

Rivers to Ranges Network

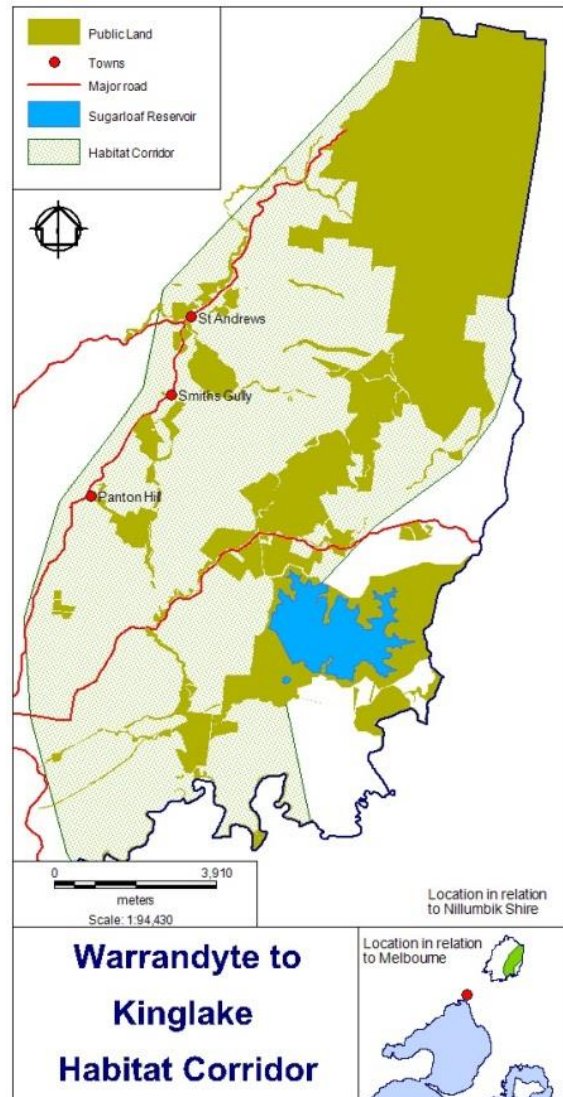
Environmental Works Toolkit



Revised
24 January 2018

Acknowledgements

This document is part of the Environmental Works Toolkit. The Toolkit was developed by the *Warrandyte to Kinglake Habitat Corridor Network* (now *Rivers to Ranges Network*) enabled by State Government funding. The Toolkit is free to use and adapt. If you do please acknowledge the *Rivers to Ranges Network* and the project partners (Nillumbik Shire Council, Parks Victoria, Melbourne Water and the Department of Environment, Land, Water and Planning).



Further information

For further information on the Rivers to Ranges Project or the Environmental Works Toolkit, visit the Nillumbik Shire Council Website at www.nillumbik.vic.gov.au or contact the project coordinator, Stacey Warmuth at Nillumbik Shire Council on 9433 3184 or stacey.warmuth@nillumbik.vic.gov.au.

Disclaimer

This material may be of assistance to you but Nillumbik Shire Council and its employees and the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or consequences which may arise from your relying on any information contained in this material.



Table of contents

1	The Toolkit.....	4
2	Toolkit contents.....	5
3	Toolkit procedure.....	6
3.1	Project management.....	7
3.2	Works Planning.....	7
3.3	Mapping.....	8
3.4	Monitoring, Evaluation, Reporting and Improvement.....	8
3.1	Training.....	9
4	Toolkit principles.....	10
4.1	Collaboration and Landscape-scale management.....	10
4.2	Adaptive management.....	10
4.3	Asset prioritisation.....	11
4.4	Biosecurity approach.....	14
	Some notes on the biosecurity approach for weeds.....	15
4.5	Strategic goal setting.....	16
5	Appendices.....	17
5.1	Example Priority Setting Tools.....	17
5.2	Threatening processes encouraging the growth and spread of weeds.....	20



1 The Toolkit

The *Environmental Works Toolkit* is a set of resources for land managers organising on-ground biodiversity conservation works. The *Warrandyte to Kinglake Habitat Corridor Network (now Rivers to Ranges Network)* developed this Toolkit for projects on public land within the corridor. However, as interest in the Toolkit has grown we are adapting the Toolkit and sharing it with the broader environmental community.

The Toolkit includes tools for prioritising and planning works, mapping weeds and rabbits, engaging contractors and reporting outcomes. It provides methods for the practical application of the principles of collaboration, landscape-scale management, adaptive management, asset prioritisation, the biosecurity approach and strategic goal setting.

We developed the Toolkit using known best practice and trying to ensure consistency with existing systems (e.g. Parks Victoria Pest Plant Mapping and Monitoring Protocols, Victorian Biodiversity Atlas, National Core Attributes for Weed Mapping). We have used and refined the Toolkit for public land works for more than three years ensuring the tools are practical and suitable for on-ground action. We have also started the process of developing tools for community groups and private landholders.

The aim of this Toolkit is to have a system for managing environmental works that is easy and practical for users of all skill levels. We believe that having a shared system provides a framework for government and the community to collectively plan and share results for true landscape-scale management.

