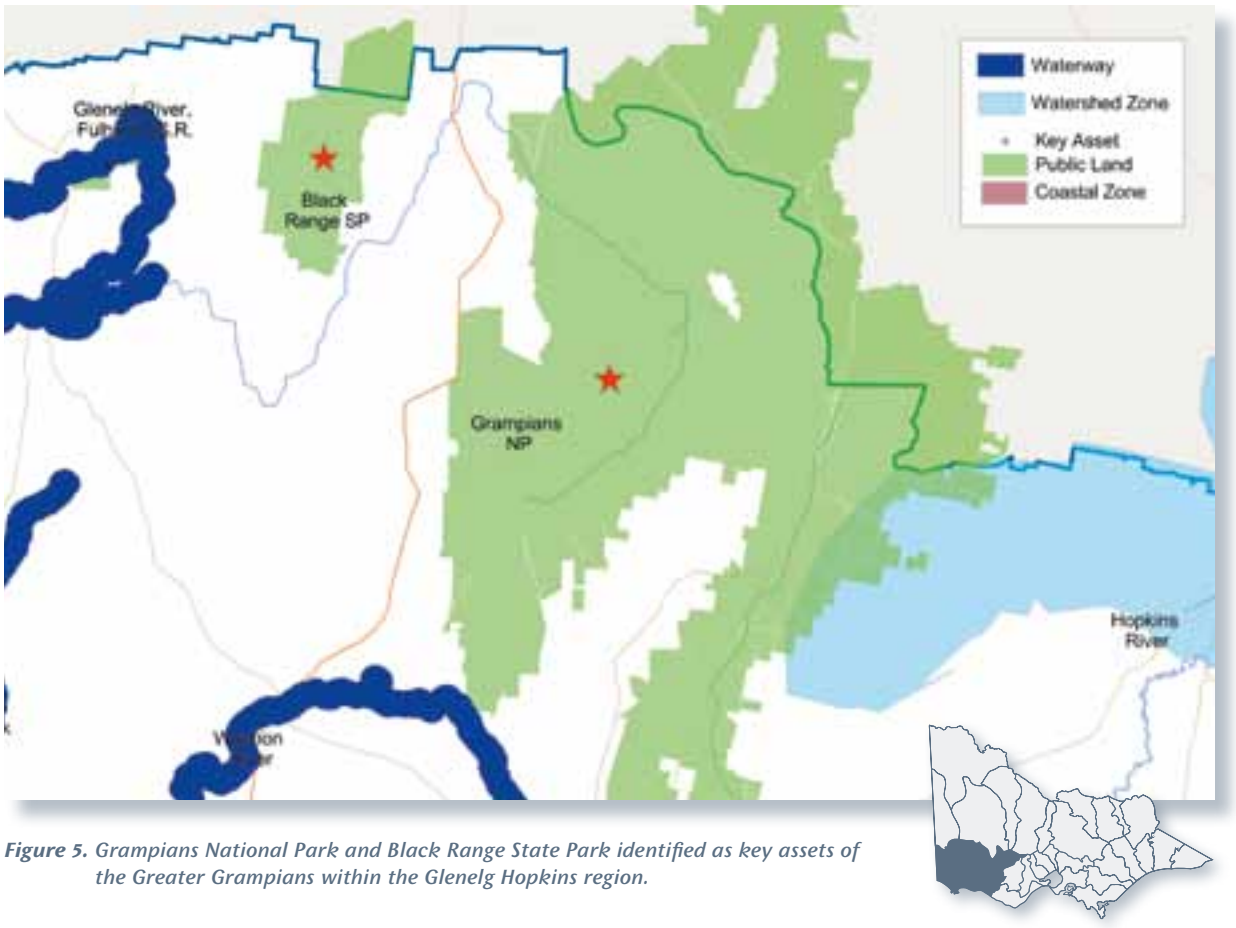

Figure 5. *Grampians National Park and Black Range State Park identified as key assets of the Greater Grampians within the Glenelg Hopkins region.*

North West Glenelg Public Land

Asset	The priority areas within the North West Glenelg Public Land are Dergholm State Park, Tooloy-Lake Mundi Wildlife Reserve, and Wilkin Flora and Fauna Reserve. No key assets are within this area.
Land tenure	Public land.
Values under threat from invasive animals	Threatened EVCs.
Threats	Rabbit grazing reducing regeneration of threatened EVCs.
Actions	Undertake rabbit control to protect threatened EVCs.
Monitoring	Monitor each invasive animal control project to assess its' success against performance indicators and targets. These results are to be used to prepare CMA reports on the progress of the Glenelg Hopkins Invasive Animal Strategy to inform future management actions to improve resource condition.

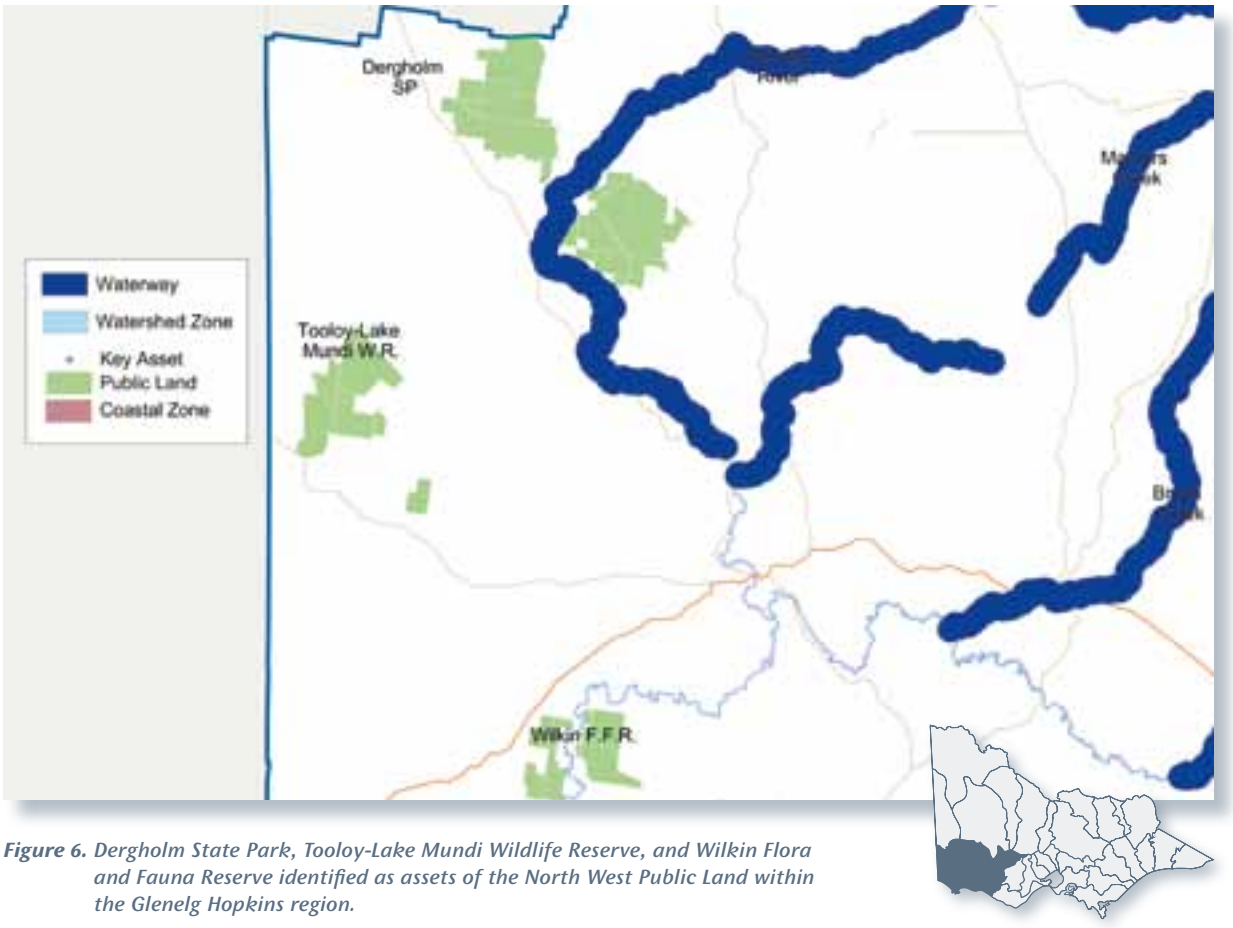

Figure 6. Dergholm State Park, Tooloy-Lake Mundi Wildlife Reserve, and Wilkin Flora and Fauna Reserve identified as assets of the North West Public Land within the Glenelg Hopkins region.

