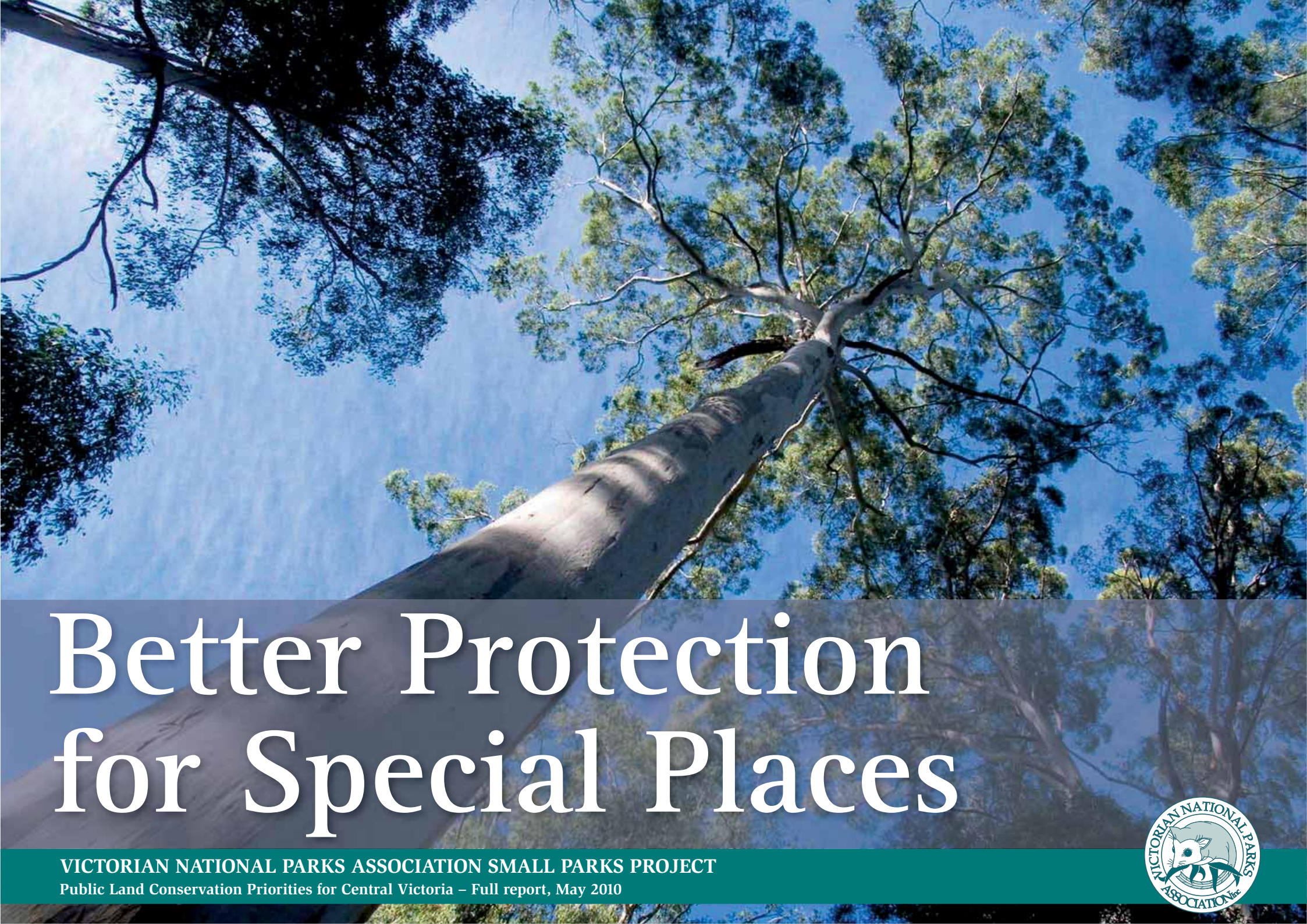

Better Protection for Special Places

VICTORIAN NATIONAL PARKS ASSOCIATION SMALL PARKS PROJECT

Public Land Conservation Priorities for Central Victoria – Full report, May 2010

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Better Protection for Special Places – Full Report (final version), May 2010

Produced by: Yasmin Kelsall, Julie Kirkwood, Matt Ruchel, Megan Clinton and Phil Ingamells.

Report design: John Sampson.

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Victorian National Parks Association
Level 3, 60 Leicester Street, Carlton, Victoria, 3053
Phone: 03 9347 5188
Fax: 03 9347 5199
Website: www.vnpa.org.au
Email: vnpa@vnpa.org.au

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Chapter 2 – Chocolate Lily, Pyrenees Ranges State Forest. Photo courtesy Yasmin Kelsall.
Chapter 3 – Sanger's Hut, Fryers Range State Forest. Photo courtesy Mary Thompson.
References – Blue Pin-cushion found in Kingower State Forest. Photo courtesy Warwick Sprawson.
Appendices – Gum leaf, Mount Cole State Forest. Photo courtesy Yasmin Kelsall.

Contents

1. Overview

1.1 Introduction

1.1.1 The VNPA Small Parks Project – Better Protection for Special Places

Victoria's unique and diverse biodiversity is in crisis. According to the Department of Sustainability and Environment (DSE, 2008), we are currently losing native vegetation extent and condition at a rate higher than any gains being made through improved protection and management. In the face of increased pressure from climate change, we must increase our efforts.

Victoria's Land and Biodiversity White Paper, Securing Our Natural Future, recognises that public land management needs to address the risks associated with climate change. It states that public land management, in coordination with private land management, will play an important role in protecting biodiversity and building ecosystem resilience (DSE, 2009).

The VNPA's Small Parks Project involves working with local and regional environment groups to document the values of, and threats to, areas of public land that are poorly managed and/or not presently included in the reserve system.

As part of the project we have developed the first stage of a register of smaller parks (areas generally less than 20,000 ha). Our current focus area is the Central Victorian Goldfields, extending from Stawell in the west to Alexandra in the east.

Based on advice from community groups in Central Victoria and an assessment of values and threats, the VNPA has identified 20 'Special Places' worthy of better protection and management which have great potential as new 'small' parks in this area. Protection of these sites would contribute greatly to improving connectivity and building climate change resilience across the Victorian landscape.

Information from this 'Register of Special Places' will be used to feed into the Victorian Environmental Assessment Council (VEAC) investigation into remnant native vegetation across the state, and will also be presented to government. Our work will increase the recognition of these special places, and help local and regional groups highlight the values of key areas of public land and, in special cases, private land.

1.1.2 Why do we need better protection of small Special Places?

The box and ironbark forests of Central Victoria have experienced significant changes since European settlement. Landscapes that were formerly continuous areas of forest and woodland have become fragmented by human settlement and resource extraction, vegetation removal, and pest plants and animals. As a result the landscape has become a mosaic of modified natural forests and woodlands among cleared land, which has had important consequences for Australia's unique flora and fauna.

A landscape approach to biodiversity conservation recognises the structure and function of these patchy environments and addresses management principles regardless of different land uses and tenures (Bennett, 1993). This approach is not new, but we still have significant opportunities to improve conservation at a landscape scale, particularly across Central Victoria.

The scale of conservation and management activity in Victoria to date has been too small to reverse the decline in biodiversity. To reverse this decline, as well as build resilience to climate change, strategic protection and restoration are urgently needed on a large scale. This will require extensive habitat-focused projects that establish a network of protected areas and sites with improved management, as well as strategically increasing connectivity to improve ecological function.

Victoria still suffers from significant gaps in its reserve system to reach adequate representation of ecological vegetation classes or vegetation communities that are most threatened by ongoing degradation. Even in the relatively intact landscapes managed as reserves, the condition of biodiversity is variable due to previous land uses and disturbances such as logging and grazing, as well as the impact of a range of

Historic house in Dunolly-Waanyarra State Forest. **Photo courtesy Yasmin Kelsall**

current and ongoing threats from invasive species (weeds and pest animals), altered hydrology, inappropriate fire regimes, grazing pressure and fragmentation (Commissioner for Environmental Sustainability, 2008).

1.1.3 The role of public land in a fragmented landscape

The highest priority for conservation and management activity in Victoria must be its remaining remnant vegetation. Remnant vegetation in Victoria forms part of the matrix and functionality for ecological processes that are integral to Victoria's economy and social wellbeing. These include climatic processes, land system productivity, hydrological processes, formation of biophysical habitats, interactions between species, movement of animals and seeds, coastal zone fluxes, natural disturbance regimes and spatially-dependent evolutionary processes (McGregor, et. al., 2008).

Plant and animal species affected by climate change will be most likely to survive if they can migrate as their environment adjusts. Creating well-managed and protected remnant vegetation links in the landscape will help this adaptation and conservation of plants and animals to occur. Remnant vegetation in Central Victoria, particularly those areas identified as priorities in the VNPA Small Parks Project, offer good opportunities for east-west and north-south landscape links. The protection and good management of public land is a key foundation in providing these refuges for our biodiversity to adapt.

At least half of Victoria's native vegetation has been cleared, including 80% of the original vegetation cover on private land, whereas public land retains more than 80% of its original vegetation cover. The current extent of native vegetation in Victoria is about 10.3 million ha, of which 7.3 million ha are on public land and 3 million ha on private land. Public land, which covers some 39% of Victoria, retains over 80% of its vegetation cover (CES 2008).

Fragmentation of habitat has severe implications for native fauna and flora. Lack of continuity between habitat fragments may prevent or limit the movement of animal populations, limiting opportunities for mating and dispersal of young, and potentially creating genetic isolation. Vegetation fragmentation is therefore likely to exacerbate the impacts of land use

change and climate change.

Increasing fragmentation also creates smaller patches of vegetation with higher edge to interior ratios. These edges, which are subject to increased weed invasion, nutrient input, and predation, can further reduce the suitability of remnant vegetation for species reliant on more extensive, less disturbed habitat. Negative consequences for a range of fauna species and groups are evident in Victoria, such as reptiles in the box-ironbark forests (CES 2008)

While it is imperative that vegetation protection on private land is addressed, in more fragmented landscapes such as those in Central Victoria public land is often the only place at a regional level where larger areas of native vegetation exist. These blocks of public land are often smaller areas (less than 20,000 ha) but they play a key role as landscape building blocks. In many ways they form the backbone of a more connected landscape and the core of any future biolink or flagship area.

1.1.4 Developing a world class National Reserve System for Victoria

Around 37% of Victoria's public land is managed under the provisions of the National Parks Act 1975. The total area managed for conservation by Parks Victoria is 3.96 million ha, or about 17% of Victoria's total area.

Since the implementation of the National Reserve System Program in 1992, all Australian states and territories have been working toward the development of comprehensive, adequate and representative (CAR) systems of protected areas, as stipulated by the JANIS criteria (Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia). This stipulated that a minimum of 15% of the original extent of each vegetation group should be protected by the reserve system.

In 2005, the Natural Resource Management Ministerial Council released the Directions for the National Reserve System – a Partnership Approach. This document, jointly developed and agreed by the Australian, state and territory governments, contains qualitative targets for the National Reserve System (NRS). The targets are:

- Comprehensiveness – 80% of regional ecosystems within an Interim Biogeographic Regionalisation of Australia (IBRA) region are represented in the NRS by 2010.
- Representativeness – 80% of regional ecosystems within an IBRA sub-region are represented in the NRS by 2015-20.

The Australian Government has provided a further update to the 2005 Directions for the National Reserve System – a Partnership Approach with the release of Australia's Strategy for the National Reserve System 2009-2030. The strategy identifies priority actions to provide a nationally coordinated approach under each theme, including the following national targets for a National Reserve System:

- Examples of at least 80% of all regional ecosystems in each bioregion by 2015.
- Examples of at least 80% of all regional ecosystems in each sub-region by 2025.
- Core areas for the long-term survival of threatened ecosystems and threatened species habitats in each of Australia's bioregions by 2030.
- Critical areas for climate change resilience, such as refugia, to act as core lands of broader whole-of-landscape scale approaches to biodiversity conservation by 2030.

The strategy highlights that "…The National Reserve System is the cornerstone of our national efforts to protect terrestrial biodiversity. It stands as Australia's commitment to future generations that land vital to the survival of our unique native species, ecosystems and associated cultural values will be protected in perpetuity."

This strategy recognises that setting aside and managing areas in the National Reserve System will not, of itself, ensure that all biodiversity conservation objectives are met. Successful biodiversity conservation requires

protected areas to be established and well-managed in conjunction with the full range of conservation measures applied to other lands across the landscape. The strategy prioritises areas to increase the area protected in under-represented bioregions (less than 10%).

Many of the Ecological Vegetation Classes within the Goldfields bioregion and Central Victorian Uplands bioregion that are covered by the landscapes in this project are under-represented in the reserve system. In these cases, improving the protection or status of the public land on which they are found would help to achieve the aims of the CAR system of protected areas.

1.1.5 Protected Areas & Climate Change

Dudley et al. (2010) clearly articulate the importance of the existing protected area system in mitigating and adapting to the impacts of climate change. Protected areas assist with mitigation by preventing the loss of carbon as well as capturing carbon dioxide in the atmosphere. They are estimated to store 15% of terrestrial carbon currently. They also assist with adaptation by providing ecosystem services that help people cope with climate change, and maintaining local ecosystem integrity. Protected areas are one of the best ways of keeping carbon 'locked in' and ecosystem services running smoothly. Increasing investment in protected areas is therefore a key to improving our response to climate change, and should be a priority in government responses to climate change.

However, concerns have also been raised about the impact of climate change on the effectiveness of our fixed protected areas, reiterating the need to view and manage protected areas as part of the broader landscape. Climate change will impact significantly on Australia's biological diversity, which is likely to impact on the ecosystem services that it provides (Dunlop, et. al. 2008). This will in turn impact on our National Reserve System, by presenting a constantly changing ecosystem with new threats. This will require the reassessment of the fundamental goals of conservation. Because species and ecosystems require suitable habitat to survive, a key to their future survival in this ever-changing environment will be ensuring that widespread and diverse habitat is available across the landscape.

Additionally, Dunlop et al. (2008) consider that the bioregional framework used to develop the National Reserve Strategy is ideal for "...strategically developing a system of protected areas that will remain effective under climate change". This is because it targets species diversity at multiple scales. In order to be effective, the bioregional framework will need to be implemented as widely as possible across all habitat conservation programs, including the protected area system.

1.1.6 Why is Central Victoria important?

A conference held by the Field Naturalists Club of Victoria in the early 1990s highlighted the dire decline that has been suffered by Central Victoria's box-ironbark forests, due to land clearing, timber harvesting, gold mining, stock grazing, pest plants and animals, altered hydrology and salinity. The conference warned of the need for urgent action to reverse this decline (Calder, 1993). Since that time, the declaration of national parks and other reserves aimed at improving protection for Victoria's box-ironbark forests has been a great step forward.

Between the late 1990s and early 2001, the Environment Conservation Council (ECC) conducted an investigation of the box-ironbark forests and woodlands in northern Victoria. The final report, delivered in June 2001, recommended three new national parks and major and minor additions to others; two new state parks and major and minor additions to others; one new park in the new category of national heritage park; one new regional park with some major and minor changes to others; a large number of new or expanded nature conservation reserves; extensive areas of state forest to remain for continued production of timber products; and numerous small reserves protecting remnant box-ironbark vegetation and providing for various community needs and uses from

CHAPTER 1

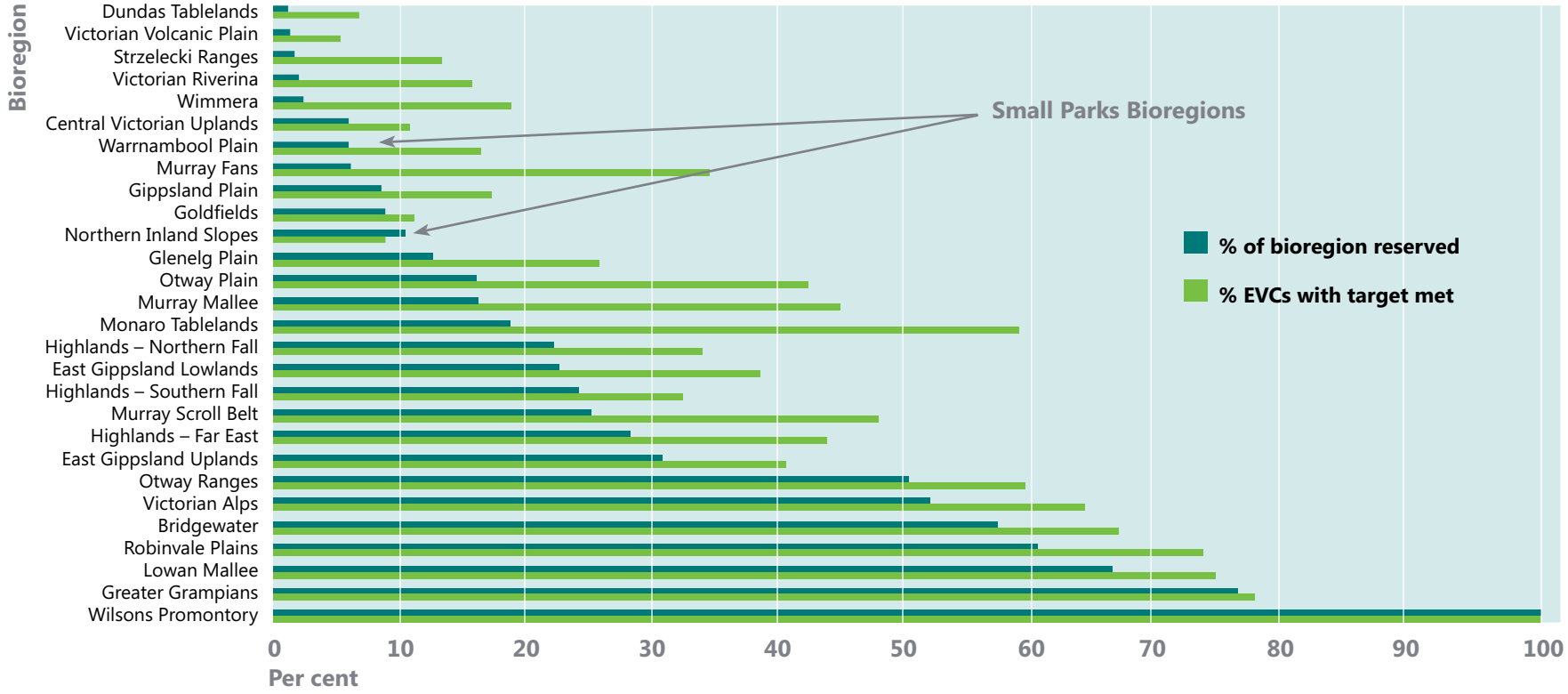


Figure 1: Percentage of ecological vegetation classes meeting nationally agreed reservation targets and proportion of bioregion reserved (includes Ecological Vegetation Class complexes and mosaics).