Data requirements of each user group

	Planning	Recording works	Reporting	Compiling and quality assuring data
Agency	✓	supporting*	✓	✓
Contractor	supporting	✓	✓	
Community group	✓	✓	✓	
Landholder	✓	✓		

* Assuming agencies employ contractors to carry out on-ground works.

Please note: There is a potential for the Toolkit to grow in scope and resources as more tools are developed.



2 Toolkit contents

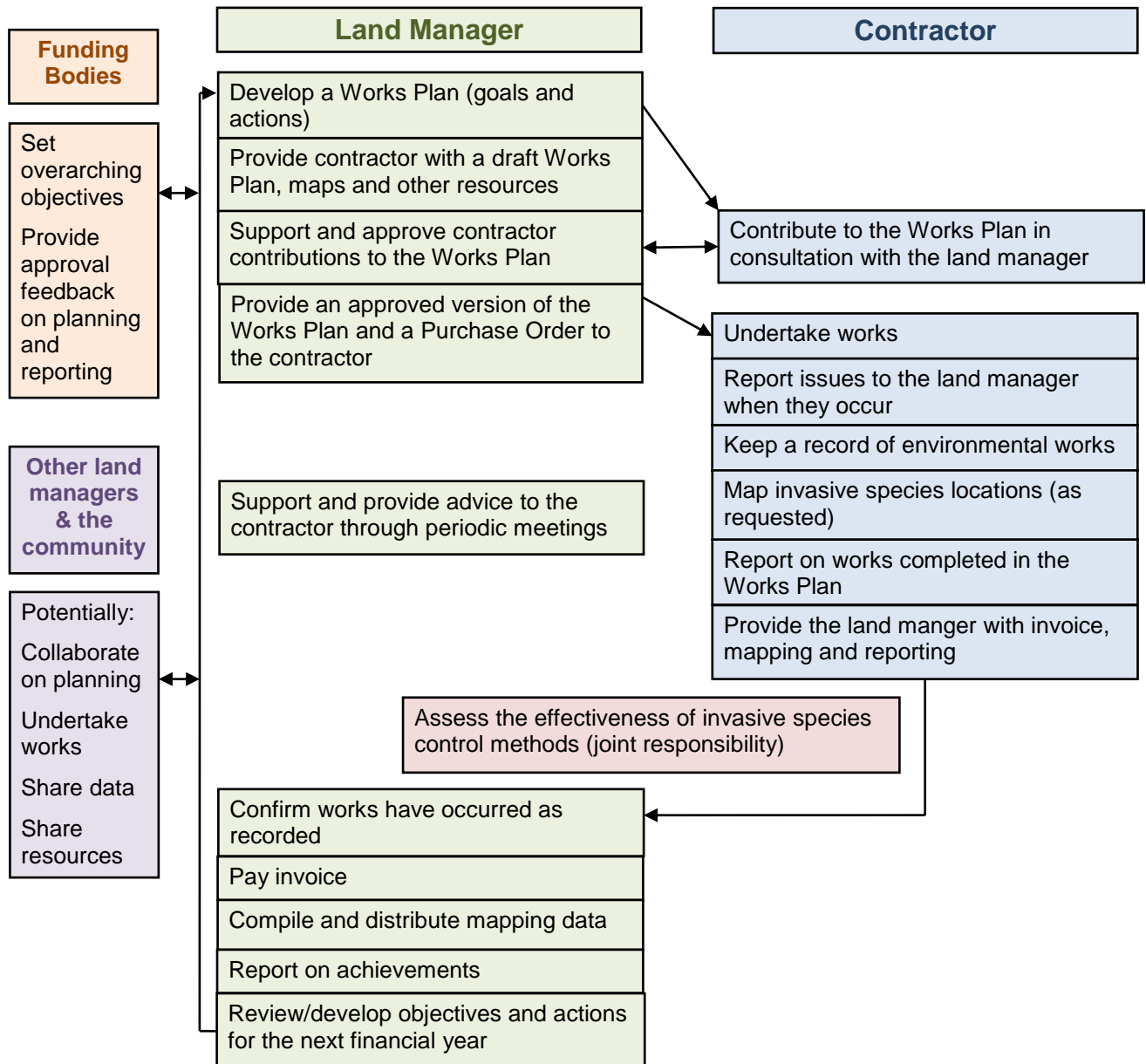
Table 1: Environmental Works Toolkit Contents