Far South West Public Land

Asset	The priority areas within the Far South West Public Land are the Lower Glenelg National Park, Discovery Bay Coastal Park including Long Swamp, Cobboboonee National Park, Mt Richmond National Park, Narrawong Flora Reserve, Mumbannar Nature Conservation Reserve, Cobboboonee Forest Park, Crawford River Regional Park and Cobboboonee, Weecurra, Hotspur, Annya and Mt Clay State Forests. Long Swamp is a Glenelg Hopkins key asset identified for protection from the impact of invasive animals.
Land tenure	Public land.
Values under threat from invasive animals	Flagship area. Nationally significant wetland. High value aquatic ecosystem. Large area of intact vegetation providing a wide range of habitats and a dependent diverse range of fauna including threatened species. Threatened Ecological Vegetation Communities in Lower Glenelg NP, Discovery Bay CP and Mumbannar NCR.
Threats	Pig grazing reducing regeneration of riparian vegetation and pugging in coastal wetlands. Fox predation of critical weight range fauna. Rabbits grazing reducing regeneration of threatened EVCs, and reducing cover of highly susceptible coastal vegetation.
Actions	Undertake pig control to contain spread and to protect Long Swamp. Undertake fox control on a landscape scale to protect critical weight range fauna. Undertake rabbit control to protect threatened EVCs and coastal vegetation.
Monitoring	Monitor each invasive animal control project to assess its' success against performance indicators and targets. These results are to be used to prepare CMA reports on the progress of the Glenelg Hopkins Invasive Animal Strategy to inform future management actions to improve resource condition.

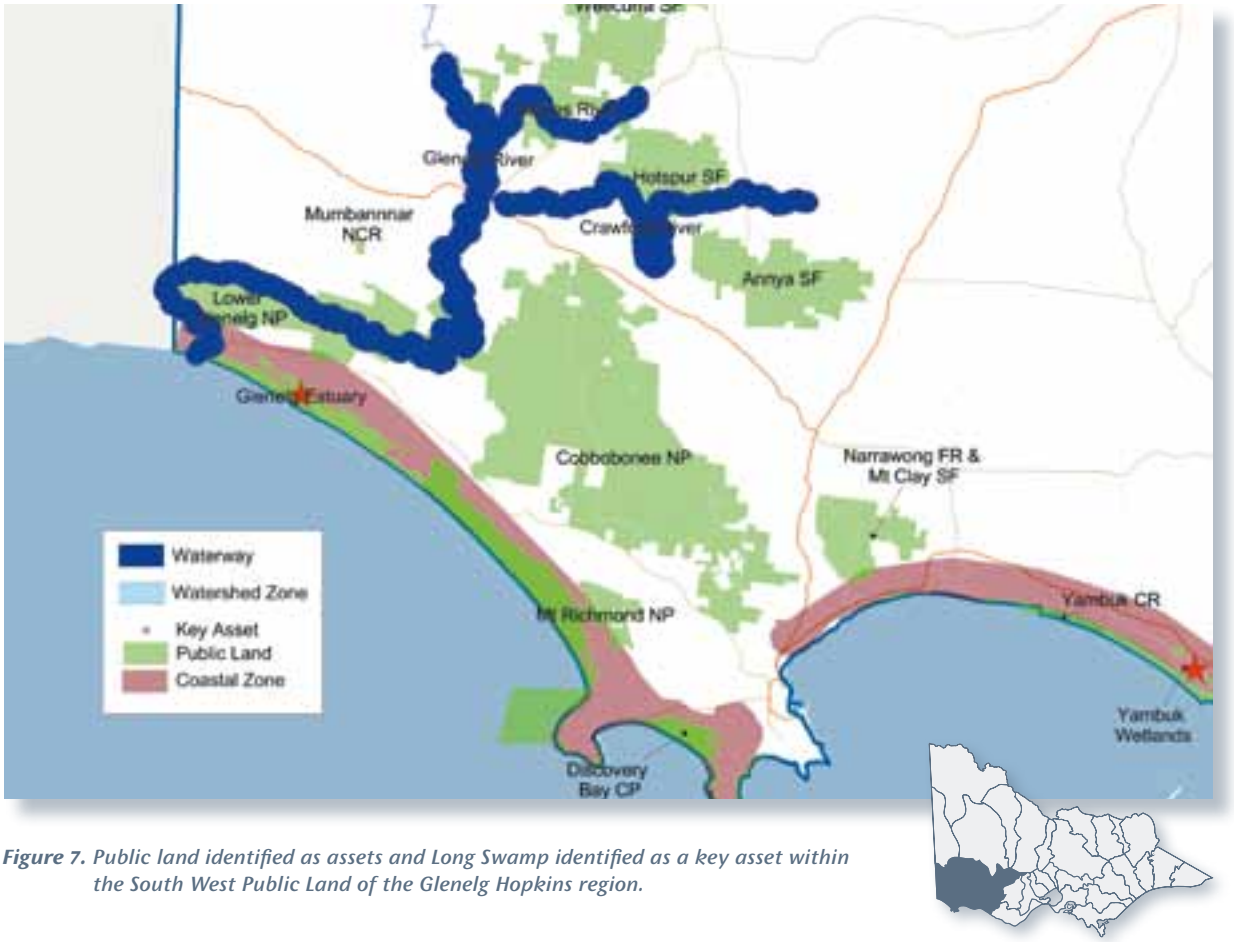

Figure 7. *Public land identified as assets and Long Swamp identified as a key asset within the South West Public Land of the Glenelg Hopkins region.*

Coastal Zone

Asset	The coastal zone is that area described as a diverse range of coastal ecosystem complexes from the Corangamite - Glenelg Hopkins catchment boundary to the South Australian border. Belfast Coastal Reserve, Eumeralla (Yambuk) Coastal Reserve including Yambuk Lake and the Lower Merri Estuary are Glenelg Hopkins key assets identified for protection from the impact of invasive animals. Other discreet assets within the coastal zone include: Hopkins Estuary, Tower Hill Wildlife Reserve and Bay of Islands Coastal Park. (Discovery Bay Coastal Park and the Glenelg Estuary have been included in Far South West Public Land and Glenelg River respectively).
Land tenure	Public and private land.
Values under threat from invasive animals	Orange-bellied Parrot and Hooded Plovers at Belfast Coastal Reserve. Nationally significant habitat values at Yambuk Lake. Threatened EVCs at Bay of Islands CP and Tower Hill WR. Significant revegetation at Tower Hill WR. Threatened birds, iconic coastal birds, riparian vegetation and water quality at the Hopkins Estuary. Coastal native vegetation.
Threats	Fox predation on Orange-bellied Parrot, Hooded Plovers, threatened and iconic coastal birds. Rabbit grazing reducing regeneration of threatened EVCs, and reducing cover of highly susceptible coastal vegetation.
Actions	Undertake fox control at Belfast CR, Lower Merri Estuary and Hopkins Estuary. Support fox control on adjoining private land. Undertake rabbit control to protect threatened EVCs, revegetation at Tower Hill WR and coastal vegetation.
Monitoring	Monitor each invasive animal control project to assess its' success against performance indicators and targets. These results are to be used to prepare CMA report on the progress of the Glenelg Hopkins Invasive Animal Strategy to inform future management actions to improve resource condition.

Figure 8. Belfast Coastal Reserve, Eumeralla (Yambuk) Coastal Reserve including Yambuk Lake and the Lower Merri Estuary identified as key assets along the coastline of the Glenelg Hopkins region.