Source: Department of Sustainability and Environment, unpublished 2008; CAPAD 2006

public land. The recommendations would enlarge the box-ironbark reserve system from about 69,500 hectares to 190,500 hectares. The new system is equivalent to about 6.5% of the original extent of the forests and woodlands (ECC, 1991).

According to the Victorian State of the Environment Report for ten of Victoria's 28 bioregions, less than 20% of EVCs had met the reservation target (see figure 1). This in part reflects the high proportion of private land in these bioregions, the extent of vegetation loss and the consequent difficulties in reserve establishment. However, of these bioregions, the Strzelecki Ranges, Wimmera, Central Victorian Uplands and Goldfields all have significant areas of vegetated public land not in the reserve

system. Goldfields bioregions had more than 90% of remaining vegetation in medium and low quality classes (CES 2008).

Significant gaps still remain in the protection and good management of Victoria's box-ironbark landscape. A recent report identified that the box-ironbark forests of south-eastern Australia have been suffering a significant and long-term decline in the abundance of local bird populations as a result of drought (Bennett, 2008). This work shows that, with continuing changes to our climate, we are likely to see substantial changes in the avifauna of these forests. It is essential that such impacts are recognised and mitigated as much as possible.

The Victorian Government has defined a range of land tenures that apply to public land across the state, and the activities that are permissible or exempt in each category. Appendix 1 outlines the land-use categories in which activities are generally permitted in the major box-ironbark public land categories (see Appendix 1). A number of these categories are referred to in our report, and this will help to appreciate the issues facing each particular site discussed.

1.1.7 Creating landscape scale biolinks and flagships areas

The Victorian Government has outlined a framework for action to build ecosystem resilience across the Victorian landscape in the Land and Biodiversity White Paper, released in December 2009 (DSE, 2009).

As noted in the White Paper, adaptation to climate change requires immediate action to manage risks, avoid costs and maximise priority outcomes. (DSE, 2009a). The White Paper outlines a framework for action to build ecosystem resilience across the Victorian landscape, prioritising the building of landscapes identified as biolinks within identified flagship areas. The primary aim for managing flagship areas will be to protect and enhance the natural assets contained within them, and the ecosystem services that they provide.

Outcome 2.2 of the White Paper directs that: Assets within flagship areas are [to be] managed to maintain ecosystem services. This is intended to focus attention on landscapes that provide important ecosystem services. Thirteen 'flagship' areas with important social, environmental and economic values were chosen for the White Paper, based on a number of criteria (see DSE, 2009). The Goldfields are one of these flagship areas prioritised for action.

A new Victorian Natural Resource Management Plan will be prepared to further outline the specific long-term management actions for the flagship areas. As some threats to natural assets may occur outside the boundaries of a flagship area, management activities may need to be extended beyond these boundaries. Management of flagship areas will be regularly reviewed to ensure the progression of objectives. Another key outcome for the White Paper is to improve connectivity within important biolinks, [Outcome 2.3: A system of biolinks strengthens connectivity across Victoria].

The Register of Special Places collated by the VNPA identifies important landscapes and priority sites that fall within the Goldfields flagship area (as well as the adjacent Central Victorian Uplands). The regional biolinks outlined in the White Paper also coincide with the VNPA's Register of Special Places (see Figure 2). The register therefore helps to identify important areas for protection that will also contribute greatly towards achieving key White Paper outcomes, particularly Outcomes 2.2 and 2.3 noted above.

State, regional and local conservation groups have supported the state government's proposal for biolinks. Likewise, many local groups are already actively developing local and regional biolink projects, such as the Connecting Country project with Mount Alexander Shire, North Central Catchment Management Authority and City of Greater Bendigo.

CHAPTER 1

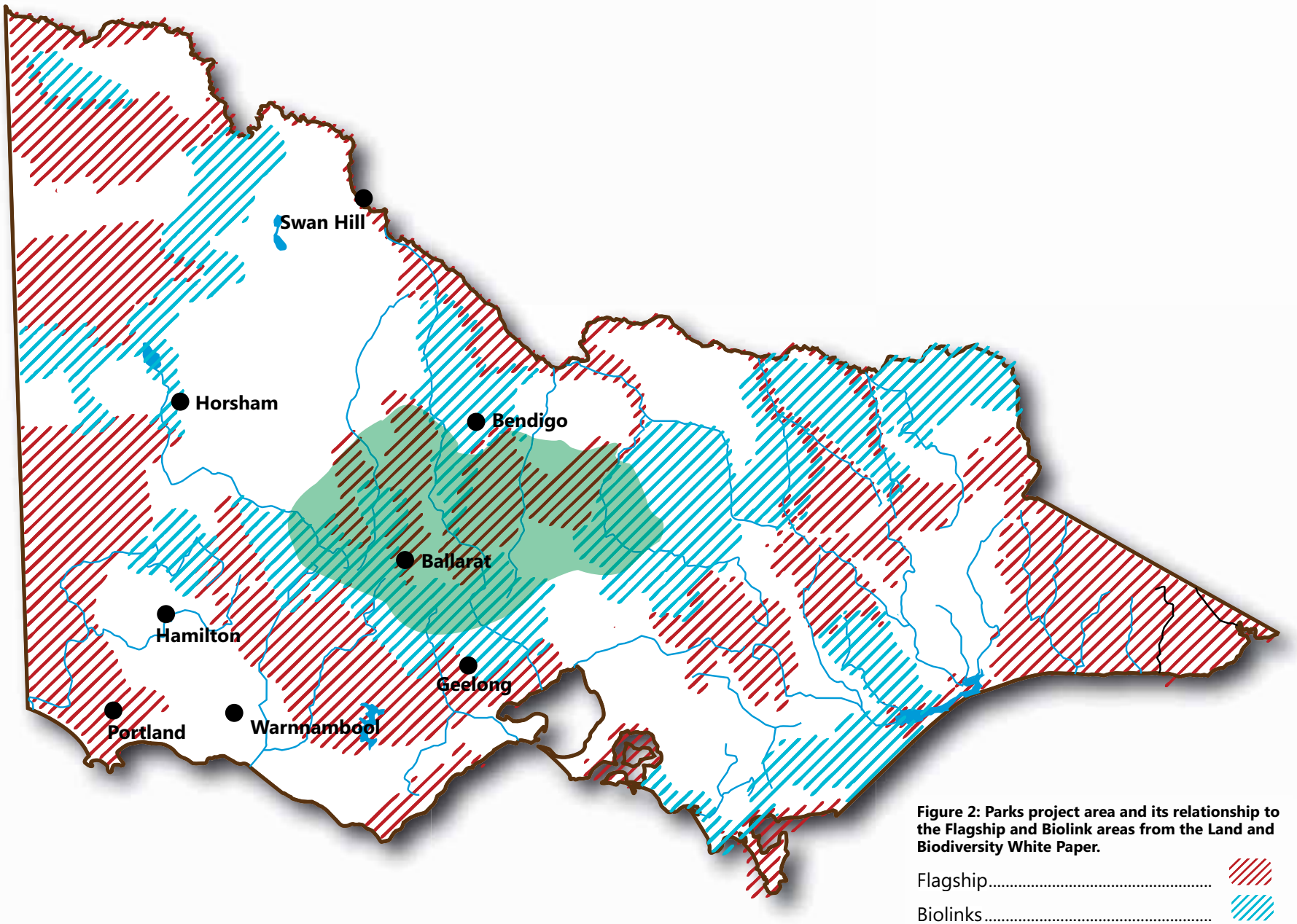


Figure 2: Parks project area and its relationship to the Flagship and Biolink areas from the Land and Biodiversity White Paper.

Map based on work by the DSE.

1.1.8 The Victorian Environmental Assessment Council (VEAC) Native Vegetation Investigation

The Victorian Government asked the Victorian Environmental Assessment Council (VEAC) to investigate remnant native vegetation on Crown land and public authority landoutside of largely intact landscapes across Victoria to identify opportunities for ecological linkages. 'Largely intact landscapes', the areas excluded from the investigation, have been defined for the purposes of Net Gain Accounting for the Native Vegetation Management Framework as 'contiguous areas of native vegetation greater than 20,000 ha, with high Landscape Context scores and Site Condition scores that are high (or if scores are not high, this is primarily due to natural or semi-natural disturbances). This definition essentially excludes the Alps, East Gippsland and the large, already-established parks in the Mallee, Otways and Grampians. The Central Victorian region is expected to be one of the areas looked at as part of this investigation, which is expected to release a discussion paper in mid 2010 and final report in 2011.

The purposes of the investigation are to:

(a) Identify and evaluate the condition, values, resources and uses of these areas of remnant native vegetation and associated fauna outside largely intact landscapes.

(b) Assess these areas for their connectivity and contribution to sustainable landscapes in relation to climate change.

(c) Report on the contribution of these areas of remnant native vegetation to biodiversity conservation, recreation activities, community uses, commercial opportunities, services and utilities in the context of improving connectivity with largely-intact landscapes and freehold land.

(d) Report on opportunities for management to achieve improved ecological connectivity.

1.2 What we did – Approach & Methodology

The VNPA identified Central Victoria as an area with a relatively high proportion of public land in smaller blocks across the landscape. The larger region was then broken into five sub-regions or zones of similar landscapes (see figure 4). The development of the zone or sub-regional classification system built on the approach developed by the Department of Natural Resources and Environment, Box-Ironbark Remnants Project undertaken in the 1990s (NRE 1996).

The project developed and implemented a five-step process (see Figure 3):

Step 1: Site identification.

Step 2: Site assessment.

Step 3: Prioritisation.

Step 4: On-ground assessment.

Step 5: Discussion and recommendations.

Step 1: Site Identification. The Small Parks Project initially sought nominations for special areas of public land considered by regional and local environment groups to be worthy of improved management or reservation in Central Victoria. The VNPA project officer approached these groups, and through phone conversations, meetings and field trips, areas to be nominated were determined. Local groups provided significant technical information and, importantly, extensive local knowledge. This resulted in 61 locations being nominated by ten environment groups and individuals (see Appendix 2 for list of participating groups and full list of sites).

Step 2: Site Assessment. After identification, information was collected on the natural values and threats for each location. Data sourced from the Department of Sustainability and Environment (DSE) was used to source data for the areas nominated in this project. This included data for native vegetation type or Ecological Vegetation Class (EVC) and bioregional conservation status (ie. whether endangered, depleted, vulnerable or least concern); native vegetation quality; threatened fauna records; threatened flora records; and some landscape-scale datasets such as conservation significance and landscape context (see Table 1 for summary,

see Appendix 3 for detailed results).

Natural values considered:

- Area.
- Number of Ecological Vegetation Classes (EVCs).
- Number of threatened fauna (EPBC, VROT and FFG listed).
- Number of threatened flora (EPBC, VROT and FFG listed).
- Conservation significance (derived from modelled dataset).
- Connectivity (derived from modelled dataset).
- EVCs under-reserved by bioregion (ha and % of the forest area).

Threats considered

- % reserved or under Special Protection Zones.
- Hectares (and volume) designated under the wood utilisation plan.
- Threats identified by local groups and expert panel including:

- Inappropriate fire management.
- Firewood collection & logging.
- Weeds & pest animals.
- Inappropriate recreation activities.

Step 3: Prioritisation. The natural values, and threats to those values, were then summarised and a scoring assessment developed. An expert panel was convened to review the data and scoring method, and the panel then ranked the identified sites.

The prioritisation process resulted in the identification of 20 priority locations. This included one cluster of small sites in the Mid-Loddon area which individually did not score highly, but were considered by the panel to comprise unique habitat refuge values that warranted their representation as a 'grouped' priority location. It also included the elevation of two Nature Conservation Reserves, Tunstalls Block west of Maryborough and Crosbie, east of Bendigo, on the basis of their exceptional fauna habitat values.

The 20 high-priority sites were then placed within sub-regions or landscape blocks (see Table 1). Detailed descriptions of each of the priority sites were developed, and on-ground assessment was initiated for 10 of the sites.

Step 4: On-ground Assessment. Suitably qualified ecological consultants were appointed to undertake vegetation quality assessments of each of the ten priority sites, which were:

– Bealiba State Forest
– Crosbie Nature Conservation Reserve
– Kingower State Forest
– Mount Cole State Forest
– Pyrenees Ranges State Forest (A and B)
– Tunstalls Nature Conservation Reserve
– Dunolly-Waanyarra State Forest
– Wellsford State Forest
– Wombat State Forest – Bullarto North
– Wombat State Forest – West

The consultants visited each of the sites and presented reports on each of the blocks, including:

- An initial reconnaissance of the forest area/reserve.
- Collection and use of relevant aerial photographs and other available mapping and resources, in order to identify appropriate habitat zones.
- Completion of a Habitat Hectare Assessment for each habitat zone.
- Determination of management opportunities for each habitat zone.

The results are incorporated in Table 2. The habitat hectare data and accompanying maps which are the final results of the vegetation assessments are in Appendix 4.

Step 5: Discussion & recommendations. A discussion of key values, threats and management issues is in chapters relating to each of the landscape zones. Each of the individual sites is discussed, and management and tenure recommendations made.

Figure 3: Small Parks Approach

Step 1: Site Identification
– 10 local & regional groups nominate 61 sites across 5 zones.

Step 2: Site Assessment
Information collated about natural values & threats:

- Area.
- Number of EVCs.
- Number of threatened flora & fauna.
- Conservation significance.
- Connectivity.
- Reserve status.
- Threats.

Step 3: Prioritisation

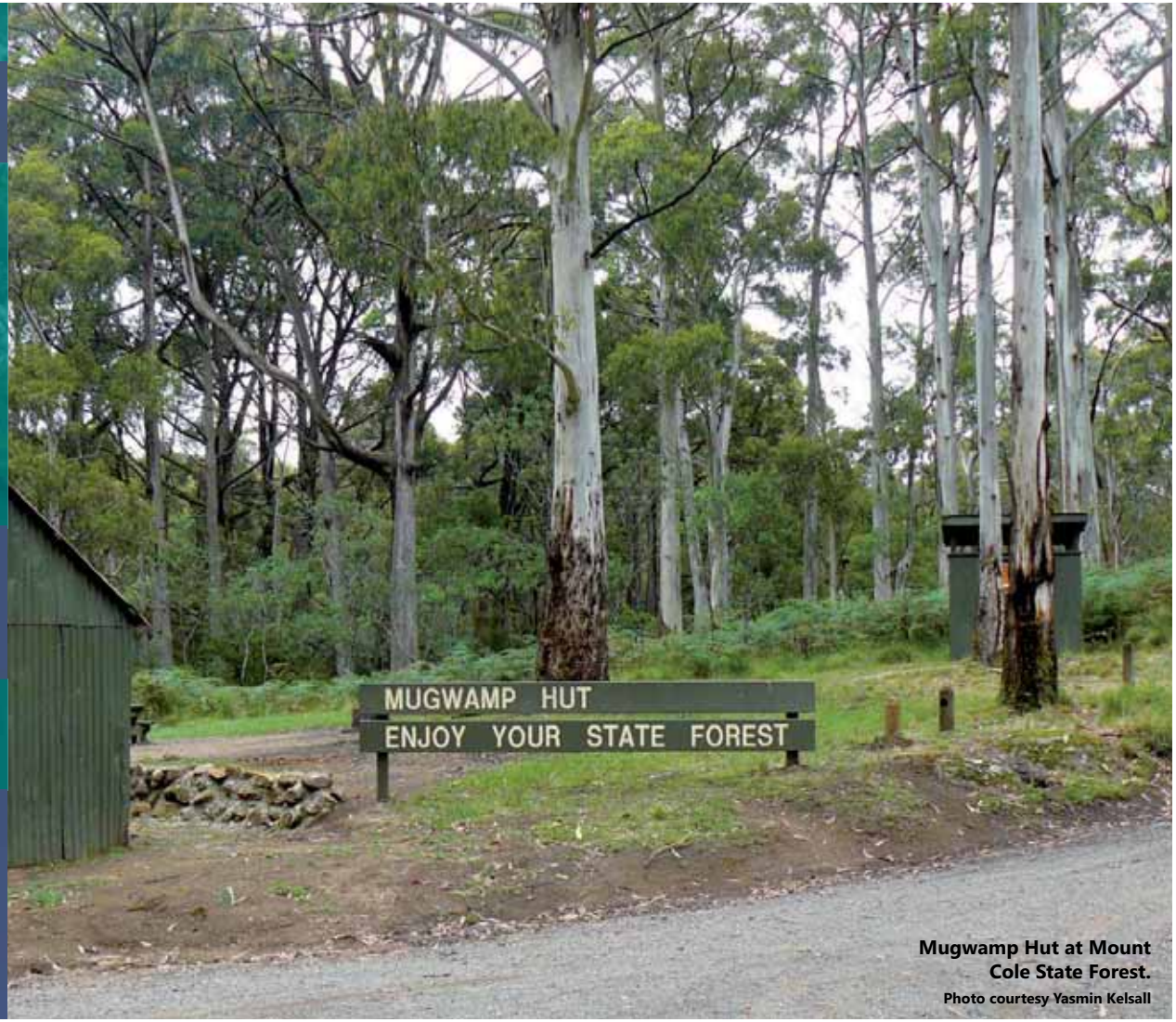
- Values & threats ranked.
- Expert panel review.
- 20 sites within five zones identified.