Type of tool	Tools
Overview documents	<ul style="list-style-type: none"> ▪ Environmental Works Toolkit Factsheet ▪ Environmental Works Toolkit Overview (this document)
Manuals	<ul style="list-style-type: none"> ▪ EWT - Environmental Works Contractor Reporting Procedure ▪ EWT - Works Planning Guide ▪ EWT - Environmental Works Toolkit Training Guide
Templates	<ul style="list-style-type: none"> ▪ EWT Works Plan Template
GIS and data collection tools	<ul style="list-style-type: none"> ▪ EWT Weed mapping and control works recording sheet ▪ EWT Rabbit mapping and control works recording sheet ▪ EWT Weed data collection – quick reference ▪ EWT Rabbit data collection – quick reference ▪ Environmental Works Mapping Data Fields
Additional resources	<ul style="list-style-type: none"> ▪ Nillumbik Shire Council bushland and wetland reserves prioritisation and planning guidelines ▪ Nillumbik Shire Council conservation management plan user manual ▪ Nillumbik Shire Council conservation management plan template
Potential future tools or tools in development (if interested contact Stacey Warmuth for early versions)	<ul style="list-style-type: none"> ▪ Agency guide to running on-ground biodiversity projects ▪ Environmental Works planning, mapping and monitoring – a guide for community groups and private landholders ▪ Biodiversity project template ▪ Works plan template – community ▪ Weed mapping and monitoring for landholders - fact sheet ▪ Weed Record for Apple Numbers (iPhone, iPad or iPod touch) ▪ Manual - Weed Record for Apple Numbers (iPhone, iPad or iPod touch)



3 Toolkit procedure

Figure 1: Environmental Works Procedure



3.1 Project management

The Rivers to Ranges Network developed the Toolkit within the broader scope of managing a collaborative landscape scale environmental project. The Toolkit considers the various aspects of project management including budgeting, risk management, stakeholder engagement and reporting within a MERI (Monitoring, Evaluation, Reporting and Improvement) framework.

3.2 Works Planning

Works plans (Figure 2 and Figure 3) define specific goals and actions. Works plans bring together asset prioritisation, the biosecurity approach and strategic goal setting (see Section 4).

By having standard methods and templates for developing works plans, land managers can compare works in different reserves, properties and projects and share information with the various people conducting on-ground work in the same area.

The Toolkit's Works Plan Template also provides sections for reporting on works completed (Figure 3). This helps land managers monitor contractors, track invoices and plan future works.

Figure 2: Planning component of Works Plan

Section 1					Section 2				Section 3			Section 4					
Works plan					Total Budget:												
					Annual works plan				Contractor planning (cost and time works)				Actual Works				
Works ID	Responsible Group	Weed/Threat/Activity	Location	Five year goal	Action	Control Method/s	Budget (exGST)	Funding Source	Suggested changes to actions or control methods	Timing	Est. hours	Est. cost (exGST)				

Figure 3: Reporting component of the Works Plan

Section 4					
Actual Works					
Progress	Comments	Suggested follow-up works	Actual hours	Actual Cost (exGST)	Invoice number/s



3.3 Mapping

The Toolkit sets a standard format for collecting location-based information about threats and assets and resources for collecting weed and rabbit mapping. By keeping all data in the same format we can compare information from a variety of sources and make better landscape-scale decisions.

3.4 Monitoring, Evaluation, Reporting and Improvement

Monitoring is an important part of running an environmental works project. By understanding what is happening on the ground, land managers can make better decisions. Monitoring could include: flora and fauna surveys, vegetation-monitoring plots and transects, fauna cameras, photopoints, works monitoring and weed mapping. Currently the Toolkit provides instructions and resources for photopoint monitoring, works monitoring and weed mapping.

Information collected when planning, recording works and mapping using the Toolkit can help land managers determine if works are having a positive impact and how they can adapt actions to improve their results.

For most people, the ultimate outcome desired of environmental works is an improvement in the health of the natural ecosystems – not just a reduction in invasive species. However, in these complex environments other factors, such as climate, other works occurring, and the actions of other land managers, can have a major impact on environmental health. Particularly in the short term, it is very difficult to measure environmental health and link it to works completed.

However, the inputs (time, cost, actions) and the direct outcomes (changes in invasive species cover and abundance, area revegetated) provide important indicators of success. Longer term monitoring of assets, threats and works will reveal a more accurate picture of progress. Table 2 lists some of the important indicators of success and where the Toolkit is used to collect the information.

On large and long-term projects and projects focusing on the protection of threatened species evaluation would be well complemented by using scientifically rigorous monitoring methods.

Based on the results of the evaluation there are several actions users can take to improve the outcomes of their projects:

- Review works plan – change goals, actions, estimations of costs and time
- Change resource allocations (money and time) – Increasing resources in the early years of a works plan may allow them to get on top of a weed infestation. Alternatively they may find that resources are better allocated to other weeds/areas/activities.
- Change invasive species control methods

The Toolkit also provides data that land managers can use to provide the following information in reports:

- details of expenditure.
- before and after photos from photopoints
- maps showing the location of works



- maps showing areas treated overlaid over weed distribution
- maps showing changes in weed cover and distribution
- maps showing planned treatment areas over actual treatment areas
- graphs/tables showing progress towards achieving annual actions
- graphs/tables showing progress towards achieving midterm (4-5 year) goals