Upper Hopkins Catchment

Asset	The priority asset is the Upper Hopkins Catchment in the vicinity of Watgania, Ararat and Beaufort. Within this priority asset there are valuable waterways, remnant native vegetation and public land areas with significant values such as: Langi Ghiran State Park, Mt Buangor State Park and Ararat Regional Park. No key assets are within this area.
Land tenure	Public and private land.
Values under threat from invasive animals	Biolink area, water quality, riparian and remnant vegetation, threatened EVCs.
Threats	Within the waterway catchment rabbit grazing exacerbates soil erosion and increases sediment and nutrient levels in the waterways. Rabbit grazing also reduces the quality of riparian vegetation which in-turn impacts on native species diversity and abundance as well as water quality. Rabbit grazing reduces regeneration of threatened EVCs.
Actions	Undertake rabbit control to protect waterway catchments and threatened EVCs. Undertake rabbit control in areas of high value riparian and remnant vegetation.
Monitoring	Monitor each invasive animal control project to assess its' success against performance indicators and targets. These results are to be used to prepare CMA report on the progress of the Glenelg Hopkins Invasive Animal Strategy to inform future management actions to improve resource condition.

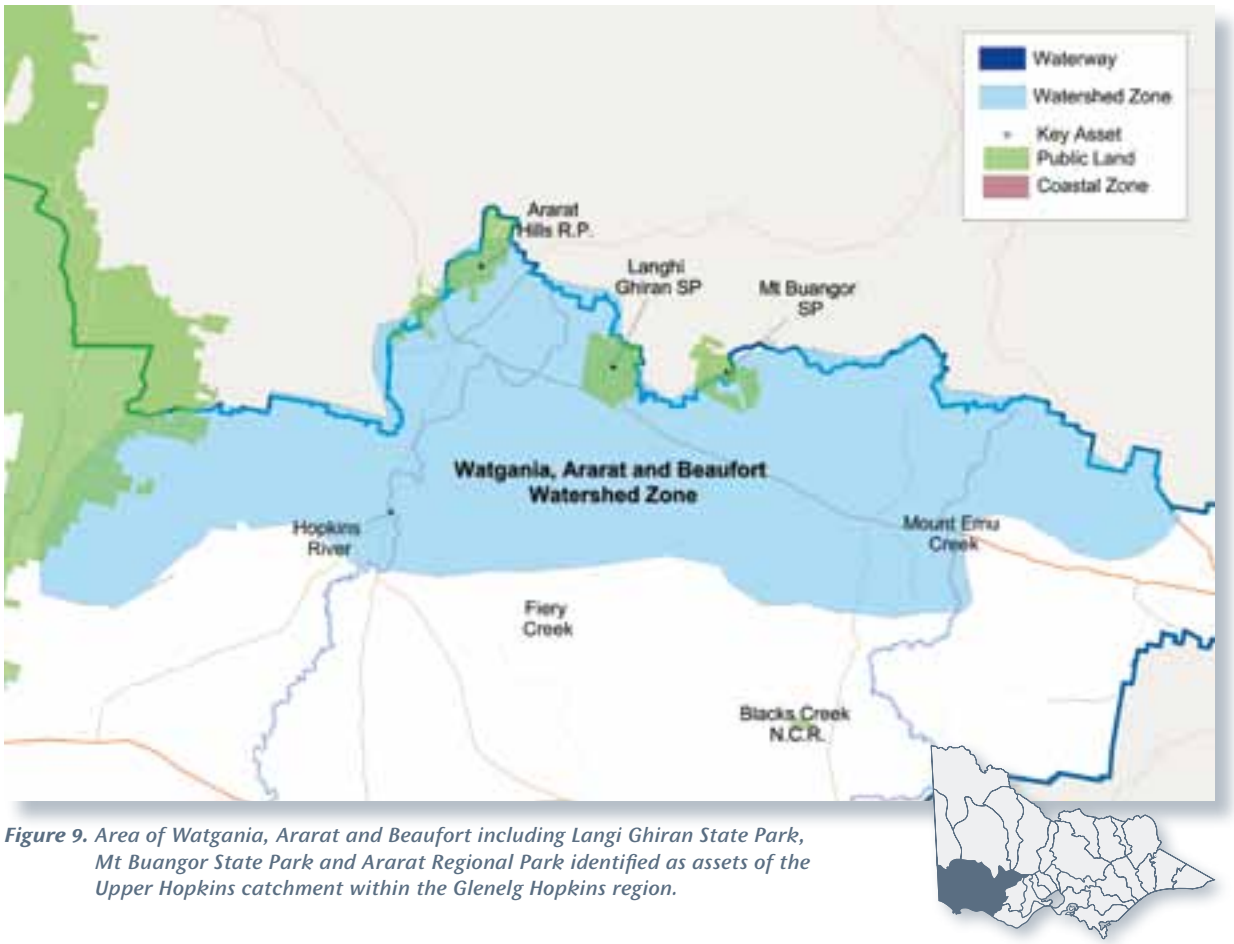

Figure 9. *Area of Watgania, Ararat and Beaufort including Langi Ghiran State Park, Mt Buangor State Park and Ararat Regional Park identified as assets of the Upper Hopkins catchment within the Glenelg Hopkins region.*

7. Goals and Actions of the Regional Invasive Animal Strategy

The aims of the Strategy (see Introduction) will be underpinned by the following goals for invasive animal management in the region:

Goal 1

Support state action to prevent the establishment of new invasive animals into the State.

Objective

To be supportive of statewide programs aimed at preventing the introduction of new invasive animals into the state.

Goal 2

Support statewide programs to eradicate prohibited, controlled and regulated invasive animals and other high risk invasive animals in the wild within Victoria.

Objective

To be supportive of statewide programs aimed at eradicating prohibited, controlled and regulated invasive animals and other high risk invasive animals in the wild within Victoria.

Goal 3

Contain invasive animals currently restricted in distribution but with potential to expand across the region.

Objective

To contain the spread of any identified invasive animals of limited distribution within the whole region.

Goal 4

Protect high value regional assets from the impact of invasive animals.

Objectives

To assess the threat of invasive animals on identified priority assets to determine the feasibility of managing impacts of invasive animals on the priority assets and to apply management as appropriate. To support community led effort in invasive animal management

Goal 5

Integrate invasive animal management with sustainable agriculture and other natural resource management activities.

Goal 6

Improve coordination of invasive animal management across land tenures through increased community capacity and effective partnerships.

Goal 7

Continuous improvement in invasive animal management in the region through effective monitoring, evaluation and reporting.

NOTE: Goals 5 - 6 are integrated with goals 1 - 4 in the following tables.

7. Goals and Actions of the Regional Invasive Animal Strategy (continued)

Goal 1

Support state action to prevent the establishment of new invasive animals into the State, incorporating:

Goal 5 Integrate invasive animal management with sustainable agriculture and other natural resource management activities, and

Goal 6 Improve coordination of invasive animal management across land tenures through increased community capacity and effective partnerships.

Objective

To be supportive of statewide programs aimed at preventing the introduction of new invasive animals into the state.

Preventing new introductions into the region is the primary and most cost-effective way to manage invasive species. It is therefore advisable to implement a holistic approach, including identification of sources and pathways, and interception before entry, to deal with invasive species that are potential invasives but not yet established *(Australian Invasive Animal Strategy, 2007).*

The Victorian Government has a statutory leadership role in the management of high risk invasive animals in Victoria. The High Risk Invasive Animals Program's key investment priorities are to address the prevention of new high risk invasive animals from establishing in Victoria and eradication of high risk invasive animals in the early stage of establishment. These priorities are addressed by:

- surveillance and response
- incursion management
- compliance and extension
- coordination, capacity and capability

The project also provides a comprehensive compliance program for ongoing management of exotic invasive animals in Victoria. A component of the compliance program includes overseeing the commercial keeping of high risk animals such as American Bison, Indian Antelope, Water Buffalo and Llama by using regulator instruments such as mandatory standards and licensing.