Step 4: On-ground assessments

- On-ground assessment on top 10 sites.

Step 5 Discussion & Recommendations

- Write up of values.
- Management & Tenure recommendations.

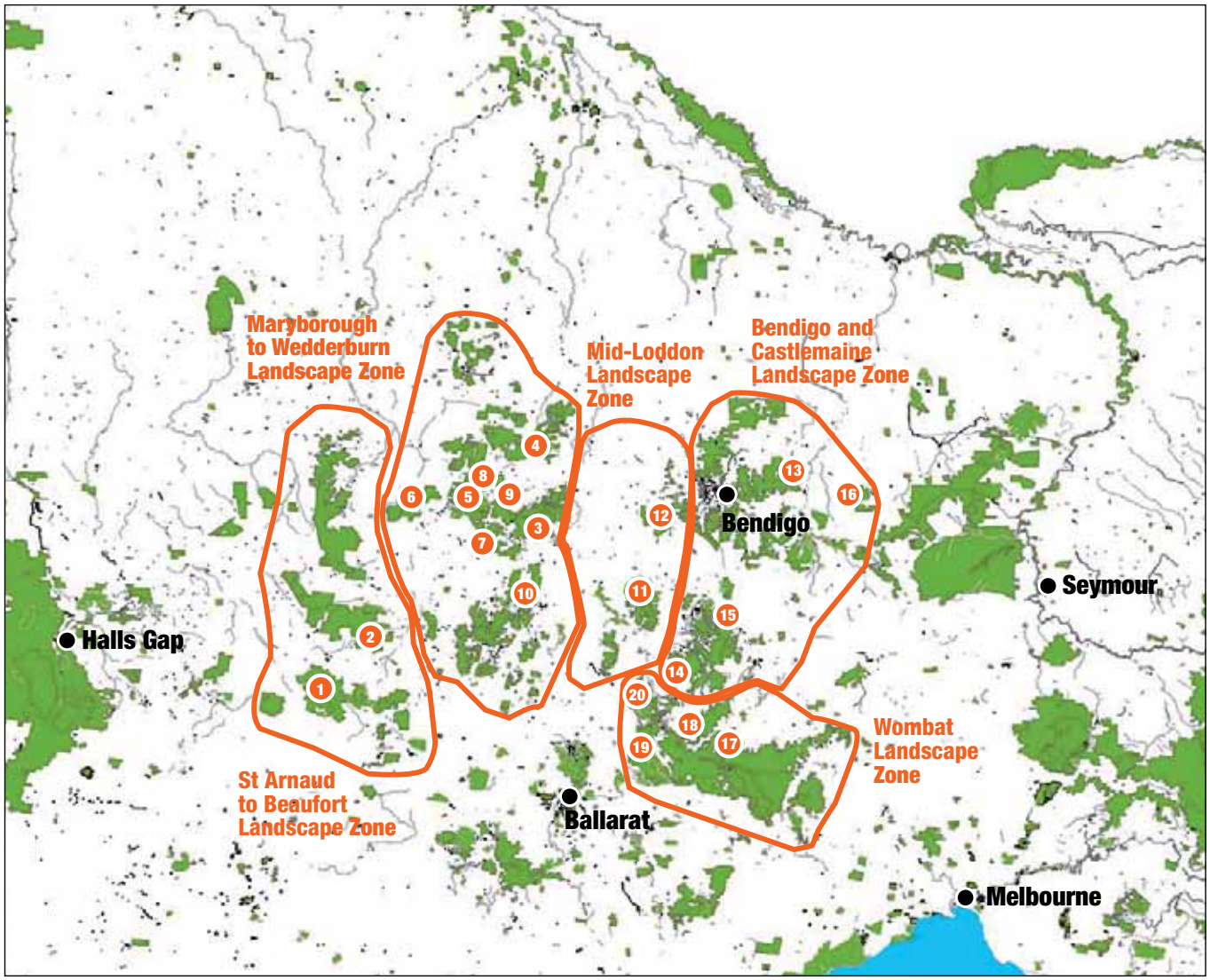


Mugwamp Hut at Mount Cole State Forest.
Photo courtesy Yasmin Kelsall

LOCATION & LAND STATUS	APPROX AREA	DIVERSITY (no of EVCs*)	THREATENED SPECIES Fauna	Flora	CONSERVATION SIGNIFICANCE	THREATS	RECOMMENDATIONS Management needs	Land tenure
	Ha	H, M, L	H, M, L	H, M, L	H, M, L	H, M, L		Proposed category of tenure
St Arnaud to Beaufort								
Mt Cole State Forest	8,926	H	M	H	H	H	✓	State Park
Pyrenees Ranges State Forest – Main section	14,680	H	M	L	H	H	✓	State Park, include Percydale Historic Area and Landsborough and Landsborough Hill Nature Conservation Reserves
Maryborough to Wedderburn								
Dunolly-Waanyarra State Forest	7,547	M	M	L	M	M	✓	State Park
Kingower State Forest	4,690	H	H	H	M	M	✓	State Park
Bealiba State Forest	7,954	H	H	L	M	M	✓	State Park
Tunstalls Nature Conservation Reserve	1,637	L	L	L	M	L	✓	–
Mt Hooghly State Forest	2,121	M	H	L	M	M	✓	State Park
Moliagul State Forest	1,396	M	L	L	M	M	✓	State Park
Harvest Home State Forest	2,242	M	L	L	M	M	✓	State Park
Timor State Forest	1,379	L	M	L	M	M	✓	State Park
Mid-Loddon								
Muckleford State Forest	3,152	M	H	M	M	M	✓	Add to Maldon Historic Reserve
Mid-Loddon small riparian reserves	81	L	L	L	H	L	✓	–
Bendigo Castlemaine Region								
Wellsford State Forest	7,122	M	H	M	M	H	✓	State Park
Upper Loddon State Forest – West section	1,806	L	L	L	M	M	✓	Add to Castlemaine Diggings National Heritage Park
Fryers Range State Forest	3,321	L	L	L	M	M	✓	Add to Castlemaine Diggings National Heritage Park
Crosbie Nature Conservation Reserve	2,056	M	H	L	M	L	✓	–
Wombat Region								
Wombat State Forest - Main	31,448	H	H	H	M	H	✓	State Park
Wombat State Forest – Bullarto North	5,747	M	M	L	H	H	✓	State Park
Wombat State Forest – West	5,085	H	M	L	H	H	✓	State Park
Wombat State Forest – Northwest	2,820	M	L	L	M	M	✓	Nature Conservation Reserve

Table 1 Summary of Results for High Priority Sites. * Ecological Vegetation Class.

KEY: High (H), Medium (M), Low (L)



1 Mt Cole State Forest

2 Pyrenees Ranges State Forest – Main section

3 Dunolly-Waanyarra State Forest

4 Kingower State Forest

5 Bealiba State Forest

6 Tunstalls Nature Conservation Reserve

7 Mt Hooghly State Forest

8 Moliagul State Forest

9 Harvest Home State Forest

10 Timor State Forest

11 Muckleford State Forest

12 Mid-Loddon small riparian reserves

13 Wellsford State Forest

14 Upper Loddon State Forest – West section

15 Fryers Range State Forest

16 Crosbie Nature Conservation Reserve

17 Wombat State Forest – Main

18 Wombat State Forest – Bullarto North

19 Wombat State Forest – West

20 Wombat State Forest – Northwest

Figure 4: Landscape Zones investigated in this report.

CHAPTER 2

2. Landscapes & Site Descriptions for Small Parks and Special Places

2.1 Introduction to the Bioregional Landscape

Through the Small Parks project, more than 115,000 ha of public land has been identified for improved management, and tenure change in some cases, of which 111,000 ha is currently state forest and 3,774 ha is retained in conservation reserves. The 20 priority sites are generally within the Central Goldfields and Central Victorian Uplands Bioregions. Some smaller areas identified fall in the Victorian Riverina Bioregion. Descriptions for the Goldfields and Central Victorian Uplands bioregions are given below.

The **Goldfields** bioregion comprises a series of rolling plains and low hills, mainly sedimentary in origin, extending east-west across the state from about Stawell to Wangaratta, and lying north of the Great Dividing Range (NRE 1997, in DSE 2002).

Its forests and woodlands are characterised by relatively poor soils, and selective clearing of the more productive sites since European settlement has tended to reinforce further the perception of low fertility throughout the fragmented remnants of native vegetation. With over 80% of the bioregion privately owned, sheep and cattle grazing and mixed cropping are the major land uses on freehold land. Vegetation cover has changed dramatically since European settlement. Rural residential sub-divisions have developed strongly in a number of areas near major cities and towns, especially around Bendigo (DSE 2002). Much of the bioregion is recognised as being of high conservation value, due to its relatively high percentage (about 25%) of remnant vegetation cover, low agricultural potential and high requirement for land protection and restoration work (Davidson 1996, in DSE 2002).

Cut-leaf Daisy, common in the Mount Cole State Forest. Photo courtesy Warwick Sprawson

Much of the Goldfields bioregion is also characterised by uncertain rainfall (400-700mm per annum). Declining terms of trade, particularly in the wool industry, have led to less intensive grazing in some areas. This, along with an increasing demand for 'lifestyle' properties near regional centres has meant that current land use in the bioregion has changed significantly over the past 15 to 20 years. The presence of scattered vegetation remnants has enabled this resilient landscape to regenerate in some areas as previous grazing activities have declined (DSE 2002).

The **Central Victorian Uplands** bioregion consists of rugged to gently undulating terrain extending from Great Western in the west to Carboor in the east. Towards the north-eastern part of the bioregion, hilly and mountainous terrain of less resistant Lower Palaeozoic sedimentary rock occurs near Porepunkah. Topography is less variable in the Pyrenees region where the ranges are around

Richardsons campground at Mount Cole State Forest.

Photo courtesy Yasmin Kelsall

660 m, punctuated by Mount Avoca (760 m). Throughout its north-eastern section, the bioregion is characterised by riverine plains of the Goulburn River and dissected uplands at higher elevations (600-800m) in the Lake Eildon region (DSE 2003).

Vegetation cover on both land tenures has changed dramatically since European settlement. Sharing a common boundary with the Goldfields bioregion, some regions of the western Central Victorian Uplands bioregion suffered extensive clearing and modification during the 19th century gold rush period (DSE 2003).

The area has a temperate climate with rainfall varying from 600 to 1000 mm per annum – the southern reaches receive less (400-500 mm). The flatter and more fertile valleys have been extensively used for agriculture. Sheep and cattle grazing and horticulture are the major land uses on freehold, along with some cereal and seed oil cropping. There has recently been a variety of agricultural changes within the Central Victorian Uplands bioregion and an increase in the purchase of small acreage properties for 'lifestyle' properties (DSE 2003).

CHAPTER 2

2.2 Regional & Site Descriptions

2.2.1 St Arnaud to Beaufort Zone

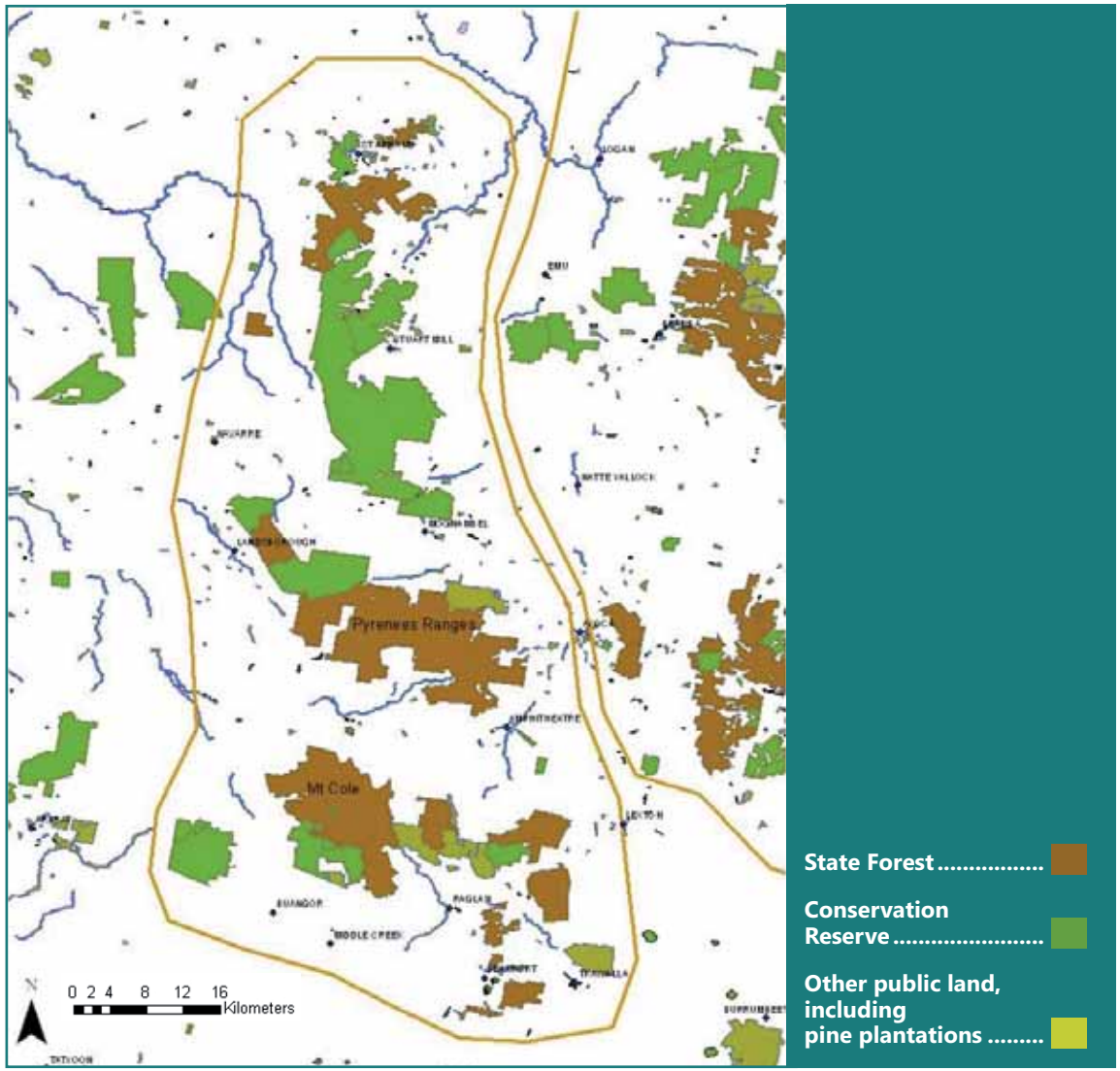
2.2.1.1 Overview of the Landscape

The landscape that we have identified as St Arnaud to Beaufort spans the Central Victorian Uplands and Goldfields bioregions.

This landscape lies west of Avoca, and forms links in the north with the Landsborough Nature Conservation Reserve, St Arnaud National Park and Percydale Historic and Cultural Features Reserve. It links to creek systems that flow to the north, east, south and west. Mount Cole and the Pyrenees Ranges State Forest are linked by private land.

Preliminary analysis conducted by the VNPA has identified the landscape as containing generally high conservation significance vegetation. The ranges within this landscape are well regarded for their abundant wildlife and wildflowers. The area varies from the lush cool valleys, waterfalls and alpine plateaus to box-ironbark forests of the lower forest areas. With stunning views and rugged mountains, the area is considered to be a walker's paradise.

In 1836 Major Thomas Mitchell travelled through the region and this was quickly followed by pastoralism and timber cutting, and later the gold rush. Timber harvesting began in the area in the 1850s in response to the demand for timber for mines and goldfield towns. Mount Cole was particularly impacted by this demand, and was closed to harvesting in 1904 because all millable timber had been removed. It was reopened in 1947



and harvesting continues today.

The uplands associated with this landscape are well known for their abundant flora and fauna, with plants including the state-listed and rare Mount Cole Grevillea (*Grevillea montis-cole* subsp. *montis-cole*) and Shiny tea-tree (*Leptospermum turinatum*).