Table 2: Indicators of success

Indicators of success	Source
Accurate estimations of costs and hours (time spent on on-ground works)	<ul style="list-style-type: none"> ▪ Works plan
Works plan is accurate and easy to follow	<ul style="list-style-type: none"> ▪ Works plan
Actions are completed as planned	<ul style="list-style-type: none"> ▪ Works plan
A reduction in costs over time (without an increase in cover/abundance of invasive species)	<ul style="list-style-type: none"> ▪ Works plan
A reduction in time spent on invasive species control over time (without an increase in cover/abundance)	<ul style="list-style-type: none"> ▪ Works plan ▪ Weed mapping and control works record
A reduction in the use of herbicides and other chemicals (without an increase in weed cover/abundance)	<ul style="list-style-type: none"> ▪ Weed/rabbit mapping and control works record
Area of weed treated reduced over time (without an increase in weed cover/abundance)	<ul style="list-style-type: none"> ▪ Weed mapping and control works record
Cover and extent of invasive species infestations reduced	<ul style="list-style-type: none"> ▪ Weed/rabbit mapping ▪ Photopoints
Number of new weed infestations reduced	<ul style="list-style-type: none"> ▪ Weed mapping ▪ Works plan
Midterm (4-5 year) goals achieved or exceeded	<ul style="list-style-type: none"> ▪ Works plan ▪ Mapping
Little or no off-target impact on native species	<ul style="list-style-type: none"> ▪ Photopoints ▪ Observations of weed control works
Condition of native vegetation improved	<ul style="list-style-type: none"> ▪ Photopoints ▪ General observations ▪ Other environmental monitoring (not in Toolkit)

3.1 Training

There are significant advantages when land managers (public and private) work together using shared tools. However, to do so requires education for agency staff, contractors and the community. The Toolkit provides a manual on what to include in a training session to help promote this consistent approach.



4 Toolkit principles

4.1 Collaboration and Landscape-scale management

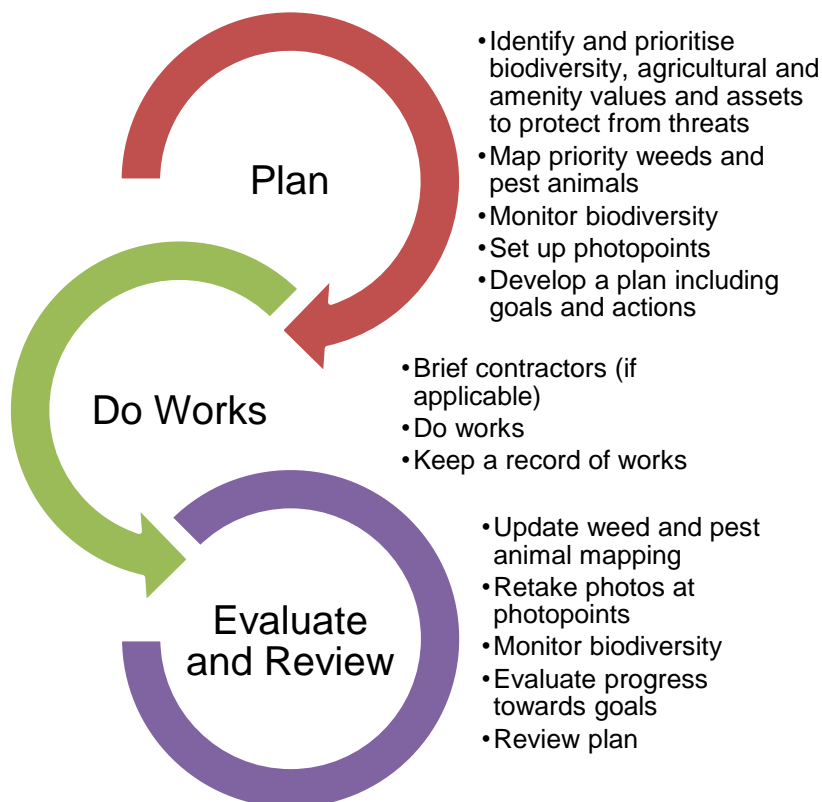
The Toolkit allows different land managers to collaborate at a landscape scale. It does this by providing tools for land managers to develop collective goals and share works plans and mapping that are in the same format.

The Toolkit acknowledges that environmental contractors can have an intimate understanding of the areas they are working in and certainly should have a better understanding on the effectiveness of different control methods. The Toolkit allows better decisions by harnessing the contractor’s knowledge and combining it with the land manager’s broader understanding of the priorities at a landscape-scale. Maintaining the same contractor on a site over time and including them in the decision-making should help enhance the connection and ownership a contractor has for a site.

4.2 Adaptive management

Planning is essential for on-ground environmental works. Good plans enable land managers to manage works over several years and/or over large areas. The best plans constantly evolve based on the outcome of control works and changes in environmental condition through a cycle of **plan**, **do** and **review** (see Figure 4). The Toolkit provides methods and tools for all stages in this process.

Figure 4: Environmental works cycle



4.3 Asset prioritisation

The Toolkit operates on the principle of protecting and enhancing the highest value assets at the greatest risk first and then progressively concentrating on lesser value assets at lower risks. In this context, assets could be an indigenous species, a vegetation community, a landscape, a reserve or a patch of vegetation. Asset prioritisation allows land managers to decide how to best direct finite resources.

Asset prioritisation at a small scale may be obvious, however as the scale increases so does the complexity of the decision-making. For private landholders asset prioritisation may involve simply mapping their areas of bushland and learning about the plant and animal species present. For large landscape scale projects like the Rivers to Ranges Project more comprehensive knowledge and asset prioritisation tools are needed.