In addition, preventing high risk invasive animals from being introduced into the Glenelg Hopkins region involves understanding how each species may be introduced, working with identified industries to help prevent spread and ensuring all known infestations are treated.

Actions	Lead Responsibility	Key Partners
Surveillance and response Develop and implement an effective surveillance, detection and response procedure for reports of new high risk invasive animals involving: • Elimination of high risk invasive animals • Actively investigate reports of high risk invasive animals • Develop a standard operating procedure for surveillance and detection activities	DPI	DSE, Wider community, Industry, AQIS, Interstate agencies, State enforcement agencies
Compliance • Ensure compliance with the *CaLP Act 1994* for the keeping, illegal trade and management of Prohibited, Controlled, Regulated and undeclared high risk invasive animals involving; • Undertake assessments of permit applications	DPI	DSE, Industry, Permit holders
Incursion management Manage the response to incursions of new high risk invasive animals, involving; • Actively manage known incursions of high risk invasive animals Develop incursion plans for high risk invasive animal species	DPI	DSE, contractors, landowners

7. Goals and Actions of the Regional Invasive Animal Strategy (continued)

Goal 2

Support statewide programs (High Risk Invasive Animals Program) to eradicate prohibited, controlled and regulated invasive animals and other high risk invasive animals in the wild within Victoria, incorporating:

Goal 5 Integrate invasive animal management with sustainable agriculture and other natural resource management activities, and

Goal 6 Improve coordination of invasive animal management across land tenures through increased community capacity and effective partnerships.

Objective

To be supportive of statewide programs (High Risk Invasive Animals Program) aimed at eradicating prohibited, controlled and regulated invasive animals and other high risk invasive animals in the wild within Victoria.

Actions	Lead Responsibility	Key Partners
Incursion management DPI Landscape Protection manages the response to incursions of new high risk invasive animals, involving; • Actively manage known incursions of high risk invasive animals	DPI	Landowners/managers Industry, Community, CMA Contractors
Compliance • Collaborate with industry for the eradication of high risk invasive animals • Identify gaps in *CaLP Act* for future changes regarding eradication of high risk invasive animals	DPI	Industry, CMA, DSE

Carp sampling in the Glenelg River tracks the spread of this fish downstream.

7. Goals and Actions of the Regional Invasive Animal Strategy (continued)

Goal 3

Contain invasive animals currently restricted in distribution but with potential to expand across the region, incorporating:

Goal 5 Integrate invasive animal management with sustainable agriculture and other natural resource management activities, and

Goal 6 Improve coordination of invasive animal management across land tenures through increased community capacity and effective partnerships.

Objective

To contain the spread of any identified invasive animals of limited distribution within the whole region.

Currently, there are no invasive animals formally identified for containment. Well established invasive animals such as feral pigs are often beyond eradication in a statewide context, even if they have not reached their full spread potential. Therefore containment may be the most appropriate management option to contain the core infestation and prevent its further spread. The whole community, including government and agencies, all have a role in containing these invasive animals to prevent any further impact on regional assets.

Actions	Lead Responsibility	Key Partners
Implement invasive animal containment programs such as: • Contain the spread of Feral pigs in the Discovery Bay Coastal Park • Contain the spread of Carp in the upper Glenelg River	CMA/PV/DSE	Local Government Community & industry
Monitor and report on the change in boundaries of core infestation of candidate species, the presence of satellite infestations outside of core incursion boundaries and eradication of satellite populations, such as: • Monitor the spread of Feral pigs in the Discovery Bay Coastal Park • Monitor the spread of Carp in the upper Glenelg River	CMA/PV/DSE	Community & industry, DPI

Goal 4

Protect high value regional assets from the impact of invasive animals, incorporating:

Goal 5 Integrate invasive animal management with sustainable agriculture and other natural resource management activities, and

Goal 6 Improve coordination of invasive animal management across land tenures through increased community capacity and effective partnerships.

Objective

- To assess the threat of invasive animals on identified priority assets
- To determine the feasibility of managing impacts of invasive animals on the priority assets and to apply management as appropriate.
- To support community led effort in invasive animal management

7. Goals and Actions of the Regional Invasive Animal Strategy (continued)

To enhance the value of an asset, management of invasives should be considered as part of a holistic approach to restoring an asset. This involves addressing other NRM issues at a site, including restoration activities such as revegetation, to provide for long term maintenance of asset value.

The asset based approach to invasive animal management requires identifying specific locations with the regional assets most in need of protection from the threat of the suite of invasive animals and other threats, and developing appropriate management programs that include invasive animal management components.

Such programs are intended to suppress invasive animal infestations to assist in protection and restoration of the asset.

Cross-tenure approaches are required where the spread of invasive animals occurs across public and private land. Underlying these actions is the need to improve the asset resilience to invasive animal invasion, thereby focusing on the cause rather than the symptom.

Actions	Lead Responsibility	Key Partners
Identify high value regional assets requiring protection from invasive animals and other threatening processes. Assets identified are to be determined based upon the achievability of actions during the life of this Strategy	CMA	PV, DPI, DSE
Develop integrated, cross-tenure management plans to protect priority assets from invasive animals and other threatening processes	CMA, DPI, PV, DSE, Local Government, Community Invasive Management Groups	Community, Landcare Groups, Landcare Networks Industry Peak Bodies, Local Government, VicRoads, Rail Managers
Engage and support all land managers and other relevant stakeholders in development and implementation of integrated cross-tenure management plans	DPI, PV, DSE, CMA, Landcare Networks, Community, Invasive Management Groups, Industry Peak Bodies	Community, Industry, Landcare Groups, Local Government, Landcare Networks, Community Invasive Management Groups, Industry Peak Bodies
Provide enforcement responses, if required, to support implementation of management plans for protection of high value assets	DPI	CMA
Assist community groups to build their invasive animal management capacity	CMA	DSE, Community, PV, Landcare Networks, Community Invasive Management Groups, Industry Peak Bodies, DPI
Monitor and document the impact of target invasive animals on priority public and private land assets	PV, DSE, CMA	Community, DPI
CMA to collate data from all key partners on an annual basis and report annually on progress towards goals and performance indicators	CMA	PV, DPI, DSE
Support and implement the Good Neighbour program with the community to maximize asset protection outcomes	DSE	CMA, PV, DPI, Community, Industry

7. Goals and Actions of the Regional Invasive Animal Strategy (continued)

Goal 7

Continuous improvement in invasive animal management in the region through effective monitoring, evaluation and reporting.

The goals of the Strategy will be assessed against a series of performance indicators.

Monitoring and evaluating this Strategy will enable benchmarks to be established and enable an assessment of the Strategy's actions and effectiveness of the document in regards to compiling an accurate picture of invasive animal management within the Glenelg Hopkins region.

Monitoring and evaluation is to occur on an annual basis to allow adaptive management and accurate directions for the life of the Strategy.

In addition to annual reporting, there will be three and six year reporting on natural resource management performance. The three yearly reports will link performance measures and resource condition. This will provide information for the State of the Environment and Catchment Condition reporting which will be at six yearly intervals (East Gippsland CMA 2010).