Both areas have important habitat for the state-listed and vulnerable Powerful Owl and a range of woodland birds, as well as the state-listed vulnerable Brush-tailed Phascogale and other common mammals including koalas, echidnas and wallabies.

2.2.1.2 Special places requiring better management

We have identified two priority areas in the St Arnaud to Beaufort landscape zone that are candidates for improved management on the basis of their conservation attributes and their current management. They are:

1. Mount Cole State Forest
2. Pyrenees Ranges State Forest – Main section

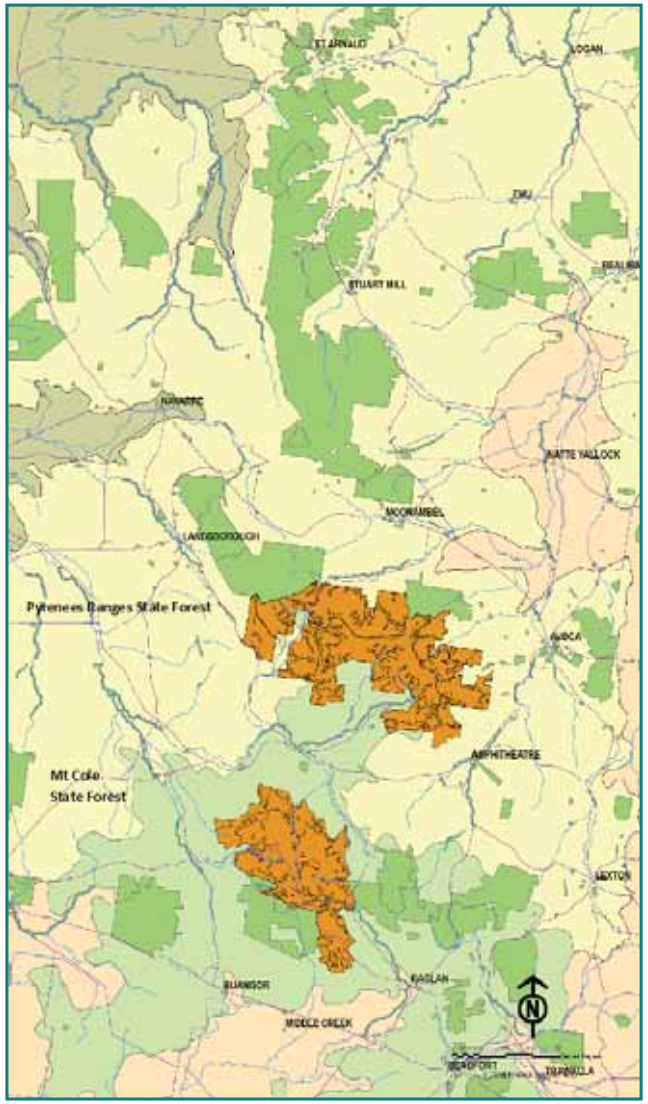
We have summarised the values associated with each forest area or reserve, assessed their current management, summarised results for vegetation quality management for the Mount Cole and Pyrenees Ranges state forests and made recommendations for their future management – see below.

Mount Cole State Forest covers an area of 8,926 hectares.

Mount Cole State Forest is in the Central Victorian Uplands bioregion. Mount Cole was created by the uplift of hot magma rock 390 million years ago, which crystallised to form granite.

Preliminary analysis shows the Mount Cole State Forest to contain generally high conservation significance vegetation, with the exception of some patches of medium conservation significance throughout. It is moderately linked to the east and south-west. The forest contains large Messmates and Manna Gums in the wetter southern part, with drier woodlands of stringybark and Yellow Box in the north. There are rare plants including the Mount Cole Grevillea and many orchids and other native wildflowers. More than 130 bird species are recorded for the area.

The state forest contains small patches of three Ecological Vegetation Classes considered endangered within the Central Victorian Uplands bioregion. These are Alluvial Terraces Herb-rich Woodland, Alluvial Terraces Herb-rich Woodland/Plains Grassy Woodland complex, and Creekline Grassy Woodland. Two vulnerable EVCs are also present for the bioregion: Riparian Forest (33 hectares) and Valley Grassy Forest (118 hectares). Based on mapping conducted by DSE, a total of 87% of the EVCs within this forest are under-reserved for the bioregion,



demonstrating that protection within Mount Cole would contribute significantly towards ensuring their conservation under the JANIS Comprehensive Adequate and Representative reserve criteria.

The nationally vulnerable Grampians Bitter-pea (*Daviesia laevis*) is recorded in Mount Cole State Forest. A number of state-listed rare flora species are also found, including Deane's Wattle (*Acacia deanei*), Mount Cole Grevillea (*Grevillea montis-cole* subsp. *montis-cole*), One-flower Early Nancy (*Wurmbea uniflora*), Shiny Tea-tree (*Leptospermum turbinatum*), Tight Bedstraw (*Galium curvihirtum*) and Yarra Gum (*Eucalyptus yarraensis*).

The Powerful Owl, Speckled Warbler, Square-tailed Kite and Brush-tailed Phascogale, all state-listed as vulnerable, have been recently recorded within Mount Cole State Forest.

Summary of results from the Vegetation Quality Assessment:

The complete results for the vegetation quality assessment and accompanying map for Mount Cole State Forest are in Appendix 5.

Current management

Parts of Mount Cole State Forest continue to be harvested for firewood, and fallen logs are also collected for firewood.

As well as the impacts noted above, Sambar Deer are particularly problematic within Mount Cole State Forest, causing significant damage to vegetation. Pine trees from the adjacent pine plantation are also invading the eastern edges of the forest.

In addition, camping in non-camping areas was identified through this project as being a concern for Mount Cole State Forest. For example, one individual was found to have been camping recently in a stone hut at Ben Nevis for at least six weeks. The impact of campers in designated camping grounds is also significant.

Pyrenees Ranges State Forest – Main section covers an area of 14,680 hectares.

The Pyrenees Ranges State Forest is in the Pyrenees wine region, and within the Goldfields and the Central Victorian Uplands bioregions. It is also in both the Wimmera River Catchment and the Avoca River Catchment.

This state forest is part of a much larger block of public land that links to both St Arnaud National Park to the north and Mount Cole to the south via private land.

More than 200 species of plants are recorded for the Pyrenees Ranges, including the state-listed and rare Rayless Daisy-bush (*Olearia tubuliflora*) and Squat Picris (*Picris squarrosa*).

There are also over 100 bird species in the area, including the state-listed vulnerable Diamond Firetail and Powerful Owl, and the near-threatened Black-chinned Honeyeater and Brown Treecreeper (south-eastern ssp.).

While overall the state forest was assessed as containing vegetation of high conservation significance, it contains patches of low, medium and very high conservation significance. The Alluvial Terraces Herb-rich Woodland EVC is present in the forest, and this is considered endangered within the Goldfields bioregion. Based on mapping conducted by DSE, about 30% of the EVCs within this forest are under-reserved for the bioregion, demonstrating that protection of the Pyrenees Ranges State Forest would contribute significantly towards ensuring their conservation under the JANIS Comprehensive Adequate and Representative reserve criteria.

Summary of results from the Vegetation Quality Assessment:

Complete results for the vegetation quality assessment and an accompanying map for Pyrenees Ranges State Forest are in Appendix 5.

Current Management

There are some 20 Special Protection Zones (SPZ) and seven Special Management Zones (SMZ) in the Central section of the Pyrenees Ranges State Forest. The SPZ areas are mainly for EVC protection for the variety of EVCs, as well as for Powerful Owl, threatened flora and water catchment areas in the east. The total area of SPZ is approximately 6,174 hectares.

The SMZ areas are for Powerful Owl habitat, the protection of a variety of EVCs and the

protection of a water supply catchment. The total area for SMZs is approximately 532 ha.

As well as the range of management issues noted above for the general landscape, previous sheep grazing that appears to have occurred in the recent past has significantly impacted on the vegetation in the Pyrenees Ranges State Forest.

Threats

We have identified four key threats affecting the priority sites in the St Arnaud to Beaufort landscape. They are:

1. Timber harvesting, including firewood collection.
2. Recreational use, particularly localised trail-bike riding and four wheel driving.
3. Pest animals (especially foxes, rabbits, pigs and cats) and weeds.
4. Inappropriate fire management.

The state forest areas within the landscape are significantly impacted by continued timber harvesting. The landscape has a history of timber harvesting and as a result there are very few large or old trees. Firewood continues to be sourced from the forest, both through targeted harvesting of trees and collection of fallen timber.

Local trail-bike riding and four wheel driving contributes to erosion and other related disturbance within the forest. A trail-bike management plan has been introduced in the Pyrenees Ranges State Forest – Main.

Foxes, rabbits, pigs and cats are particularly problematic pests that threaten fauna in this area. Various programs are in place for fox management in particular, but they are not necessarily consistent or particularly targeted. Weeds are prevalent, particularly along the edges of tracks.

The frequency and intensity of fires threaten the ecological integrity of the habitats in this landscape.

Different management arrangements as between Mount Cole and the Pyrenees Ranges State Forest are an impediment to managing the area as a connected landscape. Under current arrangements, Mount Cole is managed from Beaufort and the Pyrenees Ranges State Forest from Maryborough. Primary management responsibility is held by DSE.

A lack of perimeter fencing, off-track driving, degradation around the perimeter due to adjacent land uses, poor maintenance of vehicle tracks (ie. logs across roads) and poor signage of tracks, and camping in non-camping areas, are further threats.

2.2.1.3 Recommendations for future management

General recommendations for management of the landscape

In general, the landscape area requires a comprehensive reassessment of current management and status. This should be

Mount Cole State Forest contains many beautiful fern gullys. Photo courtesy Yasmin Kelsall

undertaken with an aim to ensure that its natural attributes are sustained into the future.

Improved management of the area will require a significant increase in resources and a consideration of management arrangements between different regions and agencies.

The following management issues within the general landscape require further action:

1. A reassessment of current and future timber harvesting practices and firewood collection.
2. Targeted and sustained control of key pest animals and weeds.
3. Improved fire management, taking account of the ecological requirements of significant EVCs, flora and fauna. This should include a monitoring component.
4. After reaching economic maturity, *Pinus radiata* plantations should be rotated from the state forest because of the significant fire risk presented by pines to the adjacent forest and community.
5. To be effectively managed as an entire landscape, a single management office should be set up within the Pyrenees Shire, rather than the current dispersion of state government offices in Maryborough, Daylesford, Bendigo, Creswick and Beaufort.
6. Improved on-ground resourcing is required to address issues including lack of perimeter fencing, off-track driving, poor maintenance of vehicle tracks, poor signage of tracks, and degradation around the perimeter due to adjacent land uses.
7. Infrastructure to develop ecotourism and encourage recreational use should be provided. An economic return from ecotourism could allow for the increase in funding needed for activities such as track and fire trail maintenance, weed and pest animal control, and provision of fire-fighting plans. The Pyrenees Shire should be encouraged to investigate the creation of trails for walkers, bike and horse riders from accommodation venues to forest access locations.
8. Control unauthorised access by trail-bikes, 4WD vehicles and shooters.

Mount Cole State Forest

- A trail-bike management plan has been introduced in the Pyrenees Ranges State Forest – Main, and this should be extended to cover Mount Cole State Forest as well.
- A management plan and allocated funding are needed for Sambar Deer and to address pine invasion.
- Targeted management of camping in both designated and undesignated areas is needed, with improved surveillance and signage to reduce incidence of camping in non-camping areas.
- Pine plantations that extend to the east should eventually be phased out and replaced with native vegetation, thus forming a link to Mount Lonarch State Forest and Ben Major Flora Reserve and State Forest.

Pyrenees Ranges State Forest – Main section

- Exclusion plots would be useful to assess the recovery of the understorey from previous sheep grazing.
- The amount of timber harvesting and firewood collection should be reduced to protect and retain habitat.

Tenure

We recommend that both Mount Cole and Pyrenees Ranges state forests be reclassified to become state parks. For the Pyrenees, this would include the inclusion of the Percydale Historic Area, Landsborough Nature Conservation Reserve, and Landsborough Hill Nature Conservation Reserve.

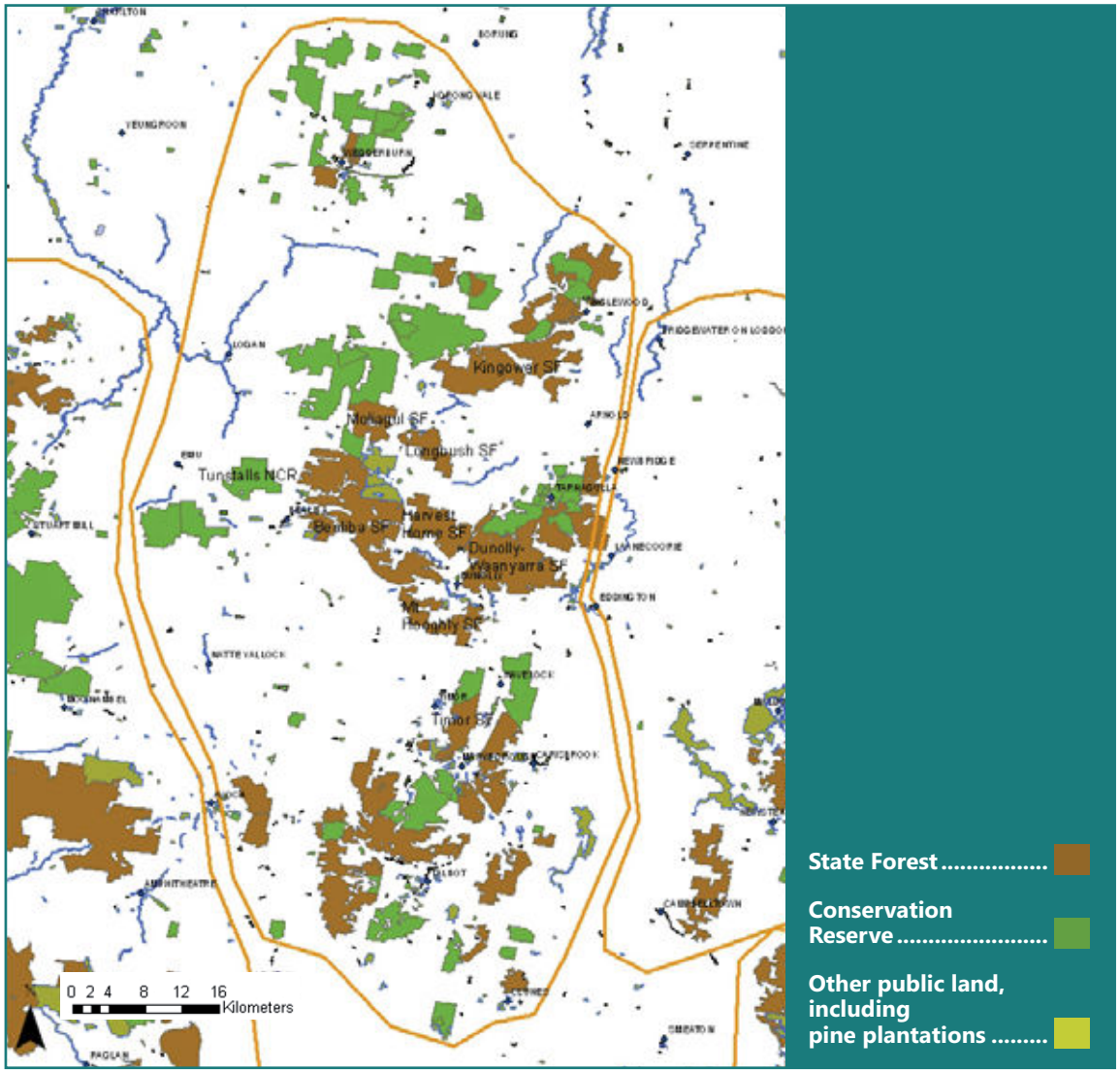
2.2.2 Maryborough to Wedderburn Zone

2.2.2.1 Overview of the Landscape

The landscape block that we have identified as Maryborough to Wedderburn extends from Wychitella Flora and Fauna Reserve in the north down to Maryborough, encompassing Kooyoora State Park and Laanecoorie Reservoir. The landscape links with other remnant vegetation to the north, as well as the Loddon River and significant wetlands, providing a potential link to the Murray River. This landscape is contained within the Goldfields bioregion.

The landscape is generally well linked by vegetation on public and private land, with a varied quality of habitat. The area has had a history of intense land use, including stock grazing, gold mining and timber harvesting. The gold mining in the region included the removal of timber for settlements and infrastructure, and significant disturbance of surface soil and waterways. Timber harvesting commenced in the 1850s and has continued to the present time. Box and ironbark eucalypts have been prized for their timber and sought for many different purposes over the years, including eucalyptus distilling. Timber harvesting continues in state forest areas within this landscape, and as a result there are very few large or old trees, and many areas of understorey are significantly degraded.

The area contains significant stands of box-ironbark forest as well as other associated



forests and woodlands. Box-ironbark forests are exceptionally rich producers of nectar, a food source sought by many birds and possums.

This landscape block is home to a range of rare and threatened plant and animal species. It has important habitat for a wide diversity of fauna including the nationally endangered Swift Parrot, state-listed Powerful Owl, Brush-tailed Phascogale or Tuan, and numerous woodland birds and reptiles including the Woodland Blind Snake.