There are many asset prioritisation tools, resources, and decision frameworks. The ones a land manager chooses depends on the values and assets they are trying to protect. The Toolkit provides some simple asset prioritisation tools based on those used for the Rivers to Ranges Project and for the prioritisation of Nillumbik Shire Council's conservation reserves. Other parts of the Toolkit are still usable with different asset prioritisation methods.

The Rivers to Ranges Project selected key ecological assets representing the biodiversity values the project needs to protect from weeds to achieve the project's vision. By protecting these ecological assets, the project aims to contribute to the protection and enhancement all biodiversity supported within the project area.

Key Ecological Assets for the Rivers to Ranges Project

- Habitat link connecting the Yarra River and the Kinglake Ranges
- Species
 - Brush-Tailed Phascogale (canopy connectivity)
 - Common Dunnart (understory quality and connectivity)
 - Threatened Orchids (fine-scale understory protection at priority sites)
 - Platypus (waterway quality and protection)
- Attributes
 - Old growth, hollow bearing trees
 - Structural diversity with a broad age class distribution
 - Landscape Context (connectedness, width, area)
 - connectedness of quality habitat
 - Aquatic habitat health
 - Understory diversity
 - Recruitment of native plants



Nillumbik Shire Council and the Rivers to Ranges have developed reserves priority setting tools to prioritise reserves for management (see Appendix 5.1).



As a final step in asset prioritisation, the Toolkit provides guidelines for ranking different areas within reserves or a landscape in order of priority. This allows setting of consistent goals across large project areas:

Biodiversity Hotspots (BH)

Biodiversity Hotspots are small and clearly defined areas vital for maintaining biodiversity within the landscape. They include one or more of the following attributes:

- Support the most sensitive or threatened species (such as EPBC listed species or species at risk of local extinction; e.g. Rosella Spider Orchid or Clover Glycine)
- Support habitat for the most sensitive or threatened fauna species (such as EPBC listed species; e.g. Eltham Copper Butterfly)
- Contain a particularly high diversity of indigenous plants
- Support an intact patch of a particularly rare or threatened vegetation type



Biodiversity Hotspots generally require intensive management to protect and promote a particular biodiversity asset. Depending on the biodiversity asset, management may include, grazing management through fencing or cages, zero tolerance for weeds, assisted pollination, planting of pollinator or food species, reintroductions and/or ecological thinning.

Core Habitat (CH)

Areas of Core Habitat provide refuge for indigenous plants and animals to live, reproduce and flourish. Protecting, improving and connecting core habitat is vital to maintain ecological function at a landscape scale.

They include one or more of the following attributes:

- Support a diversity of indigenous species
- Support relatively intact native vegetation
- Provide habitat for a range of indigenous fauna species
- Provide an important habitat link (even if relatively disturbed) in a habitat corridor



Core Habitat generally requires a moderate level of management to maintain biodiversity. Management may include, landscape scale pest animal control, reduction of high threat weed cover, supplementary planting of absent or structural species, revegetation to improve connectivity, maintenance of existing revegetation, artificial habitat creation (nest boxes, dunnart tiles) and/or ecological burning.



Non-Core Habitat (NCH)

Non-Core Habitat are areas of lower quality bushland compared to Core Habitat. They contain only a low diversity and/or cover of indigenous plants or are newly rehabilitated from significant disturbance (such a paddock area that has been revegetated). Non-Core Habitat is generally not vital for the movement of indigenous fauna.

Management may include, pest animal or weed control to prevent spread into Core Habitat and Biodiversity Hotspots, and/or maintenance of existing revegetation. It may also aim to aid rehabilitation depending on the resources available.



Highly Degraded Habitat (HDH)

Highly Degraded Habitat are cleared or degraded areas that support mostly exotic and few native plants. Management may include pest animal or weed control to prevent spread into Core Habitat and Biodiversity Hotspots.



Amenity Zones (AZ)

Amenity Zones are vegetated areas managed for community amenity following horticultural practices.

Landholder Engagement Zones (LEZ)

Landholder Engagement Zones are areas of private land surrounding an area of public land where landholders are engaged to complement works. Management focuses on preventing pest animal or weed spread into Core Habitat and Biodiversity Hotspots on the public land and to protect biodiversity or agricultural assets on the private land.



Fuel Management Zone (FMZ)

Fuel management zones are areas managed to mitigate bushfire risk. Fuel Management Zones generally overlap other management zones.



4.4 Biosecurity approach

The biosecurity approach supports the management of invasive species at all stages of invasion – from preventing the entry of new species to managing widespread infestations. It acknowledges that economic returns for managing pest plants and animals are much higher when infestations are new or small, thus the old adage: prevention is better than cure.

When managing established pest plants and animals, the biosecurity approach prioritises the protection of areas with the greatest biodiversity or agricultural values that are at the highest risk of damage. This also involves managing pest animals and high threat weeds growing outside these areas, if they are likely to spread into these high priority areas.