Goal	Performance Indicator	Target
Goal 1 Support programs to prevent the introduction of new invasive animals into the state and region	• Number of species with incursion plans (surveillance or eradication)	No new high-risk invasive animal species established in the Glenelg Hopkins region
Goal 2 Support programs aimed at eradication of all wild infestations of prohibited, controlled, regulated and high risk undeclared invasive animals within the state and region	• Number of species and infestation sites under active treatment for eradication • Number of species (if any) considered eradicated according to established criteria • Number of species with eradication plans	All known infestations of all prohibited, controlled, regulated and high risk undeclared invasive animals treated for eradication
Goal 3 Containment of priority established invasive animals to protect regional assets with support from the community-led effort within the region	• Number and list of candidate species for containment • Spatial extent of boundary of core infestation, i.e.: feral pigs • Number of spread pathways under mitigation • Number of new satellite infestations outside the containment line • Number of satellite infestation sites under active treatment • Number of satellite infestation sites eradicated according to established criteria	The spread of priority established invasive animals is contained at 2010 levels
Goal 4 Protection of high value regional assets from the impact of invasive animals	• Number of rabbit control target areas for asset protection • Number of hectares where rabbit warren density has been reduced to less than one active warren entrance per hectare. • Number of fox control target areas for asset protection • Reduce fox density to benefit targeted critical weight range native fauna	Priority regional assets are protected from the impacts of invasive animals

7. Goals and Actions of the Regional Invasive Animal Strategy (continued)

Goal	Performance Indicator	Target
Goal 5 Integrated invasive animal management with sustainable agriculture and other natural resource management activities	• Types of partnerships • Number of integrated projects (DPI, DSE, PV, Community Groups, industry, CMA)	All Glenelg Hopkins CMA project prioritising processes contain an integrated invasive management component
Goal 6 Effective partnerships for coordinated invasive animal management across all land tenures	• Number of co-ordinated invasive animal projects with multiple key stakeholders, for example: Lower Glenelg High Conservation Value Aquatic Ecosystems project	Public and private land managers are engaged in invasive animal management planning, where cross-tenure management is required
Goal 7 Benchmark community capacity for effective long-term control of invasive animals	• Community capacity and understanding of long term invasive control identified and documented • Community capacity levels reviewed annually and programs modified resulting in improved levels of invasive animal control	Annual increase in community capacity to undertake effective long-term control of invasive animals
Goal 8 Effective monitoring, evaluation and reporting of invasive animal management in the Glenelg Hopkins region	• Partners to submit project reports to Glenelg Hopkins CMA detailing progress against performance indicators	Glenelg Hopkins CMA submits annual report to Victorian Government

Landscape protection of assets is a goal of the strategy.

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Acronyms

CaLP	*Catchment and Land Protection Act 1994*
CMA	Catchment Management Authority
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
IPAPF	Invasive Plants and Animals Policy Framework
PV	Parks Victoria
RCS	Regional Catchment Strategy
VPMF	Victorian Pest Management – A Framework for Action
VPARA	Victorian Pest Animal Risk Assessment
IPA	Invasive Plants and Animals
EVC	Ecological Vegetation Class
CP	Coastal Park
NCR	Nature Conservation Reserve
NP	National Park
WR	Water Reserve
CR	Coastal Reserve
AQIS	Australian Quarantine and Inspection Service
GHCMA	Glenelg Hopkins Catchment Management Authority
FFG	Flora and Fauna Guarantee
EPBC	Environmental Protection and Biodiversity Conservation
RHD	rabbit haemorrhagic disease

Glossary

Asset-based approach	Invasive Management programs that are a part of a holistic approach to minimising the impact of a number of threats to a certain defined area of the region or locality.
Biosecurity approach	Biosecurity provides for the protection of the economy, the environment, social amenity and human health from the negative impacts associated with invasive species. It covers the continuum from preparedness, prevention, surveillance, response to and recovery from incursions and outbreaks, and ongoing management of established species.
Duty of Care	A legal obligation placed upon land owners to conserve soil, protect water resources and avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner.
Market failure	The concept that markets do not reflect the societal costs of all economic activity and, in particular, the economic costs imposed on third parties (i.e. by allowing invasives to spread from one property to another, thereby impacting upon another landholder).
Eradication	An invasive animal or plant that has been removed or killed over time and no longer occurs at that site.
Declared Invasive Animal (DPI website note LC0303)	As defined in *Catchment and Land Protection Act 1994*, on the 13th February 1997, declarations within the provisions of the *Catchment and Land Protection Act 1994* came into effect which classified exotic/invasive animals into specific categories depending on the threat particular types of animals pose primary production, Crown land, the environment or community health. Four categories of invasive animals have been declared: Established, Prohibited, Controlled and Regulated Invasive Animals.
Prohibited Invasive Animals (DPI website note LC0303)	As defined in *Catchment and Land Protection Act 1994*. Declared Prohibited Invasive Animals that are widespread and established in Victoria (e.g. rabbits, foxes) and are a serious threat to primary production, Crown land, the environment or community health. Landholders are responsible for preventing the spread and as far as possible eradicating these invasive animals on their land.
Controlled Invasive Animals (DPI website note LC0303)	As defined in *Catchment and Land Protection Act 1994*. Declared Controlled Invasive Animals are those that: did not occur naturally in the wild in Australia before European settlement, and either are a serious threat to primary production, Crown land, the environment or community health in a place outside Victoria; or for which the potential to threaten primary production, Crown land, the environment or community health in Victoria is unknown; and the importation, keeping and sale of those animals should be banned. These species can be kept under an Invasive Animal Research/ Education Collectors Permit only by a VPC Approved Scientific Institution.
Regulated Invasive Animals (DPI website note LC0303)	As defined in *Catchment and Land Protection Act 1994*. Declared Regulated Invasive Animals are those that: did not occur naturally in the wild in Australia before European settlement; and have a high potential to become a serious threat to primary production, Crown land, the environment or community health in a place outside Victoria; and should only be kept in high security collections approved by the Minister. These species can be kept under the following permits: Invasive Animal Research/ Education Collections permit; Invasive Animal Approved Collections (Zoo) Permit; Invasive Animal Approved collections (Animal Exhibition) Permit; Invasive Animal Special Conditions Permit.

Glossary

Regulated Invasive Animals (DPI website note LC0303)	As defined in *Catchment and Land Protection Act 1994*. Declared Regulated Invasive Animals are those that: did not occur naturally in the wild in Australia before European settlement; and are or have a high potential to become a serious threat to primary production, Crown land, the environment or community health in Victoria; and should only be kept in collections or at premises approved by the Minister. These invasive animals (Category 3a) maybe kept under permit at statutory zoos, circuses, wildlife parks or b class zoos licensed under the *Wildlife Act* or at approved research and education institutions. Category 3b invasive animals can be kept under permit privately.
Species–led Approach	Invasive management programs that focus upon the management of a single species of invasives.
High risk undeclared invasive animals	Identified by the DPI Invasive Animal Alert Program as high risk and possibly eradicable from the state.
Victorian Invasive Animal Risk Assessment	Process to collate biological and invasive animal impact data that is necessary for declaration process and prioritising management response.

Appendix 1 - Species Description

Rabbits

Rabbits *(Orycolagus cuniculus)* are one of the most widely-distributed and abundant mammals in Australia. Their spread was aided by the presence of burrows of native species, modifications to the natural environment made for farming and their high reproductive potential. A single pair of rabbits can produce 30 to 40 young per year.

Despite the successful use of biological control agents, rabbits are Victoria's most serious vertebrate invasive due to the high level of environmental and agricultural destruction they cause. (Parks Victoria 2004a).

Rabbits damage vegetation through ringbarking, grazing and browsing. Reduction in biomass and biodiversity of native vegetation through grazing by the rabbit is listed as a threatening process under the *Flora and Fauna Guarantee Act 1988 (FFG Act 1988)*. Rabbits impact on biodiversity by out-competing native fauna species for food and habitat. Competition with native species and land degradation by rabbits is listed as a threatening process under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999).*

They graze heavily on young seedlings, prevent the regeneration of palatable plant species, contribute to soil erosion and compete with native species for food and shelter. Fortunately, rabbits are heavily predated upon by feral cats, foxes and birds of prey (Parks Victoria 2004a).

Rabbits also impact on water quality by causing erosion, which in turn leads to the loss of further biodiversity from poor water quality. They also have a negative impact on desirable vegetation by selective grazing of some species thereby preventing natural regeneration, and in periods of drought overgrazing and ring barking plants indiscriminately. Rabbits also graze upon species that are nationally listed as threatened under the *FFG Act*.

In the Glenelg Hopkins catchment significant government and private investment into rabbit control since the Rabbit haemorrhagic disease (RHD) outbreak in 1996/7 has seen rabbit populations and their impact significantly reduced. The 2001 – 2006 Glenelg Hopkins Rabbit Action Plan was critical in providing the strategic direction for this success.