The Maryborough and Wedderburn landscape zone is also home to a range of rare and threatened flora species. These include significant orchid species, with records for the nationally endangered McIvor Spider-orchid (*Caladenia audasii*) and state-listed and rare Bristly Greenhood (*Pterostylis setifera*) and Broad-lip Diuris (*Diuris palachila*). Other significant flora include the state-listed and vulnerable Ausfeld's Wattle (*Acacia ausfeldii*) and Bealiba Ironbark (*Eucalyptus tricarpa* subsp.*decora*), and the rare Goldfields Grevillea (*Grevillea dryophylla*), Blue Mallee (*Eucalyptus polybractea*), Whirrakee Wattle (*Acacia williamsonii*) and Buloke (*Allocasuarina luehmannii*).

The native vegetation of the Maryborough to Wedderburn Landscape is very well linked in a north-south direction. There is also a potential future link that could extend north to the Murray River via a series of wetlands and the Loddon River. Additionally, there are strong links across private land to other public land, particularly to St Arnaud National Park and the Pyrenees to the west. These links are particularly important in the face of the changing climate, and will assist in giving some mobile fauna options for alternative habitats.

Grassy woodland in Bealiba State Forest. Photo courtesy Practical Ecology

2.2.2.2 Special places requiring better management

We have identified eight priority areas within the Maryborough to Wedderburn landscape that are candidates for improved management on the basis of their conservation attributes and the current

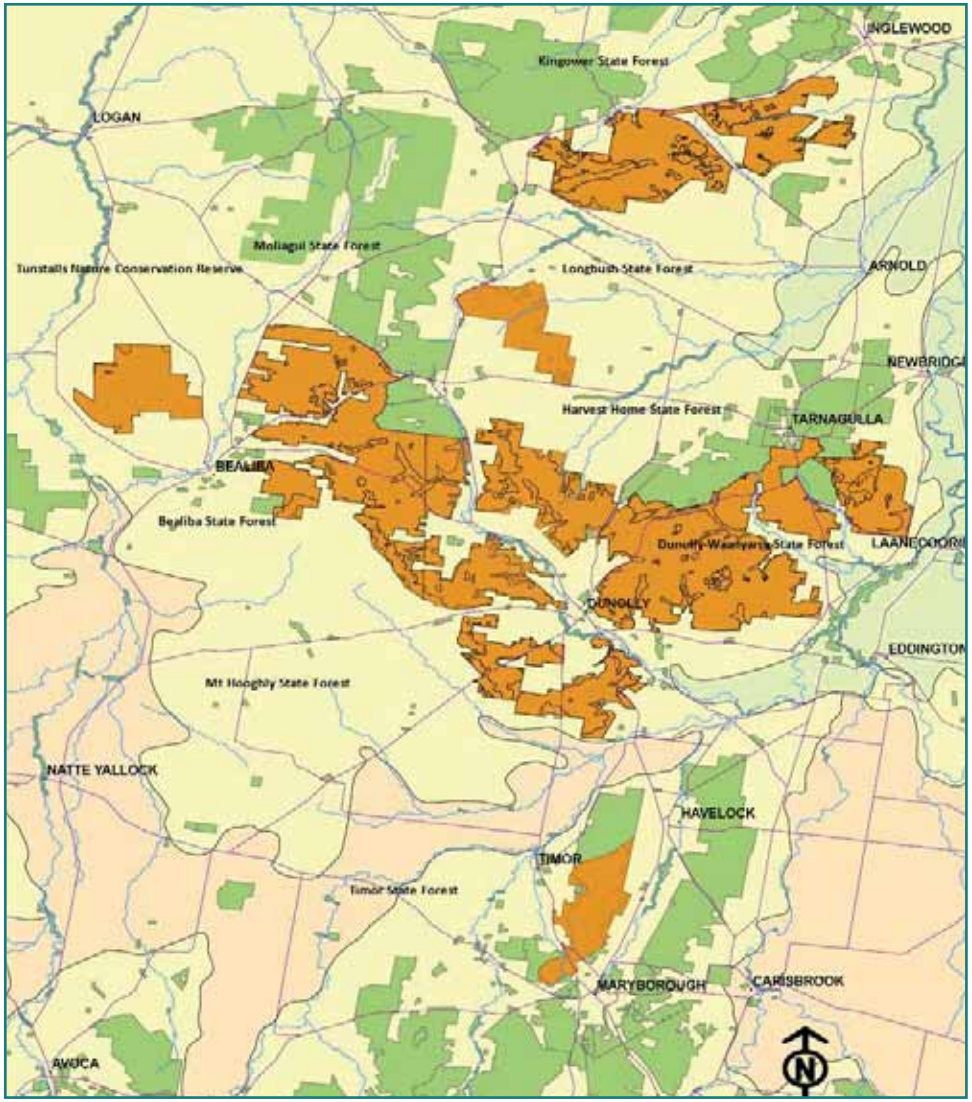
management they are subject to. They are:

1. **Dunolly-Waanyarra State Forest**
2. **Kingower State Forest**
3. **Bealiba State Forest**
4. **Tunstalls Nature Conservation Reserve**
5. **Mount Hooghly State Forest**
6. **Moliagul State Forest**
7. **Harvest Home State Forest**
8. **Timor State Forest**

All the sites identified as Special Places are managed by DSE, except for Tunstalls Nature Conservation Reserve, managed by Parks Victoria.

We have summarised the values associated with each forest area or reserve, assessed their current management, summarised results for vegetation quality management for the Dunolly-Waanyarra, Kingower and Bealiba state forests and Tunstalls NCR and made recommendations for each reserves and their future management – see below.

Dunolly-Waanyarra State Forest covers an area of approximately 7,547 hectares and is within the Loddon River catchment. It is the source of at least one creek, which flows into the Bet Bet Creek, with the Laancoorie Reservoir just to the south-east. The state forest is bordered to the north by Waanyarra Nature Conservation Reserve, with another section of the reserve close by to the east.



Nine areas in the Maryborough to Wedderburn area identified as 'Special Places'.

Preliminary analysis shows Dunolly-Waanyarra State Forest as generally having medium conservation significance with the exception of some patches of very high conservation significance at the edges of the reserve associated with patches of grassy woodland along gullies and creeks.

Approximately 12% of the EVCs identified by DSE mapping within this forest are currently under-reserved in the bioregion.

Summary of results from the Vegetation Quality Assessment:

Further work commissioned by the VNPA provided more detailed EVC information, by using existing DSE maps and carrying out field-based assessments. Low Rises Grassy Woodland Ecological Vegetation Class, classified as vulnerable within the Goldfields bioregion, was found to be present (approximately 269 hectares). The other threatened EVC present is the endangered Alluvial Terraces Herb-rich Woodland (401 hectares).

Complete results for the vegetation quality assessment and accompanying map for Dunolly-Waanyarra State Forest are in Appendix 5.

Dunolly-Waanyarra State Forest has habitat for the nationally endangered Swift Parrot, as well as other significant state-listed species such as the Black-chinned Honeyeater, Crested Bellbird, Hooded Robin, Powerful Owl, Brush-tailed Phascogale and Woodland Blind Snake.

The forest has records for significant flora including Swamp Diuris (*Diuris palustrius*) and Cane Spear-grass (*Austrostipa breviglumis*).

Current management

There are 12 Special Protection Zones (SPZ) and three Special Management Zones (SMZ) in the Dunolly-Waanyarra State Forest.

The SPZ areas are mainly for EVC protection for Grassy Woodland EVC and other EVCs associated with creeks and gullies. They also address the protection of Swift Parrot and Powerful Owl and other fauna, and two historic sites. The total area is 535 hectares.

The SMZs are for a fauna refuge, three Swift Parrot sites, a Powerful Owl site and two historic sites. The total area for SMZs is 793 hectares.

Kingower State Forest covers some 4,690 hectares. It falls within the Loddon River catchment and contains the headwaters for three creeks. The state forest is adjoined by the Inglewood Nature Conservation Reserve to the north and significant adjoining vegetation on private land to the east, north and south.

Preliminary analysis of this area showed Kingower State Forest as generally having medium conservation significance, with some patches of high conservation significance. High and very high conservation significance vegetation (particularly low rises Grassy Woodland Ecological Vegetation Class) is present on private land immediately to the east.

The area has important habitat for a number of significant woodland birds, including the nationally endangered Swift Parrot, as well as a range of state-listed species including the Woodland Blind Snake, Fat-tailed Dunnart and Brown Toadlet.

The forest contains significant orchid species, with records for the nationally endangered McIvor Spider-orchid (*Caladenia audasii*) and state-listed and rare Bristly Greenhood (*Pterostylis setifera*) and Broad-lip Diuris (*Diuris palachila*). Other significant flora includes the state-listed and vulnerable Ausfeld's Wattle (*Acacia ausfeldii*) and the rare Goldfields Grevillea (*Grevillea dryophylla*), Blue Mallee (*Eucalyptus polybractea*), Streaked Wattle (*Acacia lineata*) and Whirrakee Wattle (*Acacia williamsonii*).

Summary of results from the Vegetation Quality Assessment:

VNPA work identified the lack of perimeter fencing, and degradation around this perimeter, to be important threats to the integrity of vegetation in Kingower State Forest.

Some areas of the forest lack large trees, particularly within some large sections of box-

ironbark forest. Additionally, trees across the entire extent of the forest are showing signs of stress. The forest is identified as being at a high risk of fire.

Kingower State Forest has a good degree of vegetation diversity, which appears to result from the larger range of topography and geology that it contains. However, some areas have suffered from understorey degradation due to previous land management practices. This is particularly relevant to the history of logging and prospecting that has degraded the understorey within box-ironbark forest and Low Rises Grassy Woodland, and sheep grazing which has degraded the top of the range and southern slopes. Other parts of the range are almost weed-free and have a large diversity of understorey herbaceous and grass species. Despite areas of degraded understorey, excellent examples of box-ironbark forest have also been observed through this project. These areas contained large old trees as well as a good tree canopy cover and good shrub and herb layer, even though it was grass-poor.

Kingower State Forest is dominated by box-ironbark forest, with a number of other shrubland and woodland vegetation types present. Two EVCs considered vulnerable within the Goldfields bioregion are well represented in this forest: Low Rises Grassy Woodland EVC (171 ha), and Granitic Grassy Woodland (127 ha).

Capeweed and Paterson's Curse cover Bald Hill, in Kingower State Forest.

Complete results for the vegetation quality assessment and accompanying map for Kingower State Forest are in Appendix 5.

Current management

There are five Special Protection Zones (SPZ) and six Special Management Zones (SMZ) for Kingower State Forest.

The five SPZs are designated to protect five sites totalling 190 hectares.

There are two SMZs for orchid protection (24 ha), two Swift Parrot sites (438 ha) and two large old tree sites (151 ha).

As well as the range of threats to the landscape listed above, off-track driving is also a threat to this forest, due to poorly maintained vehicle tracks and/or poor signage of tracks. Trail-bike riding poses an additional threat to the integrity of the area.

Bealiba State Forest is a large forest block within the Goldfields bioregion, covering an area of about 7,954 hectares. It is located just outside Dunolly-Waanyarra, and the areas of the forest closest to Dunolly-Waanyarra are degraded due to vehicle use and firewood collection. The habitat areas further away from Dunolly-Waanyarra have better quality ground storey vegetation.

The forest is located along a ridgeline that feeds the headwaters of both the Loddon and the Avoca rivers. The Moliagul Historic and Cultural Features Reserve and the Moliagul Nature Conservation Reserve adjoin it to the north.

Preliminary analysis of the area shows Bealiba State Forest as generally having medium conservation significance with some small patches of high and very high conservation significance associated with Low Rises Grassy Woodland EVC near gullies and Burnt Creek.

The forest is dominated by box-ironbark forest, which constitutes around 6,270 ha of the total area. Two other EVCs in the forest are classified as threatened within the Goldfields Bioregion, including the endangered Creekline Grassy Woodland (41 ha) and an area of approximately 492 ha of the vulnerable Low Rises Grassy Woodland.

The forest is home to a wide range of threatened woodland birds, including the Barking Owl, Black-chinned Honeyeater and the nationally endangered Swift Parrot.

Significant flora includes the Bealiba Ironbark (*Eucalyptus tricarpa* subsp.*decora*), which is vulnerable in Victoria, and the rare Cane Spear-grass (*Austrostipa breviglumis*).

Summary of results from the Vegetation Quality Assessment:

A significant amount of vegetation diversity was observed in Bealiba State Forest. This is likely to be due to the range of topography and geology seen across the forest. Away from roads, the box-ironbark vegetation generally had a poor understorey, and areas of grassy woodland generally lacked understorey. This is probably due to a combination of previous grazing, logging and gold mining, especially on the areas of alluvial soils. Although the understorey vegetation across the top of the Bealiba Range has a greater cover of weedy species than the slopes of the range, it still had a greater than 25% indigenous vegetation cover.

Complete results for the vegetation quality assessment and accompanying map for Bealiba State Forest are in Appendix 5.

Current management

There are 14 Special Protection Zones (SPZ) and two Special Management Zones (SMZ) for Bealiba State Forest.

All the SPZs are for EVC protection, and two of these also target Barking Owl protection. The EVCs to be protected include Grassy Woodland and other EVCs associated with gullies and creeks. The area totals 682 hectares.

The SMZ areas are for the Belgian/ Perseverance Quartz Gold Mine and Belgian Reef Cyanide vat (431 ha) and a large old tree site (27 ha).

As well as the range of threats to the landscape listed above, off-track driving is also a threat to Bealiba State Forest, due to poorly maintained vehicle tracks and/or poor signage of tracks.

The assessment of vegetation quality at Bealiba State Forest indicates that there are very few areas of the forest that have any large trees. Additionally, trees across the entire extent of the forest are showing signs of stress. The forest is identified as being at an extreme risk of fire due to climate change.

Tunstalls Nature Conservation Reserve covers an area of about 1,637 hectares.

The reserve lies within the Avoca River catchment with Cochranes Creek and the Avoca River circling the reserve to the east, south and west. It has a significant number of large old trees, most of the mature trees consisting of Yellow Gums

with some scattered Yellow Boxes. There is a small number of Red Ironbarks in one area of the reserve.

Preliminary analysis of the reserve showed it to have medium conservation significance, with small areas of very high conservation significance at the edge of the forest boundary, mainly in the north, associated with patches of Grassy Woodland Ecological Vegetation Class.

The reserve is dominated by box-ironbark, with small patches of the vulnerable Low Rises Grassy Woodland (126 ha). It has habitat for a range of woodland bird species, including the nationally endangered Swift Parrot, as well as the state-listed Near-threatened Hooded Robin, Black-chinned Honeyeater and Crested Bellbird.

The forest contains records for significant flora including the Green-strap Star-liverwort (*Asterella tenera*).

Summary of results from the Vegetation Quality Assessment:

Complete results for the vegetation quality assessment and accompanying map for Tunstalls NCR are in Appendix 5.

Current management

As a Nature Conservation Reserve, the site is exempt from activities such as car rallies, horse riding and hunting, as well as fossicking, sawlog harvesting and firewood collection.

However, off-track driving is a threat to Tunstalls Nature Conservation Reserve, due to poorly maintained vehicle tracks and/or poor signage of tracks.

During research conducted by the VNPA, barbed wire on adjacent farm fences and on parts of the perimeter and internal fencing were found to be a particular hazard to native wildlife in Tunstalls Nature Conservation Reserve. A dead kangaroo was found trapped, hanging and dead in barbed wire near a perimeter fence.

Recent surveys also found that all areas of the reserve are showing signs of stress where canopy cover results are low. Weeds were noted to be an issue in Habitat Zone 5. A lack of logs was noted across the majority of the reserve in Habitat Zone 3 (see appendix for further information on habitat zones).

Mount Hooghly State Forest covers an area of approximately 2,121 hectares.

The state forest is surrounded by private land, with a high coverage of native vegetation to the west which joins the Bealiba State Forest. It is within the Loddon River catchment and adjoined by two of the tributaries of Bet Bet Creek. There are two quarry reserves in the north-east of the forest block.

Preliminary analysis identified the block as having generally medium conservation significance, with some patches of high and very high conservation significance in the centre of the reserve associated with lowland patches of Grassy Woodland. There are links to the east and west along tributaries of Bet Bet Creek, with particularly strong links to the north.

The forest is mostly box-ironbark forest, the second largest EVC being Grassy Woodland (415 ha), considered vulnerable within the Goldfields bioregion. Small patches of the endangered Creekline Grassy Woodland and Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic are also present. Some 20% of the EVCs within this forest are under-reserved within the Goldfields bioregion.

The forest has habitat for a range of significant woodland birds, including the nationally endangered Swift Parrot and the state-listed near-threatened Black-chinned Honeyeater. Significant flora includes the state-listed Buloke (*Allocasuarina leuhmannii*) and the endangered Silky Glycine (*Glycine canescens*).

Current management

There are eight Special Protection Zones (SPZ) and four Special Management Zones (SMZ) for the Mount Hooghly State Forest.

The SPZ areas are mainly for protection of Grassy Woodland and other EVCs associated with gullies and creek lines, as well as Swift Parrot and Barking Owl, and a historic mine site. These areas total 251 hectares.

The SMZ are for Swift Parrot and Barking

Owl and a historic mine site, totalling 330 hectares.

Moliagul State Forest covers an area of approximately 1,396 hectares.