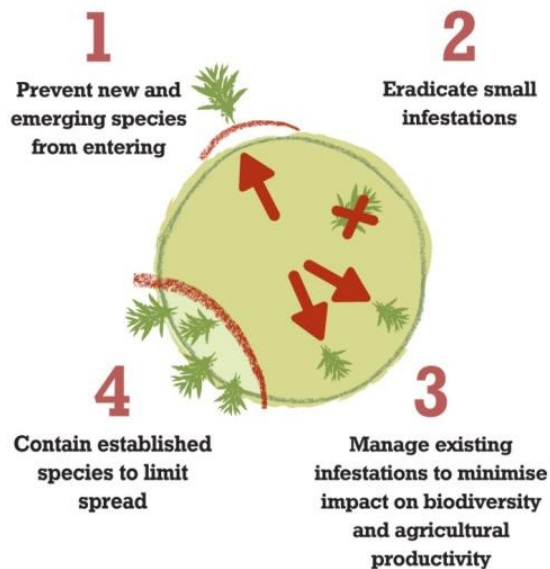
In practical terms, the biosecurity approach can include the following actions for weed management:

1. **Prevention:** Prevent the spread of invasive species from areas where they are present into areas where they are not.
 - Identify and manage sources of invasive species
 - Prioritise management of new and emerging invasive species
 - Manage threatening processes that encourage the growth and spread of invasive species
 -
2. **Eradication:** Eradicate small infestations of invasive species.
 - Target invasive species when numbers are low
 -
3. **Asset protection:** Manage existing infestations to minimise impact on biodiversity and agricultural values.
 - Prioritise the protection of areas with the greatest biodiversity and agricultural values at the highest risk of damage from invasive species
 - Target pest animal populations that are directly impacting biodiversity or agricultural values
 - Remove weeds that are smothering or otherwise directly impacting indigenous plants
 - Use structures to protect significant biodiversity values (e.g. rabbit proof fencing, orchid cages), particularly when grazing pressure is high
 - Stagger weed removal, allowing natural regeneration to maintain habitat value and prevent new weeds emerging
 - Manage vegetation to increase the protective habitat for native animals from predators like foxes and cats
 -
4. **Containment:** Contain established species to limit spread.
 - Eradicate/remove isolated infestations
 - Target mature reproducing individuals
 - Prevent seed set (weeds)
 - Reduce the size of infestations at a rate that allows natural regeneration (weeds)



Some notes on the biosecurity approach for weeds

Figure 5: A biosecurity approach to weed management (adapted from Department of Environment and Primary Industries publications)



Weed lists

The toolkit advocates developing two weed lists:

- Weeds present that pose a high threat to biodiversity and agricultural values
- Weeds that have the potential to invade and if present would pose a high threat to biodiversity or agricultural values

These lists will vary with location.

New and emerging weeds

The Victorian Government (2010) defines a new and emerging weed as:

A recognised weed that has recently been detected, or a plant species that has been known in the area for some time, but has only recently been recognised as having invasive properties.

Invasive Plants and Animals Policy Framework

Consider which weeds are new and emerging at all scales. Thus a weed could be considered new and emerging if it is new to a Shire, a Landcare area, a reserve or a property.

The biosecurity approach gives priority to preventing new and emerging weeds establishing and, if possible, eradicating small infestations for the most cost-effective and long-term result. As a first defence against weeds, it is a priority to monitor for new and emerging weeds and budget for their management.



Established weeds

Weeds that are already established in an area are less cost effective to manage, but may pose a significant threat to biodiversity or agriculture values.

Some weeds pose a higher threat to native vegetation than others. The level of threat that a weed poses depends on the risk of a weed invading bushland or agriculture and the impact it has on the values present (biodiversity or agricultural).

Following the biosecurity approach, it is a priority to contain the extent of established weeds and minimise their impact on biodiversity and agricultural values.

Weed pathways of threat

Weeds disperse from many sources and by many processes. Without managing these pathways of threat, weed control works may be ineffective in the long-term. Weed mapping and monitoring should aim to identify where weeds are dispersing from to help land managers determine which weed sources are practical to manage. The biosecurity approach prioritises the prevention of weeds. See Appendix 5.2 for potential threatening processes which can cause the spread of weeds.

4.5 Strategic goal setting

The Toolkit promotes the setting of goals based on asset prioritisation, threat identification and available resources. Medium term goals (4-5 years) make choosing actions easier and allow land managers to assess if their projects are successful.

When setting goals land managers may need to consider the biodiversity value of the asset, the cost versus the benefit of doing works, the time scale over which a threat is acting, community input and resources available now and in the future.

There is always a balance between allocating resources to achieve a small benefit for a very high value asset versus allocating resources to achieve a large benefit for a medium value asset. One way to solve this quandary, if resources are sufficient, is to start with the principle of no loss across all assets and then build improvement into the goals starting with the highest value assets.