There is good evidence that rabbits may be developing resistance to RHD infection but further research is required to confirm its ongoing usefulness as a biological control agent (Invasive Animals CRC 2010). With rabbit populations potentially on the increase, it is timely to review the risk of rabbit impact on high value assets in the Glenelg Hopkins catchment. This Strategy will provide guidance on where rabbit management for high value asset protection can be determined as a priority and provide guidance for strategic government investment into rabbit management programs 2010 – 2015. This is done by considering the threat and degree of risk to high value assets from rabbits. For further information see Section 6 - Identified Assets for Invasive Animal Management, of this Strategy.

Rabbits are a widespread agricultural and environmental problem through the Glenelg Hopkins catchment.

Appendix 1 - Species Description (continued)

Red Fox

The Red Fox *(Vulpes vulpes)* is a highly elusive and adaptive species and has the greatest natural distribution of any living terrestrial mammal besides *Homosapiens*. Its habits range from forest to open plains, farmlands and deserts. There are few environmental factors that limit their distribution. Foxes can survive in dry conditions because they are predominantly nocturnal and can meet water intake requirements through their prey without reliance on a supply of free water. (Parks Victoria 2004b).

Foxes are omnivorous hunters, generally preying on small (‹5.0kg) mammals. They are also known to eat birds, reptiles, amphibians, insects and fruits. Young rabbits form the majority of their diet, however they will also prey on lambs, and where rabbits are scarce, foxes prey largely on native animals (Parks Victoria 2004b). The fox is increasingly being seen as a significant livestock predator. The estimated cost to agricultural industries and the environment was more than $227 million in 2004. Foxes also have an economic impact on the livestock industry. Some studies indicate that foxes may account for up to 30% of the deaths of newborn lambs (DNRE, 2002).

However one positive impact is the role played by foxes in the regulation of rabbit populations. This role is thought to be important, but only at low to medium rabbit densities.

Defining fox impacts and the effectiveness of control approaches is essential to justify public and private expenditure on management. The objective of fox control programs is to reduce the impacts of fox predation, not to reduce the fox populations per se.

Foxes are an agricultural and environmental problem, preying upon livestock and small to medium sized mammals.

Appendix 1 - Species Description (continued)

Feral Pigs

The feral pig *(Sus scrofa)* is an introduced species thought to be relatively restricted in their range within the region but are known to exist within the Discovery Bay Coastal Park.

The reproductive potential of feral pigs is more similar to that of rabbits than to that of other large mammals in Australia. If conditions are favorable, feral pigs can produce one or two litters each year, each with an average of six piglets. Adult mortality can vary from 15-50% with few pigs living beyond five years of age.

The distribution and abundance of feral pigs can vary considerably depending on environmental conditions. They are habitat generalists but are particularly associated with wetlands and riparian ecosystems, therefore potentially becoming a problem anywhere in Victoria where there is suitable habitat and access to water.

The primary requirements of feral pigs are a reliable and adequate supply of food, water and cover, while their opportunistic feeding habits and omnivorous diet allow them to exploit various temporarily abundant food sources. Feral pigs have relatively high energy and protein requirements (particularly when breeding and caring for young) they often move to other parts of their home range when these requirements cannot be met by seasonal availability of food in any particularly area. This seasonal need for more or higher energy/protein food can be exploited for management purposes.

Although feral pigs may affect the environment in various ways the most important environmental impacts are through habitat degradation and predation. Feral pigs can potentially affect ecosystems in three main ways:

1. by eating animals,
2. eating plants, and
3. by the collateral damage caused by rooting in the soil in their search for underground parts of plants and invertebrates. Competition with, or disturbance of a range of animals are also likely to have important environmental impacts.

Feral pigs generally have a limited ability to regulate the abundance of plant foliage biomass. As such they are likely to directly affect the least browse-resistant and most digestible plant species or plant parts (e.g. mega herbs or bulbs and fruit). However, collateral damage to plants as feral pigs root for food may indirectly affect plant species not actually eaten. Also, the uncertainty over the role that habitat damage caused by feral pigs in ecosystems is exacerbated by the unknown effect ground disturbance has on invertebrate diversity and abundance changes in plant species composition.

The effect that ground disturbance by feral pigs has on ecosystems and communities is of conservation concern. It is uncertain of the effect ground disturbance may have on vegetation composition, and the diversity of ground-dwelling invertebrates, there are well founded concerns that repeated disturbance of the soil layer may dramatically affect a range of important biophysical processes such as water retention and nutrient cycling (Parks Victoria 2007b).

Feral pigs are found in Discovery Bay National Park where they are destroying native vegetation and preying upon native animals.

Appendix 1 - Species Description (continued)

Feral Goats

The success of goats *(Capra hircus)* is due to their hardiness and ability to survive on herbage with low nutrient content within a wide range of vegetation types, provided that surface water is available. Isolate populations of feral goats occur in the higher rainfall and agricultural areas of Victoria. These goats survive mainly in areas where patches of scrub or forest offer protection. Within the Glenelg Hopkins region, smaller numbers of populations occur in the Grampians National Park and Mt Napier State Park There is an ongoing process of new populations becoming established and old ones being eliminated.

Competition with native species and land degradation by goats is listed as a threatening process under the *EPBC Act*. Goats cause significant impact on the environment as they contribute to grazing pressure and cause damage to trees and shrubs through breakage, severe browsing and can prevent vegetation regeneration. They also spread weeds, and cause soil damage and erosion, particularly if there are large numbers of goats in an area.

The species is also believed to be a significant competitor with native species for food as feral goats apply more grazing pressure than do native herbivores. It is believed that they extend the duration of periods when food is limiting and, because of their broader diet, often utilize plant species unpalatable to other herbivores. Feral goats may also pose a risk to natural values through their potential in playing a role in exotic disease outbreaks, e.g. foot and mouth disease. (Parks Victoria 2007a).

Feral goats are a very hardy species that occur where patches of scrub or forest offer shelter. They are currently found in the Grampians National Park and Mt Napier State Park.

Appendix 1 - Species Description (continued)

Carp

Carp *(Cyprinus carpio)* are an introduced species, and are declared as noxious under the *Fisheries Act 1995* (DPI 2009). Carp are a major threat to river and floodplain ecosystems – their feeding activities increase turbidity by stirring up riverbed sediments and uproot soft-leaved aquatic plants, which can reduce habitat suitability for macro invertebrates and native fish (Koehn *et al*, 2000). They also compete with native fish for food and habitat including snags and slow flowing areas, and their presence has been associated with increased levels of total phosphorus and total ammonia (Koehn *et al*., 2000).

Carp were first discovered in the Glenelg River Catchment in February 2001, and until then, the Glenelg River was thought to be one of the last carp-free major rivers in south eastern Australia (GHCMA, 2008). The Glenelg River Carp Management Strategy was developed in 2003 by a working group consisting regional stakeholders, and updated by the Glenelg Hopkins CMA with assistance from DPI Fisheries in 2008. It specifies objectives and actions for managing carp, with the focus on containing existing carp populations, minimising numbers and distribution, and increasing knowledge and awareness of carp and their management issues in the community.

Actions implemented from the GRCMP to date include:

- provision of support to local angling clubs for carp fishing competitions in 2003, 2004, 2008 and 2009, which collectively have removed over 2.5 tonnes of carp from Rocklands Reservoir.
- feasibility assessment for the construction of a barrier in the upper reaches of the Glenelg River to prevent movement upstream from Rocklands Reservoir, which proposed the construction of a porous rock weir.
- installation of Continuous Deflection Separation units to screen environmental flow releases from Rocklands Reservoir, preventing carp, eggs and larvae from being released
- management of water levels at Rocklands Reservoir to prevent spill events
- modification to the channel from Frasers Swamp to improve flow efficiency and reduce its suitability as a spawning area for carp
- a scientific review of the monitoring program to ensure that the methods used are the most efficient and technologically up to date
- undertaking communications through local media, website, newsletters and "Carpwatch", a community monitoring program established through South West Fishcare and
- implementation of a carp monitoring program to determine abundance and distribution within the Glenelg River

The Glenelg Hopkins CMA began coordinating carp monitoring in 2001 following the first discovery of carp in Rocklands Reservoir and it has continued since then, with the monitoring carried out by DPI Fisheries between 2001 and 2007 and by Environous Pty Ltd in 2008 and 2009 (Ryan, McKinnon & Lucas, 2009).