The forest is on a ridgeline that feeds tributaries of both the Loddon and the Avoca rivers. This includes the Kangoerar and Orville creeks flowing to the east, and Cochranes Creek to the west. It is linked to Kooyoora State Park to the north, and Moliagul Nature Conservation Reserve and Moliagul Cultural and Natural Features Reserve to the south.

Preliminary analysis shows this block as having medium conservation significance associated with the EVCs linked to the creeks flowing through the forest, particularly Grassy Woodland/Creekline Grassy Woodland and Alluvial Terraces Herb-rich Woodland.

Most of the vegetation of Moliagul consists of box-ironbark forest (1,198 hectares), with a range of other EVCs represented as well in small patches. These include Creekline Grassy Woodland, Alluvial Terraces Herb-rich Woodland and Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic, all considered endangered within the Goldfields bioregion. The vulnerable Grassy Woodland EVC is also present in a slightly larger patch of 77 hectares.

The forest provides habitat for the state-listed Black-chinned Honeyeater and nationally endangered Swift Parrot. Deanes Wattle (*Acacia deanei*) is also recorded within 1 kilometre of the area.

Current management

There are two Special Protection Zones (SPZs) and two Special Management Zones (SMZs) for the Moliagul State Forest.

The two SPZs are a fauna refuge of 14 ha, and 108 ha for large tree protection.

The SMZs protect the endangered EVCs Creekline Grassy Woodland, Alluvial Terraces Herb-rich Woodland and Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic, with a total area of 58 hectares.

Harvest Home State Forest covers an area of about 2,242 hectares.

This forest links with Dunolly-Waanyarra State Forest to the east. To the west it links with Moliagul Historic and Cultural Features Reserve via vegetation on private land. The forest is within the Loddon River catchment and is the source of Bullabul Creek and Dead Log Creek. Burnt Creek flows just to the west and south-west of the forest block.

Preliminary analysis showed this forest as generally having medium conservation significance with a patch of high conservation significance in the east of the block. There are also some areas of very high conservation significance associated with patches of Grassy Woodland EVC closer to lowland areas.

Approximately 18% of the EVCs within this forest are under-reserved within the Goldfields bioregion. There are small patches of Creekline Grassy Woodland and Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic, both endangered within the bioregion. A larger area of the vulnerable EVC Grassy Woodland (216 hectares) is also present. About half the area is covered by box-ironbark forest.

Harvest Home State Forest has important habitat for the nationally endangered Swift Parrot, as well as the state-listed near-threatened Black-chinned Honeyeater.

Significant flora species recorded for the area include the Dainty Phebalium (*Phebalium festivum*) and Cane Spear-grass (*Austrostipa breviglumis*).

Current management

There are five Special Protection Zones (SPZs) for the Harvest Home State Forest. These zones are for protection of Grassy Woodland EVC and total approximately 213 hectares.

Timor State Forest covers an area of about 1,379 hectares.

This block forms part of a larger patch of public land which comprises Timor Nature Conservation Reserve to the north and Tipperary Hill Historic and Cultural Features Reserve to the south. The Havelock block comprising the Havelock Nature Conservation Reserve and Havelock State Forest lies just to the east. As well as having good links to

conservation reserves, the forest links well to vegetation on private land and state forest areas to the south and west of Maryborough.

The forest sits within the Loddon River catchment, with Bet Bet Creek running north to the west of the forest and Four-mile Creek to the east.

Preliminary analysis identified this block as generally having medium conservation significance. There are also areas of high and very high conservation significance along the edge of the forest boundary associated with patches of Grassy Woodland EVC closer to lowland areas.

The vegetation is predominantly box-ironbark forest, with very small patches of Alluvial Terraces Herb-rich Woodland, Creekline Grassy Woodland and Grassy Woodland/ Alluvial Terraces Herb-rich Woodland Mosaic EVCs, which are all endangered within the Goldfields bioregion. Larger areas of Grassy Woodland (241 ha), which is vulnerable within the Goldfields bioregion, are also present. Approximately 18% of the EVCs found in the state forest are under-reserved within the Goldfields bioregion.

A range of significant woodland birds rely on the Timor State Forest for habitat, including the nationally endangered Swift Parrot, as well as the state-listed and near-threatened Spotted Quail-thrush, Hooded Robin and Red-backed Kingfisher.

Threatened flora recorded for the forest include the state-listed Buloke (*Allucasuarina leuhmannii*) and Goldfields Grevillea (*Grevillea dryophylla*).

Current management

There are seven Special Protection Zones (SPZs) and two Special Management Zones (SMZs) for Timor State Forest.

The SPZs are primarily for the protection of Grassy Woodland EVC and other EVCs associated with the lower lying areas, such as Creekline Grassy Woodland. They also include the protection of a Swift Parrot site and an historic site (Hughes Dam Eucalyptus Distillery site) and total 390 hectares.

The SMZ areas are for a Swift Parrot site of 24 ha and for Hughes Dam Eucalyptus Distillery site for an area of less than one hectare.

Threats

The four key threats that affect priority sites within the Maryborough to Wedderburn landscape are:

1. Timber harvesting, including firewood collection.
2. Pest animals and weeds.
3. Stock and native animal grazing.
4. Inappropriate fire regimes.
5. Gold prospecting (except Timor State Forest) and other recreational activities.

Timber harvesting is still undertaken in most areas of state forest within the Maryborough to Wedderburn zone, particularly for firewood. Additionally, the collection of fallen timber for firewood is a threat to the habitat values of the area.

Pest animals and weeds are a common threat throughout the landscape block. Weeds identified include barley invading from adjacent barley crops, horehound and Cootamundra Wattle. Hares, rabbits and foxes are key pest animals, threatening native vegetation and the habitat values of the forest.

Permitted stock grazing was observed in state forest areas such as Bealiba and Kingower, and boundary fencing was found to be damaged or missing from many of the priority sites.

There has not been such a high frequency of prescribed burns within this landscape area as in others. However, the same concerns that we have for other landscapes are still relevant for this landscape – that is, burns that have occurred and are planned do not clearly consider ecological requirements. Nor is any ecological monitoring undertaken before and after each fire to learn for the future.

Recreational activities, particularly gold prospecting, have been observed to be a particular threat to the forests within this landscape. As this region has a strong history of large gold discoveries, it continues to have a strong attraction for gold prospectors.

2.2.2.3 Recommendations for future management

General recommendations for management of the landscape

Improved management of the Maryborough to Wedderburn landscape will require a significant increase in resourcing, particularly given the large number of sites that it covers. For all of the blocks within the Maryborough to Wedderburn landscape, the following management actions are recommended:

1. Targeted and sustained management of pest animals and weeds.
2. The potential expansion of the Wedderburn Conservation Management Network to extend its focus further south and include the large expanse of linking vegetation that extends to the south of Maryborough.

For the state forests only, we recommend the additional following management actions:

3. Fire management regimes that consider the ecological requirements of the EVCs and significant flora and fauna present. Ongoing monitoring should be included.
4. A review of timber harvesting practices within the state forests of the landscape area, including the collection of fallen timber for firewood.
5. A review of, and improved status for, Special Protection Zones and Special Management Zones, particularly for significant species. Current zoning does not provide ongoing protection to these important areas.
6. The exclusion of gold prospecting from sensitive areas.

The following specific management actions are required for the special places within the Maryborough to Wedderburn landscape:

Kingower State Forest:

- Weed management is required across the 'Big Hill' in the south-western section of the forest. Exclusion plots are required within Habitat Zones 2 and 3 to address the lack of recruitment possibly caused by browsing animals in these areas (see appendix for further information about the habitat zones).
- Timber harvesting, including firewood collection, should be excluded from the forest to allow more large trees to develop, providing valuable habitat.
- Improved signage and maintenance of vehicle tracks are required to reduce the incidence of off-track driving, together with the removal of any superfluous tracks to reduce fragmentation in the forest.
- Exclusion or improved regulation of trail-bike riding.
- Construction of perimeter fencing and measures to reduce degradation around the perimeter.

Tunstalls Nature Conservation Reserve:

- Targeted weed management is a priority in Habitat Zone 5 (see Appendix 4).
- Improved on-ground management is needed to remove barbed wire, including on adjacent farm fences and on parts of the perimeter and internal fencing. This would reduce the hazard to wildlife that this wire poses.
- Improved signage and maintenance of vehicle tracks, to reduce the incidence of off-track driving.

Bealiba State Forest:

- Weeds should be managed in Habitat Zones 8, 10, 10a and 14 (see Appendix 4).
- Exclusion plots are required to address grazing pressure, particularly in Habitat Zones 1 and 12 (see appendix).
- Timber harvesting, including firewood collection, should be excluded from the forest to allow for more large trees to develop providing valuable habitat.
- Improved signage and maintenance of vehicle tracks, to reduce the incidence of off-track driving.

Tenure

We recommend that each of the state forest areas identified as priorities within the

Maryborough to Wedderburn landscape be reclassified to become State Parks. These are Dunolly-Waanyarra State Forest, Kingower State Forest, Bealiba State Forest, Mount Hooghly State Forest, Moliagul State Forest, Harvest Home State Forest and Timor State Forest.

This increase in areas of reserved land within the Maryborough to Wedderburn landscape will assist in consolidating this important habitat link and also conserve the significant biodiversity values that still remain here. Furthermore, it will assist in addressing the threat of ongoing timber harvesting and gold prospecting in these areas.

CHAPTER 2

2.2.3 Mid-Loddon Landscape Zone

2.2.3.1 Overview of the landscape

The landscape block that we have identified as Mid-Loddon sits between the Bendigo and Castlemaine landscape zone and Maryborough to Wedderburn landscape zone. The landscape is contained mainly within the Victorian Riverina bioregion with some areas of the Goldfields bioregion at the perimeters.

The Mid-Loddon landscape is recognised for its significant stands of woodland and large red gum trees, high degree of fallen timber and ground litter, and wetlands, particularly Bells Swamp. The landscape has good levels of connectivity.

The very active Mid-Loddon Conservation Management Network plays a key role in working with government and private landholders to document local flora and fauna and carry out or support works to ensure their protection.

Historically, this landscape was one of the first gold rush areas. Most of the reserves highlighted in this report have been designated as Crown land since this time. This helps to explain why they are all considered as being of high or very high conservation value.

Significant fauna across the Mid-Loddon includes the state-listed Brushed-tailed Phascogale, Fat-tailed Dunnart, Yellow-footed Antichinus, Brown Tree-creeper, Black Falcon, Powerful Owl, Pied Cormorant, Little Egret, Great Egret and Royal Spoonbill, and the nationally endangered Swift Parrot.

Significant flora includes the Small Monkey-flower (*Mimulus prostrates*), River Swamp Wallaby-grass (*Amphibromus fluitans*), Short-bristle Wallaby-grass (*Austrodanthonia setacea* var. *Breviseta*), Pale Beauty-heads (*Calocephalus sonderi*), Yellow Burr-daisy (*Calotis lappulacea*), Late-flower Flax-lily (*Dianella tarda* – vulnerable in Victoria), Golden Cowslips (*Diuris behrii*) and Swainsona behriana.

2.2.3.2 Special places requiring better management

We have identified eight priority areas within the Mid-Loddon landscape zone that are candidates for improved management on the basis of their conservation attributes and their current management. This landscape is made up of mostly very small forest areas, ranging from 4 to 25 hectares in size, with one larger reserve of 3,152 hectares. They are therefore split into two main blocks within the landscape:

1. Muckleford State Forest, a large block of 3,152 ha.

The Mid-Loddon small riparian reserves consist of:

2. Bell Swamp.
3. Happy Jack Reserve.
4. Yunah Road Natural Features Reserve (NFR).
5. Woodstock NFR.
6. Bullock Creek NFR.
7. McGlashans NFR.
8. Leichardt Nature Conservation Reserve.

Muckleford State Forest covers an area of approximately 3,152 hectares. Located immediately to the south of the Maldon Historic and Cultural Features Reserve, it surrounds the Maldon Nature Conservation Reserve, which is in the centre of the state forest block. Muckleford State Forest is a large proportion of the total area of public land in the wider Maldon region.

Muckleford State Forest falls within the Loddon River catchment and is just to the east of the Cairn Curran Reservoir. It is the source of at least two creeks, Nuggetty Creek and Fryers Creek, which flow west. This forest is very well linked to other forests to the west.

Preliminary analysis has identified that the forest is generally of medium conservation significance. Two Ecological Vegetation Classes that are considered endangered within the Goldfields bioregion are present within Muckleford State Forest: Alluvial Terraces Herb-rich Woodland (16 ha) and approximately 5 ha of Creekline Grassy Woodland.

The vulnerable Alluvial Terraces Herb-rich Woodland/Creekline Grassy Woodland Mosaic is also present.

The area is home to a range of significant woodland bird species, including the state-listed and vulnerable Diamond Firetail and Powerful Owl and the nationally endangered Swift Parrot. Significant mammals recorded in the forest include the state-listed Brush-tailed Phascogale.

Significant flora in Muckleford State Forest includes the nationally vulnerable Trailing Hop-bush (*Dodonaea procumbens*) and the rare Whirrakee Wattle (*Acacia williamsonii*). A comprehensive plant list from the Castlemaine Field Naturalists Club is in Appendix 5.

Current management

Muckleford State Forest is managed by DSE. There are at least three Special Management Zones in the forest. At least two of these are for fauna refuges, Swift Parrot habitat protection, and at least two historic sites including Dunn's Reef workings and Red, White and Blue Mine. These areas total at least 161 hectares. There are no Special Protection Zones for the area.

Timber harvesting and firewood collection threaten the ecological integrity of Muckleford State Forest. The area also suffers from regular rubbish dumping.

Mid-Loddon Small Riparian Reserves – total 81 ha. As most of the remaining reserves within the Mid-Loddon landscape are very small, we have combined the available limited information for some sites with more detail for others. Nature Conservation Reserves and Natural Features Reserves are typically exempt from activities such as car rallies, horse riding

and hunting, as well as fossicking, sawlog harvesting and firewood collection. All the reserves within the Mid-Loddon landscape are managed by Parks Victoria.

Bells Swamp covers an area of 14 hectares.

Bells Swamp is within a closed catchment just a few kilometres from the Loddon River. The swamp fills with storm water runoff from the Blue Hills remnant and surrounding agricultural land.

Preliminary analysis conducted by the VNPA identified that the site is of very high conservation significance. The state-listed and near-threatened Brown Tree-creeper has recently been recorded within Bells Swamp. The area also contains a large number of ancient River Red Gums. A list of 50 plant species from the Castlemaine Field Naturalists is in Appendix 5.

Current management

Removal of fallen timber is a significant threat to the habitat values of Bells Swamp, and livestock regularly accesses some sections, contributing to further degradation of the area. Weeds including Bridal Creeper also threaten the area, smothering and outcompeting native plants. Road construction and agricultural management practices, including clearing within the closed catchment area, have impacted on the health of the swamp.

As a result of surrounding land use and modification, Bells Swamp and its remaining flora and fauna have become quite isolated. However, the area is still considered to be ecologically significant, and some rehabilitation works have been initiated.

In recent years Parks Victoria and an adjoining landholder have worked to rehabilitate the northern section of the swamp, and park rangers have made a concerted effort to stop the removal of fallen timber.

A generous landholder adjoining Bells Swamp recently donated a small remnant paddock on the western boundary, as well as labour to build protective fencing. The same landholder previously donated a large section of paddock on the northern side, which was fenced and revegetated by Parks Victoria. The privately-owned section of the swamp on the south side will be fenced and enhanced in 2010, with the assistance of Australian Government funding.

(Information provided courtesy of Judy Crocker, Mid-Loddon Landcare Network).

Happy Jack Reserve covers an area of approximately 13 hectares.

The reserve is recognised for having a number of very large and significant red gum trees. The site also benefits from a high degree of connectivity, particularly along Bullock Creek and other areas of adjacent vegetation. Preliminary analysis conducted for the reserve identified that the site is of high to very high conservation significance.

Yunah Road Natural Features Reserve (NFR) is a small reserve of more than five hectares. The site is recognised for its very large red gum trees. It is also a declared Drought Refuge, which is designated to areas with good soil and lower elevation within the landscape.

Preliminary analysis conducted by the VNPA identified Yunah Road NFR as having high conservation significance. The area is a known Black Wallaby breeding site. It also has very high connectivity with the surrounding landscape.

Woodstock Natural Features Reserve (NFR) is between four and eight hectares in size. With the adjacent recreation reserve it measures eight hectares.

Preliminary analysis identified the reserve to be of high conservation significance. It contains a grassland site of good quality, as well as a number of large old trees. Connectivity in the reserve is high, particularly along Murphy Creek.

Bullock Creek Natural Features Reserve covers an area of more than ten hectares.

Preliminary analysis conducted by the VNPA identified this site as having high to very high conservation significance. The reserve has high levels of connectivity, particularly to Bullock Creek and adjoining vegetation.

McGlashans Natural Features Reserve covers an area of 25 hectares.

Preliminary analysis identified the site as

having high to very high conservation significance, with high levels of connectivity, particularly on Spring Creek.

Leichardt Nature Conservation Reserve (NCR) is approximately 10 hectares in size.

Preliminary analysis identified the site as having high conservation significance, with high levels of connectivity on Bullock Creek.

Current management

A known threat that has been reported for the site is the removal of fallen timber.