Flexibility is required on-ground. Site-specific goals and actions may vary from the overarching goals of a project depending on the:

- biodiversity assets to be protected
- level of threat
- extent of an invasive species infestation
- the ecology of an invasive species
- feasibility of control
- ownership of the land
- accessibility
- resources available



5 Appendices

5.1 Example Priority Setting Tools

Table 3: Nillumbik Reserves Priority Setting Tool

Criteria	Rationale	Weighting	Level	Score
Ecological Criteria				
Level of Significance				
Site of Biological Significance	A BioSite is a physical area of land or water containing biological assets with particular attributes, such as the presence of rare or threatened flora, fauna or habitat required for their survival and/or rare or threatened vegetation communities.	X 2	National	4
			State	3
			Regional	2
			Local	1
			None	0
Native Vegetation Condition				
Vegetation Condition (based on Keighery 1994)	A rapid assessment of vegetation condition at a reserve level was undertaken to determine what the quality of vegetation was. Scores ranked from Pristine-no obvious signs on disturbance to Completely Degraded.	X 5	Pristine	6
			Excellent	5
			Very Good	4
			Good	3
			Modified / Revegetation	2
			Degraded	1
			Completely degraded	0
Ecological Vegetation Class Bioregional Conservation Value	A bioregional conservation status is provided for each EVC within a bioregion. It is a measure of the current extent and quality for each EVC, when compared to its pre-1750 extent and condition.	X 1	Endangered	5
			Rare	4
			Vulnerable	3
			Depleted	2
			Least Concern	1
NEROC Assessment Data				
Sites of Faunal Significance		X 1	National	3
			State	2
			Regional	1
			None	0
Habitat Link		X 1	Regional	2
			District	1
			None	0
Habitat Significance		X 1	Very High	3
			High	2
			Medium	1
			None	0
Threatened Flora & Fauna				
Flora	Contains Nationally Endangered	X2	Present	1



Criteria	Rationale	Weighting	Level	Score
	Species		Absent	0
Flora	Contains Victorian Rare or Threatened Flora Species	X2	Present	1
			Absent	0
Fauna	Contains Nationally Endangered Species	X2	Present	1
			Absent	0
Fauna	Contains Victorian Rare or Threatened Fauna Species	X2	Present	1
			Absent	0
Natural Features				
Wetland or Waterway	The presence of wetlands or waterways provides variety and dimensions to the habitat arrangement	X1	Present	1
			Absent	0
Shape & Size				
Reserve Size	Larger reserves are more likely to support viable and resilient communities	X 1	Greater than 10ha	5
			5-10ha	4
			2-5ha	3
			1-2ha	2
			0-1ha	1
Reserve Shape	Larger more rounded/square shaped reserves are more likely to have less edge effects and provide better habitat quality as compared to long and thin shaped reserves	X 1	Circular, square	6
			Oval, rectangular	5
			Irregular with few indentations	4
			Irregular with many indentations	3
			Long and thin with large proportion greater than 50m wide	2
			Long and thing with large proportion less than 50m wide	1
Community Values Criteria				
Community Use				
Active Community Group	Presence of an active Friends Group at a site would increase the community value and priority	X 3	Present	1
			Absent	0
Recreational Use		X 1	High	3
			Medium	2
			Low	1
			None	0
Heritage Significance				
Known European Historical / Cultural Values		X 1	Present	1
			Absent	0
Known Indigenous Historical / Cultural Values		X 1	Present	1
			Absent	0