Surveys in 2001 indicated that large numbers of carp were present in Rocklands Reservoir, and in 2002, at Cherrypool. Surveys conducted downstream of Rocklands between 2002 and 2004 captured carp at the "Johnny Mullugh Hole" near Harrow, the "Five-Mile Hole" near the Five-Mile outlet of the Rocklands Outlet Channel, and further downstream at "Banksia Hole" (Ryan *et al*, 2009). No carp were captured between 2005 and 2007, then following an angler sighting in 2008, carp were captured at "Clunies Hole", downstream of Harrow, then again in 2009 as well as at "Five-Mile" (Ryan *et al*, 2009). Apart from the population at Clunies, the furthest downstream sighting to date was made in January 2010 by a community member at the Dergholm Bridge, indicating that carp may be gradually moving downstream as conditions (such as greater flows in 2009) allow.

Carp are gradually moving downstream in the Glenelg River. They were initially found at Rocklands but now are found as far south as the Wannon Junction.

Appendix 1 - Species Description (continued)

Cats

Feral cats *(Felis catus)* are very adaptable, with few environmental factors to limit their distribution. Feral cats can survive in dry conditions because they are predominantly nocturnal and can use the moisture from their prey as a water supply. They are present on most Victorian public land, although their abundance is unknown.

Cats are carnivores that generally target small mammals, but they have been known to eat reptiles, birds, fish and insects. In some cases, cats have directly threatened the successful recovery of endangered species. Determining the impact of cats on native wildlife on the Australian mainland is complicated by factors such as introduced herbivores and other predatory species (e.g. foxes and wild dogs) and a lack of data.

Characteristics of native species populations most likely at risk to predation from cats are:

- Have very localized and /or fragmented distributions
- Occur in low densities
- Are species with low reproductive rates
- Include those species with behavioral characteristics which increase their vulnerability
- Occur in colonies or are colonial breeders

Cats carry infectious diseases such as toxoplasmosis and sarcosporidiosis, which can be transmitted to native animals, domestic livestock and humans. In wildlife, toxoplasmosis can cause damage to the central nervous system, blindness, respiratory problems and general debilitation. In humans, toxoplasmosis can cause debilitation, miscarriage in pregnant women and congenital birth defects.

Cats have a number of specific behavioral and ecological characteristics that must the considered when designing a monitoring program. (Parks Victoria 2004b).

Deer

Victoria hosts four introduced deer species, two of these are Red deer *(Cervus elaphus)* and Fallow deer *(Dama dama)* and both occur within the region. Red deer mainly occur within State Forests covering Casterton to Penola and both species can also be found within the Grampians National Park although Fallow deer are more prevalent due to escapees from surrounding deer farms.

Currently Fallow deer have an open bag limit under gaming regulations which means there is no closed season and they can be controlled at any time with no bag limit on numbers. Red deer do have a bag limit which means there are specified hunting periods and cannot be controlled at any time.

Deer have four main impacts: feeding, rubbing, wallowing and excretion. Feeding behaviour has the potential to change the structure and composition of vegetation. Through this behaviour the abundance and cover of some species could be reduced while for others it could increase.

Both deer species found in region rub and thrash certain species of trees and shrubs to rub antler velvet or to mark territories. Deer tend to target particular species of trees and particular sizes, therefore any impacts may be species-specific and/or size-specific. Rubbing behaviour causes tree stress and loss of condition which, if chromic, can lead to tree death. Tree death can also be caused by ring-barking.

Most species of male deer wallow. Wallowing in muddy pools (often contaminated with urine) or in dry, dusty patches is common male behaviour during the breeding season. Wallowing clears patches of vegetation and has the potential to contaminate soil and water.

Frequent access by deer to water points has the potential to erode stream banks, reduce riparian vegetation and result in a decline in water quality or contamination.

Deer often move between open, grassy feeding areas and forested, scrubby sleeping areas with some species known to roam wildly. Their excretion can alter the nutrient dynamics of an area, especially in areas where deer numbers are high. They can also alter the seed dispersal processes of the plant species they eat; with some deer species implicated in the dispersal of weeds. (Parks Victoria 2005).

Appendix 2 - Legislative Responsibilities for Invasive Animal Management

There is a range of legislation that relates to invasive management in Victoria. An overview of the legislation is provided as follows derived from the *Victorian Invasive Management Framework and Interim Guidelines and Procedures for Managing the Environmental Impacts of Invasive Animals on Public Land in Victoria.*

Catchment and Land Protection Act 1994

Extracts from the *Catchment and Land Protection Act 1994* are provided below that relate to the responsibilities of all land owners.

Section 20 General duties of land owners

1. In relation to his or her land a land owner must take all reasonable steps to-
   - a. avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner; and
   - b. conserve soil; and
   - c. protect water resources; and
   - d. eradicate regionally prohibited weeds; and
   - e. prevent the growth and spread of regionally controlled weeds; and
   - f. prevent the spread of, and as far as possible eradicate, established invasive animals.
2. A land owner must take all reasonable steps to prevent the spread of regionally controlled weeds and established invasive animals on a roadside that adjoins the land owner's land.
3. Subsection (2) does not apply to a roadside which is-
   - a. a freeway or an arterial road within the meaning of the *Road Management Act 2004*; or
   - b. Crown land held under a lease or licence by a person other than the land owner; or
   - c. land exempted from that subsection by a special area Strategy; or
   - d. Crown land in a national park or park within the meaning of the *National Parks Act 1975* or in a protected forest within the meaning of the *Forests Act 1958*; or
   - e. Crown land managed by a public authority other than the Secretary, or a Minister other than the Minister; or
   - f. Crown land reserved under the *Crown Land (Reserves) Act 1978* for a purpose other than a road.

National Parks Act 1975

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

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

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

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

Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* aims to guarantee that all Victoria's taxa of flora and fauna can survive, flourish and retain their potential for evolutionary development in the wild. Public land managers should particularly note those Potentially Threatening Processes (PTP) listed under the *Act* relating to environmental invasive animals.

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

Appendix 2 - Legislative Responsibilities for Invasive Animal Management (continued)

Crown Land (Reserves) Act 1978

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

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

Wildlife Act 1975

Within the context of the Regional Invasive Animal Strategy, the *Wildlife Act 1975* has relevance to the control of game and wildlife.

Within the *Act*, wildlife means -

- **a.** any animal of a vertebrate taxon other than mankind which is indigenous to the whole or part or parts of Australia or its territories or territorial waters, whether or not it occurs elsewhere;
- **b.** all kinds of deer, non-indigenous quail, pheasants, and partridges and any other taxon of animal which the Governor in Council by Order published in the Government Gazette declares to be wildlife for the purposes of this *Act*
- **(ba)** any taxon of terrestrial invertebrate animal which is listed under the *Flora and Fauna Guarantee Act 1988*; and
- **c.** any hybrids of a kind or taxon of animal specified in or pursuant to paragraphs (a) and (b)

Game means any kind or taxon of wildlife declared by the Governor in Council by Order published in the Government Gazette to be game for the purposes of this *Act.*

Sections 22 and 22A state that the Secretary may license a person to hunt, take, destroy buy, sell, acquire, receive, dispose of, keep, possess, control, breed, process or display wildlife or game. Sections 43 and 44 detail the conditions upon which hunting, taking or destroying wildlife or game may or may take place.

Conservation, Forests and Land Act 1987

The *Conservation, Forests and Land Act 1987* is an overarching *Act* that empowers authorized officers to take action under the *Conservation and Land Protection Act 1994.*

Water Act 1998

Part 10 – Waterway Management describes functions of Catchment Management Authorities relevant to invasive animal management.