Threats

We have identified two key areas of threat to the priority sites in the Mid-Loddon landscape. These are:

1. Collection of fallen timber.
2. Weeds and pest animals (foxes, cats, rabbits).

The collection of fallen timber is a problem in a number of reserves, particularly Bells Swamp and Leichardt Nature Conservation Reserve, as well as Muckleford State Forest. The removal of this timber significantly impacts on the availability and quality of habitat, as well as nutrient cycling.

A range of weeds and pest animals are a threat across the landscape, as a result of the significant surrounding land use change that has occurred. This land use impacts on the survival of many species of flora and fauna and on the overall ecological health of the reserves within the overall landscape. Foxes are a particular problem, and some fox control programs are carried out, but the coordination and longevity of these programs could be significantly improved. Cats and rabbits are also identified by locals as major pests.

Yunah Road Natural Features Reserve. **Photo courtesy of Judy Crocker**

Rubbish dumping is a common concern across reserves within the Mid-Loddon landscape, and drought and erosion also pose a threat to overall ecological health.

2.2.3.3 Recommendations for future management

General recommendations for management of the landscape

Improved management of the Mid-Loddon landscape will require a significant increase in resourcing, particularly given the large number of sites that it covers. For all of the sites within the landscape, the following management actions are recommended:

1. A strategic plan should be developed to ensure that all of the small reserves in the Mid-Loddon are not only protected and managed adequately, but that strategic rehabilitation, regeneration and revegetation are undertaken along creeklines that link the reserves.
2. A strategy to prevent further collection of fallen timber should be implemented, including community education about forest values.
3. Targeted, sustained and well coordinated removal of key weeds and pest animals (particularly foxes, cats and rabbits).
4. Targeted efforts should be incorporated into on-ground reserve management to reduce the incidence of rubbish dumping.

The following additional management actions are required for some of the special places within the Mid-Loddon landscape:

Muckleford State Forest

- Timber harvesting, including firewood collection, should be excluded from the forest to allow more large trees to develop, providing valuable habitat.

Bells Swamp

- Development of a Bells Swamp Management Plan, a proposal for which has been prepared by the Mid-Loddon Landcare Network.
- Extend existing efforts to prevent the removal of fallen timber.
- Reinstate strong vegetation connections to the Loddon River.
- Fence areas currently accessed by stock.
- Community education, targeted at the nature of Bells Swamp being a closed catchment and the resulting important impacts of land management on surrounding properties. This would include provision of information regarding how best to reduce the impacts of agricultural practices on the site.

Tenure

We recommend that Muckleford State Forest be reclassified to be incorporated into the Maldon Historic Reserve.

2.2.4 Bendigo and Castlemaine Zone

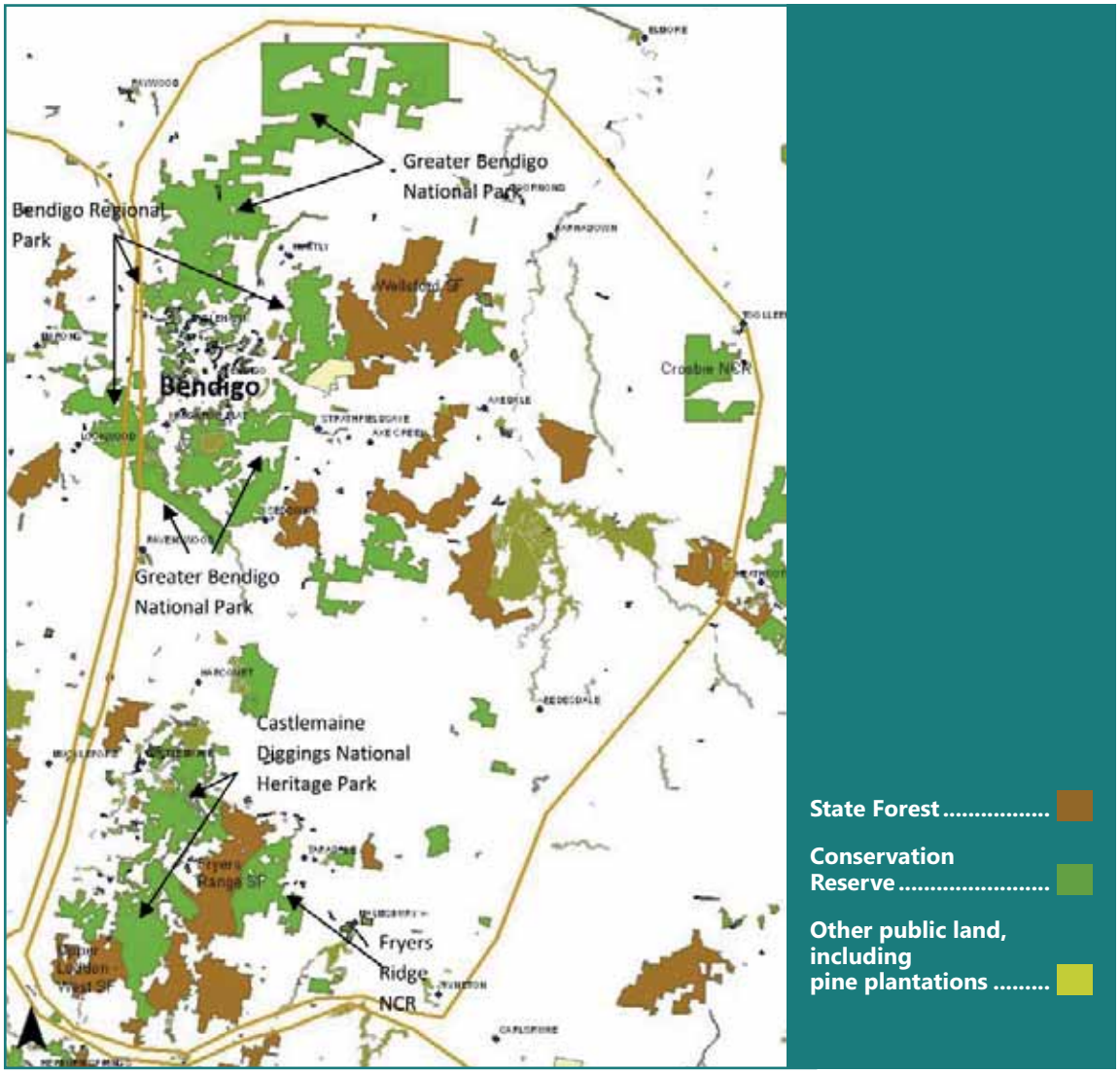
2.2.4.1 Overview of the Landscape

The landscape that we have identified as Bendigo and Castlemaine extends across the uplifted country associated with the Goldfields bioregion surrounding Bendigo and Castlemaine.

The Bendigo and Castlemaine landscape comprises the headwaters for many of the region's important waterways, including the Campaspe and Loddon rivers, which flow north across the fertile Victorian Riverine plains to the Murray River.

This landscape incorporates some important parks and reserves including the Castlemaine Diggings National Heritage Park and Greater Bendigo National Park. The landscape is generally well linked by native vegetation, but much of it is of moderate to poor quality. This is due to a history of intense use including extensive gold mining and timber harvesting. Gold mining in the region involved the removal of timber for gold mining settlements and infrastructure and significant disturbance of surface soil and waterways. Timber harvesting commenced in the 1850s and has continued until the present. Box and ironbark eucalypts have been prized for their timber and have been sought for many different purposes over the years, including eucalyptus distilling. Timber harvest continues in state forest areas within this landscape, and as a result there are very few large or old trees.

The area contains significant stands of box-



ironbark forest as well as other associated forests and woodlands. Box-ironbark forests are exceptionally rich producers of nectar, a food source sought by many birds and possums.

This landscape is home to a range of rare and threatened plant and animal species. It provides important habitat for a wide diversity of fauna including the nationally endangered Swift Parrot, state-listed Brush-tailed Phascogale or Tuan, and Fat-tailed Dunnart, numerous woodland birds and reptiles such as the Lace Goanna.

The Bendigo and Castlemaine landscape is also home to significant flora, including some that are rare and others that are endemic to the area. These include the vulnerable Midlands Spider-orchid (*Caladenia clavescens*) and Scented Bush-pea (*Pultenaea graveolens*) and the rare and Victorian endemic Fryerstown Grevillea (*Grevillea obtecta*), the rare Small-leaf Goodenia (*Goodenia benthamiana*), Whirrakee Wattle (*Acacia williamsonii*) and Buloke (*Allocasuarina luehmannii*).

The native vegetation of the Bendigo and Castlemaine Landscape is well linked to vegetation in adjoining areas to the east and west, and also, importantly, to the wetter forests to the south. These include Wombat State Forest and (further south), Lerderderg State Park. These links are particularly important in the face of a changing climate and will assist in giving some mobile fauna options for alternative habitats.

2.2.4.2 Special places requiring better management

We have identified four priority areas within the Bendigo and Castlemaine landscape that are candidates for improved management on the basis of their conservation attributes and their current management. They are:

1. Wellsford State Forest.
2. Upper Loddon State Forest – West section.
3. Fryers Range State Forest.
4. Crosbie Nature Conservation Reserve.

We have summarised the values associated with each forest area or reserve, assessed their current management, summarised results for vegetation quality management for the Wellsford State Forest and Crosbie NCR, and made recommendations for the future management of each reserve below.

Wellsford State Forest covers an area of 7,122 hectares.

The forest is located primarily in the Goldfields bioregion, but has a small portion in the Victorian Riverina bioregion. It is adjoined by Mount Sugarloaf Nature Conservation Reserve, Longlea Commonwealth Land and Bendigo Regional Park, and also has good links to Axe Creek and the Campaspe River. The forest has had a long history of logging and periods of recovery. The protected areas offer an excellent example of a recovering forest, particularly seen in the understorey and trees with developing hollows. However, most of the area is still subject to timber harvesting and a range of other threats.

Preliminary analysis shows this forest area as generally having medium conservation significance, with some patches of high conservation significance along the creek. It also contains vegetation of high conservation significance that links to patches in the north and south. The forest contains around 7,000 hectares of Box-Ironbark Forest EVC. While most of it is contained within the Goldfields bioregion part of the forest, this EVC is classified as vulnerable within the Riverina (and Depleted in the Goldfields). Mapping provided by DSE has identified approximately 60 ha of Grassy Woodland EVC. However, a vegetation assessment commissioned by the VNPA identified that the forest contains two distinct grassy woodland EVCs: Low Rises Grassy Woodland (19.3 ha), which is considered vulnerable within the Goldfields bioregion, and Plains Grassy Woodland (6.72 ha), endangered within the Goldfields.

Wellsford State Forest provides important habitat for threatened fauna, with recent records for a range of species including the Brush-tailed Phascogale, Diamond Firetail, Grey-crowned Babbler, Speckled Warbler and the nationally endangered Swift Parrot. Also

present are a range of rare and threatened plants including the state-listed and vulnerable Ausfeld's Wattle (*Acacia ausfeldii*) and Dainty Phebalium (*Phebalium festivum*), and the rare Small-leaf Goodenia (*Goodenia benthamiana*), Sand Rush (*Juncus psammophilus*), Whirrakee Wattle (*Acacia williamsonii*) and Buloke (*Allocasuarina luehmannii*).

Summary of results from the Vegetation Quality Assessment:

The vegetation assessment has shown that all areas of the Wellsford are deficient in large trees with the exception of Habitat Zone 6, a small separate block of Plains Grassy Woodland. Additionally, trees across the entire extent of the forest are showing signs of stress.

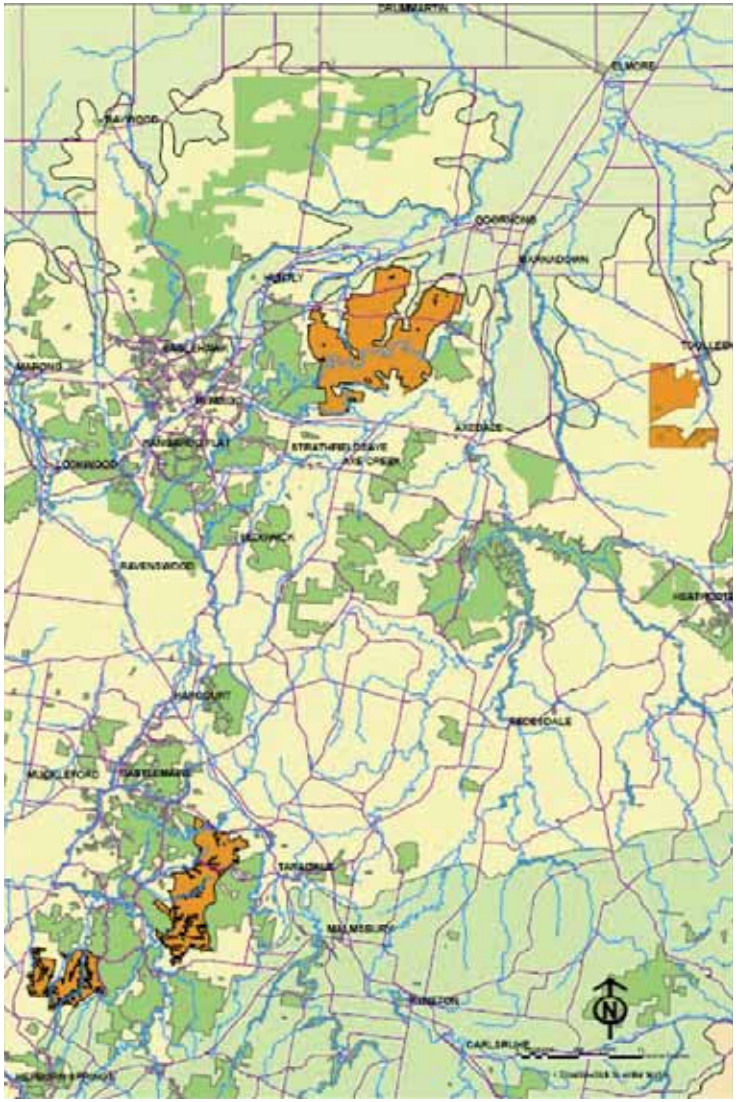
Four habitat zones are particularly deficient in logs.

Complete results for the vegetation quality assessment and accompanying map for Wellsford State Forest section is in Appendix 5.

Current Management

Wellsford State Forest is currently managed by DSE for timber harvest and recreational values. It has two Special Protection Zones for the protection of 55 ha of Grassy Woodland, but the remainder of the forest is not under any level of formal protection.

The forest has been subject to three prescribed burns in the 2008-09 fire seasons, totalling approximately 300 hectares. Reports from local ecologists have identified that these fires burnt



Four priority areas within the Bendigo and Castlemaine landscape that are candidates for improved management.

too hot and were possibly inappropriate for the forest ecology.

Apart from individual pursuits such as walking, horse-riding, trail-bike riding and cycling, organised recreational use of the forest includes car rallies, dog-sledding, orienteering and army cadet training. Regular rubbish dumping is a problem within this forest, and trail-bikes also contribute to increased fragmentation and localised erosion.

Upper Loddon State Forest – West section comprises 1,806 hectares.

This forest is within the Goldfields bioregion. It is well linked to both the north and south, and links the wetter forests of the south to the drier Castlemaine and Bendigo blocks. It forms a significant link between two sections of the Castlemaine Diggings Heritage Park and private land to the south, which then links to Hepburn Regional Park and Wombat State Forest. The area falls within the Loddon River catchment, and the Tarilta and Hunter Creeks flow north through the forest block. Tarilta Creek contains a beautiful intact gorge.

Tarilta Creek gorge, an important water catchment area for the Loddon River, is a stunning and long deep gorge with very steep sides, containing many large old trees and an amazing array of fungi and lichen. Many of the slopes within the gorge are likely to contain old growth forest, as there are no signs of any timber cutting. The area provides habitat for Powerful Owl and Brush-tailed Phascogales. Common Galaxias (*Galaxias maculatus*) are found in the creek, disappearing when it is dry and reappearing again after rain.

Preliminary analysis shows the Upper Loddon West State Forest West block as generally having medium conservation significance. However, the forest block also contains some good examples of Valley Grassy Forest along the creek lines. This EVC is considered vulnerable within the Goldfields Bioregion, and the 277 hectares within this forest are identified as being of very high conservation significance.

The block has recent records for the Powerful Owl, which is vulnerable in Victoria, as well as the vulnerable Midlands Spider-orchid (*Caladenia clavescens*) and Scented Bush-pea (*Pultenaea graveolens*) and the rare and Victorian endemic Fryerstown Grevillea (*Grevillea obtecta*).

Current management

The Upper Loddon State Forest West is managed by DSE for timber harvesting, although there has been minimal coupe maintenance activity since the early 1990s. The current Wood Utilisation Plan states that no timber harvesting will occur for the next three years. The forest contains one Special Management Zone for the Midlands Spider-orchid (*Caladenia clavescens*). Overall the forest is not formally protected.

There has been little recorded prescribed burning affecting this forest and it is not overly utilised for organised recreational activities. In the last two years, however, there has been a serious incursion of trail-bike riding into this previously undamaged area.

Crosbie Nature Conservation Reserve comprises 2,056 hectares.

The reserve is in the Goldfields bioregion and is surrounded by vegetation on private land except to the east, and has good links to public land. It is within the Campaspe River catchment and feeds a number of small creek headwaters that flow to the north-west.