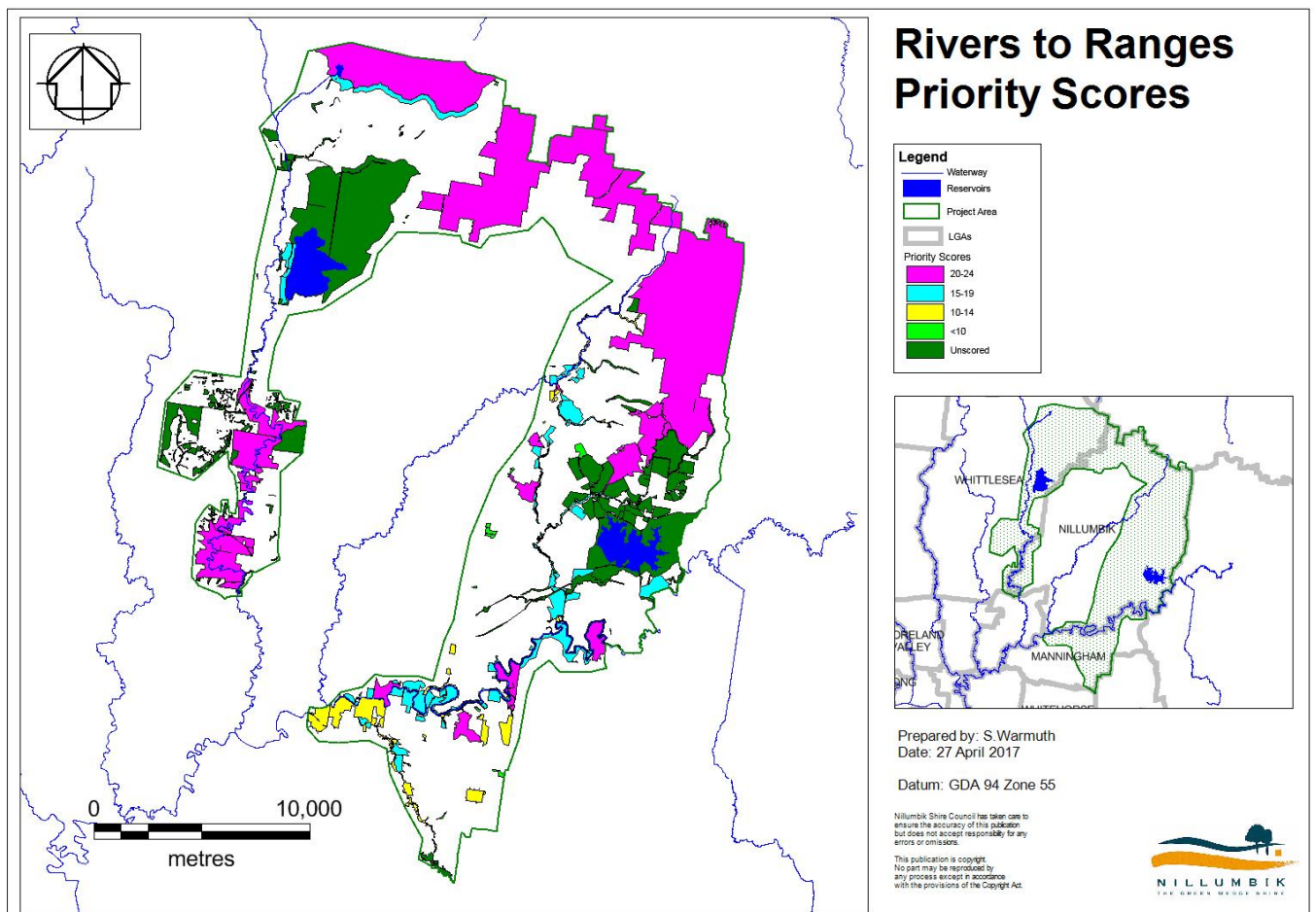


Table 4: Rivers to Ranges Reserves Priority Setting Tool

Criteria	Weighting	Level	Score
Faunal Significance (From NEROC where available) (Rarity, Diversity, Representativeness, Abundance and Scientific Value of Fauna Species).	X 1	Very High / National	3
		High / State	2
		Medium / Regional	1
		Local / None	0
Faunal Habitat Significance (From NEROC where available) (Rarity, Diversity, Representativeness, Abundance, Intactness and Scientific Value of Fauna Habitat).	X 1	Very High / National	3
		High / State	2
		Medium / Regional	1
		Local / None	0
Habitat Link/Connectivity/Corridor value (From NEROC where available) (Contribution of area to strategic habitat links)	X 3	Strategic Habitat Link/ Regional Network	3
		Habitat Link/District Link	1
		None	0
Flora value (self-assessed) (diversity and significance)	X 3	High / National (Medium to high diversity. One or more EPBC listed species)	3
		Medium / State (medium to high diversity. A number of state-listed threatened species.)	2
		Low/Local significance (low to medium diversity, few or no threatened flora species)	1
		None	0
Total			



Figure 6: Rivers to Ranges Reserve Prioritisation Map



5.2 Threatening processes encouraging the growth and spread of weeds

Commerce

- Sale of new and existing weed species
- Promotion of high threat weed species

Roads

- Introduction of weeds from vehicles and maintenance machinery (including lack of vehicle hygiene)
- Spread of existing weeds from road maintenance activities (e.g. slashing, grading)
- Spread of weeds along roads from vehicle movement, wind, pest animals and stock movement

Transport and machinery

- Disturbance of soil and spread of seed and plant material

Waterways

- Introduction of weeds from higher in the catchment
- Spread of weeds along waterways from water movement



- Stock grazing of waterways causing soil disturbance, spread of weeds and increased nutrient levels promoting weed growth

Construction of fuel breaks

- Disturbance of soil
- Spread of weeds from machinery and movement along breaks

Fire

- Encouraging weed growth through disturbance and disadvantaging native species
- Germinating weed seeds that require post fire weed control

Pest animals (foxes, goats, deer, rabbits)

- Disturbance of soil and spread of seeds (including deer wallows)
- Rabbit, deer and goat grazing preventing regeneration and reducing the resilience of sites to weeds

Dieback (caused by a range of factors including fragmentation, bell minors, *Phytophthora cinnamomi* infection, etc)

- Reducing resilience of native vegetation to weeds

Recreation (Horse riding, trail bike riding, mountain bike riding and bush walking)

- Disturbance of soil and spread of seed and plant material

Waste disposal

- Dumping of garden and other waste on public land
- Accumulation of weed species at rubbish disposal sites
- Prohibitive land fill fees can encourage inappropriate disposal of weeds

Private Properties

- Weeds escaping into public land
- Planting of high threat weed species
- Residents not identifying or managing weed species
- Stock escaping causing disturbance of soil, spread of seeds and reducing resilience of vegetation to weed invasion
- Runoff from private property increasing nutrient levels promoting weed growth.

Changed hydrology, drainage patterns

- Disturbance of soil and vegetation
- Changing environmental conditions that may encourage weed growth
- Creating new hydrological pathways along which weeds can spread