Appendix 3 - Current Control Programs for Invasive Animals

Species: Rabbits

Current programs and activities	Responsibility
• Asset protection extension program. High value asset protection areas are determined by the Glenelg Hopkins CMA. DPI conducts property inspections to survey distribution and abundance of rabbits and provides best management practice advice to land owners/managers. Landowners/managers conduct on-ground works such as baiting, warren ripping, warren fumigation, harbour removal and exclusion fencing.	DPI/Glenelg Hopkins CMA
• Asset protection compliance program. High value asset protection areas are determined by the Glenelg Hopkins CMA. DPI conducts property inspections to survey distribution and abundance of rabbits, provides best management practice advice to land owners/managers and enforces the *Catchment and Land Protection Act 1994* where land owners fail to comply with the *Act*. Landowners/managers conduct on-ground works such as baiting, warren ripping, warren fumigation, harbour removal and exclusion fencing.	DPI
• Monitoring rabbit abundance and activity at one Glenelg Hopkins monitoring site.	DPI
• Grampians Back in Balance and protection works for biodiversity values at high threat from rabbits within Parks.	PV
• Good Neighbour Program.	DSE
• Coordinated on ground works, baiting, warren ripping, warren fumigation, harbour removal and exclusion fencing. Investment from Second Generation Landcare Grants and in-kind contributions.	Landcare/ Community Groups
• On ground works, baiting, warren ripping, warren fumigation, harbour removal, shooting and exclusion fencing.	Individual farmers/ landowners
• On ground works on roadsides and rail reserves such as baiting, warren ripping, warren fumigation, and harbour removal.	Local Government, VicRoads, Rail Managers
• Strategic research for improved rabbit management.	Arthur Rylah Institute

Appendix 3 - Current Control Programs for Invasive Animals (continued)

Species: Foxes

Current programs and activities	Responsibility
• Glenelg Ark, including Grampians Back in Balance program, fox baiting for the protection of threatened fauna species.	PV and DSE
• Protection of threatened species programs such as the Eastern Barred Bandicoot at Hamilton Parklands.	DSE
• Future Farming Strategy project: Improving Fox Control on Private Land. Extension program for landholders to implement integrated fox management on private land in the Glenelg Ark buffer zone.	DPI
• Future Farming Strategy project: Community participation in fox control, FoxStop hunter(shooter) reward program administered by peak hunting organizations.	Sporting Shooters Association of Australia/Field and Game Association
• High Conservation Value Aquatic Ecosystems Project: Extension program for landholders to implement integrated fox management on private land in the Lower Glenelg and Glenelg Eden buffer zones.	DSE
• Protection of threatened species using guard animals such as the use of Maremma dogs.	Warrnambool City Council
• Protection of farm animals and native fauna by conducting baiting, shooting, den fumigation, exclusion fencing and guard animal programs.	Farmers/Landowners/ government agency

Species: Pigs

Current programs and activities	Responsibility
• High Conservation Value Aquatic Ecosystems – Discovery Bay project to eradicate and monitor number of animals	PV
• Research project for detecting and dealing with new populations of large herbivores.	Arthur Rylah Institute

Species: Goats

Current programs and activities	Responsibility
• PV feral goat control in the Grampians National Park	PV
• Research project for detecting and dealing with new populations of large herbivores.	Arthur Rylah Institute

Appendix 3 - Current Control Programs for Invasive Animals (continued)

Species: Carp

Current programs and activities	Responsibility
• Rocklands population monitoring and removal.	Glenelg Hopkins CMA

Species: Cats

Current programs and activities	Responsibility
• Glenelg Ark – trialling trapping methods.	DSE

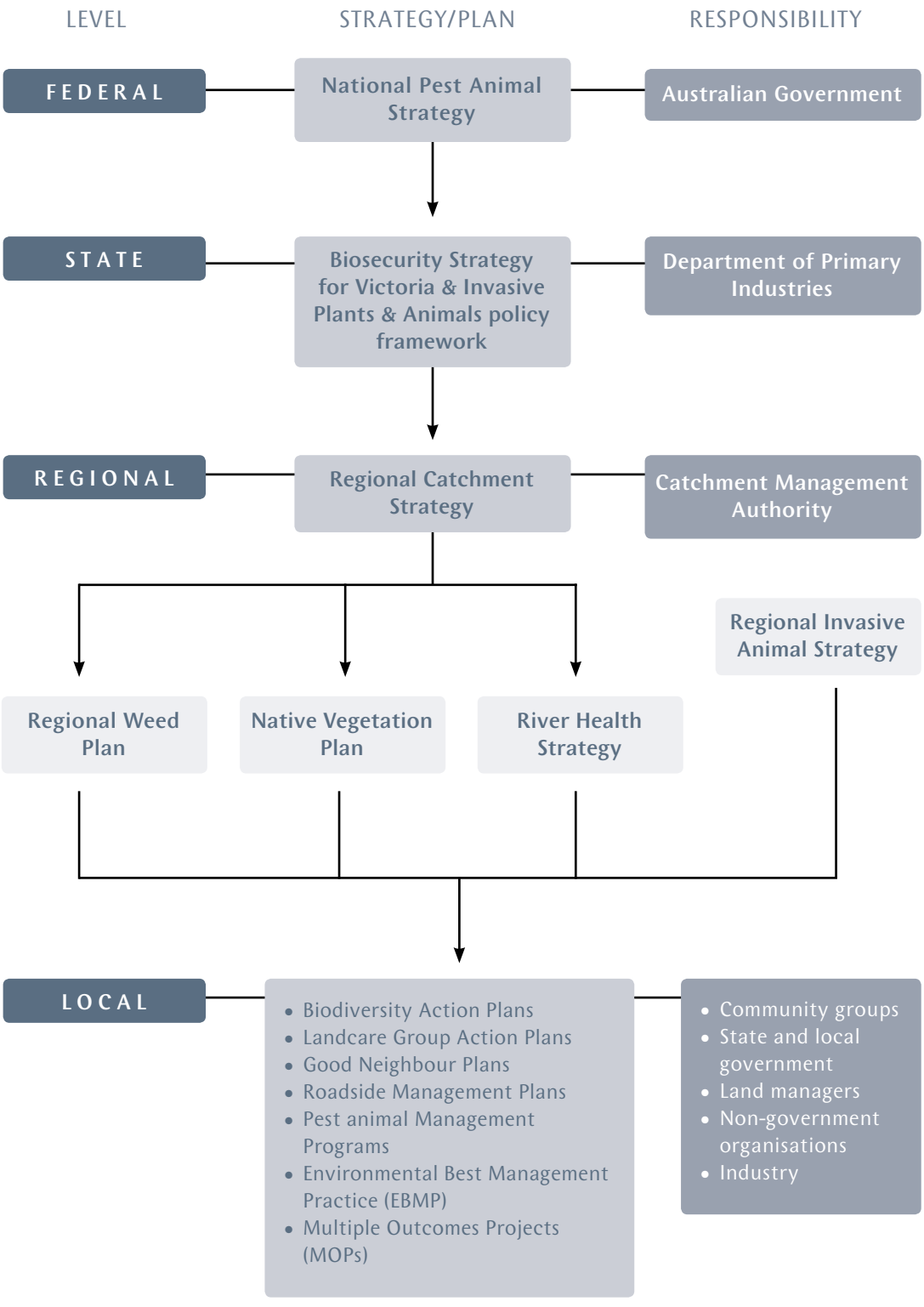
Species: Deer

Current programs and activities	Responsibility
• Established or formal control programs are not being undertaken • Research project for detecting and dealing with new populations of large herbivores (i.e.: Feral Goats and Feral Deer)	Arthur Rylah Institute

Species: High Risk Invasive Animals

Current programs and activities	Responsibility
• High Risk Invasive Animal Incursion (HRIA) Management, i.e.: (2009 statewide reports of Red Eared Slider Turtle, Cane Toad, Asian Black-Spined Toad and Indian House Crow among others) • Pre-Incursion Planning • Surveillance and monitoring • Investigation in illegally imported, kept and traded invasive animals • Ensure known invasive animals are kept in accordance with the *CaLP Act* • Identify and manage pathways of introduction and spread for HRIA	DPI

Appendix 4 - Invasive Animal Strategy Relationship to other Strategies and Plans



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Protecting our future - Naturally

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