Threatened fauna recently recorded in the Reserve include the state-listed Brush-tailed Phascogale, Diamond Firetail, Grey-crowned Babbler, Painted Honeyeater, Eastern Great Egret and Powerful Owl, and the nationally endangered Swift Parrot. Significant plants include Ausfeld's Wattle (*Acacia ausfeldii*) and Buloke (*Allocasuarina leuhmannii*).

Importantly, the reserve is a well known location for bird observation, and is considered to provide important habitat for many fauna species, particularly birds including the Swift Parrot.

Preliminary analysis shows the reserve as generally having vegetation of medium conservation significance, with some patches of high conservation significance scattered throughout southern areas.

Summary of results from the Vegetation

Quality Assessment:

Assessment of vegetation quality at Crosbie NCR shows that there is a lack of large trees, and that vegetation at higher elevations or further from creeks is stressed. In general, the reserve is dominated by box-ironbark forest, but around the edges, and where there is variation in the landscape, other vegetation is present. Two patches of very high significance vegetation in the north and east are associated with Low Rises Grassy Woodland EVC (60 ha) identified by work commissioned by the VNPA. The reserve also contains 37 ha of the endangered EVC Alluvial Terraces Herb-rich Woodland, as well as 2.8 ha of Creekline Grassy Woodland (endangered).

Complete results for vegetation quality assessment and accompanying map for Crosbie NCR are in Appendix 5.

Current management

Crosbie NCR is managed by Parks Victoria. Weeds and pest animals are the key threats to this reserve. As a Nature Conservation Reserve, Crosbie is exempt from activities such as car rallies, horse riding and hunting, as well as fossicking, sawlog harvesting and firewood collection. During field visits, it was observed that the reserve was being impacted by poorly maintained perimeter fencing, poorly managed tracks and roading, and a low-density housing estate to the north.

Fryers Range State Forest comprises approximately 3,321 hectares.

This forest is in the Goldfields bioregion and forms a significant link between two sections of the Castlemaine Diggings National Heritage Park. Fryers Range falls mainly within the Loddon River catchment, although the northern section is within the Coliban River catchment. It is the source of at least two creeks, Nuggetty Creek and Fryers Creek, which flow west.

Preliminary analysis identified the forest block as generally having medium conservation significance, with some areas of very high conservation significance associated with Valley Grassy Forest along creeklines. This EVC is considered vulnerable within the Goldfields bioregion and 297 ha are identified for the block. Plains Grassy Woodland, an endangered EVC for the Goldfields bioregion, is also recorded for the area, with 13 hectares.

Rare and threatened species recorded within the forest include the state-listed vulnerable Brush-tailed Phascogale, and rare Fryerstown Grevillea (*Grevillea obtecta*), a shrub endemic to Victoria.

Fryers Range State Forest contains significant post-settlement historic sites. These include a mineral spring site, Junction township at Tunnel Hill, Patten's Reef workings and Charlie Sanger's main hut and mining area. The Friends of Box Ironbark Forest have written a very interesting book titled *Vagabond: The Story of Charles Sanger*, about his time in the Fryers Ranges (Slattery, Ralph and Slattery, 2008).

Current management

Fryers Range State Forest is managed by DSE for timber harvesting, and contains three Special Management Zones, designated for three areas containing large old trees. One of these areas also protects a number of key historic sites. These zones do not offer formal protection for the sites. The remainder of the forest is not formally protected.

Timber harvesting and firewood collection are key threats to this forest, as well as hot fires and trail-bike riding. Deer and weeds also threaten the habitat values, as does wallaby browsing. The eastern half of the forest has been frequently burnt since the early 1990s. Reports from local ecologists have reported that recent fires have burnt too hot and were not appropriate for the forest ecology.

Threats

The four key threats that affect all areas of the native vegetation within the Bendigo and Castlemaine landscape are:

1. Inappropriate fire management.
2. Stock and native animal grazing.
3. Commercial and illegal firewood harvesting and collection.
4. Pest plants and animals.

The frequency and intensity of fires have been

observed by local environment groups and concerns have been raised about the value of the burns and their impact on the ecology of the forest. With no monitoring in place, nor a planning process that clearly considers the ecological requirements and limitations of each area, there is little to justify the ecological credentials of the current (and proposed) fire regime.

Wallaby browsing, as well as stock entering through poorly maintained fences, has been identified as an important threat. Grazing exclusion plots established in areas such as Fryers Range State Forest by the Rotary Club in the 1930s, and more recently in places like Shelbourne State Forest west of Bendigo, have demonstrated that the exclusion of browsing animals greatly improves the diversity of the understorey. Through field visits associated with this project, a number of boundary fences were observed to be in poor repair in areas such as Wellsford State Forest and Crosbie Nature Conservation Reserve.

Blackberry and gorse are key weeds of concern, mainly because they threaten to displace indigenous vegetation, particularly given the threat of encroachment from private land and lack of consistent management.

Kangaroo Creek, Tarilta Creek and the Loddon River are focus areas for the local Catchment Management Authority, which has worked on joint projects with DSE to manage weeds along these waterways including gorse, blackberry, hawthorn and willow.

Foxes and cats are particularly problematic pests and threaten a range of fauna. Various programs are in place for fox management, although they are not necessarily consistent or particularly targeted. On public land, funding is mainly received for fox management through the 'Good Neighbour' program.

Deer are also known to be present in this landscape, and goats in Fryers Range State Forest in particular. These animals can cause significant damage to vegetation.

In addition to the widespread threats mentioned above, the state forest areas within the landscape are specifically and significantly impacted by continued timber harvesting.

Timber harvesting is still undertaken in most areas of state forest within the Bendigo and Castlemaine landscape and is mainly associated with the provision of commercial firewood. To a lesser extent, it supplies domestic firewood and small produce. There is little volume allocation for sawlogs. The landscape has a history of timber harvesting and as a result there are very few large or old trees.

Harvest operation methods, which now include mainly single tree selection and thinning from below, still have the potential to disturb significantly, and actually destroy, the understorey, and result in large amounts of woody debris on the ground which significantly increases the impact of any future fires.

Other threats mainly relevant to public land include the dumping of rubbish and garden waste, and trail-bikes. The presence of unmaintained vehicle tracks is also a threat, leading to vehicles cutting across vegetation and creating new tracks and erosion. Poor signage also contributes to people driving over vegetation to find the correct track.

Mining and fossicking are additional threats within some reserves. Additionally, low density subdivision around reserves is leading to more intensive human pressure, especially through increased user numbers and a growing number of cats and dogs in the area.

2.2.4.3 Recommendations for future management

General recommendations for management of the landscape

The following management activities are recommended for the Bendigo and Castlemaine landscape:

1. Timber harvesting, including firewood collection, requires reassessment in the three state forests within the Bendigo and Castlemaine landscape area, with the possibility of sourcing wood from private woodlots or plantations to be considered as an alternative.
2. Appropriate fire management, taking

account of the ecological requirements of significant EVCs, flora and fauna. This should include a monitoring component.

3. Removal of stock grazing and /or establishment of exclusion plots to monitor understorey recovery.
4. Targeted and sustained management of pest plants and animals, particularly blackberry and gorse. Implementation of a sustained fox control program.
5. Improved on-ground maintenance to reduce the impact of rubbish dumping and garden waste.
6. Maintenance of vehicle tracks and improved signage to reduce off-track driving.
7. Removal or restriction of mining and fossicking to specially zoned areas which are regulated, and accompanied by an education program.
8. Introduction of restrictions to address the impacts of low-density subdivision close to parks and reserves, especially through the growing number of cats and dogs in the area.
9. Community education program.

The following key management actions could be implemented for the priority areas listed below:

Wellsford State Forest

- Habitat Zones 4 and 5 would benefit from exclusion plots to reduce the impact from browsing animals.
- Timber harvesting, including firewood collection, should be excluded from the forest to allow for more large trees to develop and for logs to accumulate, providing valuable habitat.
- Exclusion of trail-bike riding from sensitive areas.

Upper Loddon State Forest – west section

- The state-listed threatened Midlands Spider Orchid (*Caladenia clavescens*) is not formally protected under the existing Special Management Zone. Permanent protection should be considered to ensure its long-term survival within this site.
- Exclusion of trail-bike riding from the Tarilta Creek valley.

Fryers Range State Forest

- Important areas within the forest, such as those containing large old trees and, importantly, small old trees and historic sites, would benefit from a more permanent form of protection than Special Management Zones.
- Targeted deer removal/goat removal.
- A track reduction and management plan and process.
- Exclusion of trail-bike riding from sensitive areas.

Crosbie Nature Conservation Reserve

- Targeted protection of large trees and future hollow-bearing trees.
- Weeds identified within Habitat Zones 1, 2, 4 and 7 require active management.
- Exclusion plots are required to address the issue of inadequate recruitment across the entire reserve, in particular associated with areas of Heathy Dry Forest and Box Ironbark Forest.
- A program or network to be established to encourage private landholders adjacent to Crosbie NCR to protect their native vegetation and improve the connectivity of vegetation in the local area. Ideally this program would include high targets for permanent protection, possibly via land acquisition in some cases. It would also target areas of endangered EVCs along creeks and lowlands.

Tenure

In addition to the above actions, we recommend that Wellsford State Forest be reclassified as a State Park, and that Fryers Range State Forest and Upper Loddon State Forest West be consolidated into Castlemaine Diggings National Heritage Park to address key threats identified in this report.

CHAPTER 2

2.2.5 Wombat Landscape Zone

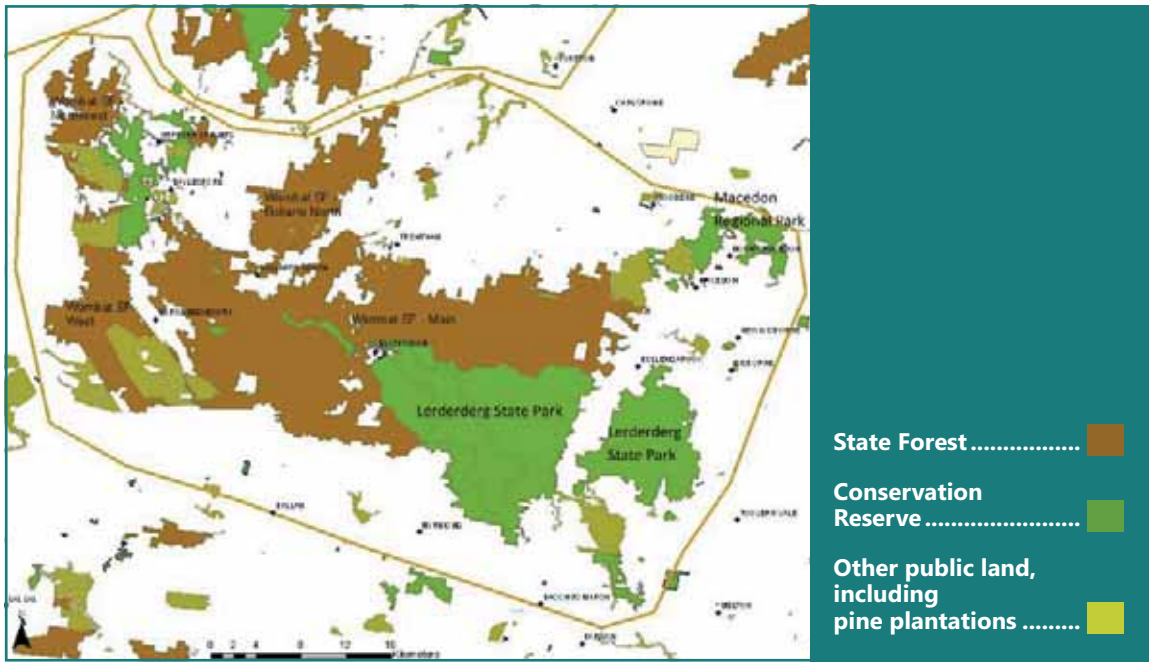
2.2.5.1 Overview of the landscape

The area we have identified as the Wombat Region Landscape straddles the Great Dividing Range in Central Victoria, running between Daylesford and Woodend, and crosses the Central Victorian Uplands and Goldfields bioregions.

Since Europeans arrived in the district, the landscape has had a very intensive history of exploitation for timber, firewood, gold, and until recently, woodchips. Virtually all old-growth trees have been removed from the forest.

Despite its history, the Wombat region is very important for biodiversity conservation, and has a significant role to play in building resilience across the landscape in the face of climate change. The Land Conservation Council (1985) stated that the Wombat Forest area has a high capability for nature conservation as it is one of the largest forest areas in Central Victoria. The forest is also of biogeographic importance as it divides the drier box-ironbark forests to the north from the grassy woodland areas to the south. It also represents the western limits of distribution for a range of flora and fauna species, including the Greater Glider.

Recent vegetation quality assessments undertaken as part of this project indicate that the understorey within the Wombat State Forest is of good quality. It appears that the vegetation type and climate influence



the ability of the understorey vegetation to regenerate after disturbance.

In relation to climate change and the maintenance of other ecological processes, the area is a vital part of a network of native vegetation stretching across to the wet/damp forests of the Macedon Ranges in the east, the damp forest areas of the Lerderderg State Park to the south-east, and the drier forest areas of the Upper-Loddon State Forest – West in the north.

This landscape is also very important as a water catchment, with the headwaters of six major river systems originating in its forest areas. The Moorabool, Werribee and Lerderderg Rivers flow to the south, while the Loddon, Coliban and Campaspe rivers flow to the north. Creating links in the landscape by using natural systems such as creeks and rivers is one way of enhancing ecological processes. The Land and Biodiversity White Paper notes that rivers, wetlands and estuaries are a central focus for biolinks and will therefore play a key role in providing

habitat refugia and connectivity in the face of climate change (DSE, 2009).

For most of their length, all of these rivers are generally in poor to very poor health. However, the sections of these rivers and their tributaries within the Wombat State Forest are in very good condition. For example, the Upper Loddon Catchment Action Plan (NCCMA 2008) identifies the area as '… containing some of the few waterways in the North Central region that are rated in good condition'. As a result, various Catchment Management Authorities have identified these upper catchment areas as priority areas for action.

The forest areas within the Wombat region landscape contain 16 different EVCs, including 13 that have a bioregional conservation significance of endangered, vulnerable or Depleted. Heathy to damp forests cover the foothills, Shrubby Foothill Forest and Herb-rich Foothill Forest being the most common. A range of riparian EVCs follows the network of waterways and drainage lines.

Over 350 indigenous plant species occur in this landscape, including a total of 28 rare or threatened flora species. These include two species endemic to the Wombat State Forest: the state-listed and rare Wombat Bush-pea (*Pultenaea reflexifolia* var *reflexifolia*) and the endangered Wombat Leafless Bossiaea (*Bossiaea vombata*). In late 2009, members of the Wombat Forestcare group, working with staff from DSE, found three new stands of the Wombat Leafless Bossiaea near Spargo Creek. Until then, only one infertile plant was known to occur. One of the new stands shows potential to develop seed, and the Wombat Forestcare group is closely monitoring seed development. If seed could be collected and grown, the likelihood of long-term survival of the species would be greatly increased.

The Wombat landscape also provides habitat for over 200 species of vertebrate fauna, including 17 species listed as rare, threatened or near-threatened in Victoria (DSE, 2007). endangered fauna include Bibron's Toadlet, Growling Grass Frog, Macquarie Perch, Masked Owl, Musk Duck, Powerful Owl, Square-tailed Kite, Grey Goshawk, Brush-tailed Phascogale and Spot-tailed Quoll. It also contains a number of species at the western edge of their range, including the Greater Glider, Mountain Brush-tail Possum, Red-browed Tree-creeper and Olive Whistler.

2.2.5.2 Special places requiring better management

The entire extent of Wombat State Forest has been identified as containing very high natural values. We consider all areas of the forest as one priority location within the Wombat Forest landscape. On this basis we recommend that this area should receive improved management on the basis of its conservation attributes and its current management. The four sections that comprise Wombat State Forest are:

1. Wombat State Forest – Main.
2. Wombat State Forest – Bullarto North.
3. Wombat State Forest – West.
4. Wombat State Forest – North-west.

We have summarised the values associated with each forest area or reserve, assessed their current management, summarised results for vegetation quality management for the Bullarto North and Wombat State Forest – West sections, and made management recommendations for each reserve.

Wombat State Forest – Main section is a long block of 31,448 hectares that abuts Lerderderg State Park at its south-eastern corner.

This section of forest has significant wetter habitats which include Sedgy Riparian Woodland and Damp Forest, linked to the drier forests of the Castlemaine and Bendigo landscape. As well as many creeks, the heritage-listed Lerderderg River runs through this section of the forest.

Preliminary analysis using a modelled mapping dataset shows this forest area as generally having medium conservation significance, apart from some patches of high conservation significance vegetation mainly associated with Sedgy Riparian Woodland EVC throughout the forest. Additionally, there are three EVCs vulnerable in the Central

Victorian Uplands within the forest: Grassy Forest (8 ha), Riparian Forest (261 ha) and Valley Grassy Forest (68 ha).

Wombat State Forest – Main section has important habitat for threatened fauna, with recent records for a range of species including the Powerful Owl, Spotted Quail-thrush and Square-tailed Kite, and records in 1992 for the nationally endangered Spot-tailed Quoll, and in 1999 for the nationally vulnerable Growling Grass Frog and state endangered Masked Owl. Also present are a range of at least twenty rare and threatened plants including the state-listed and endangered Small Sickle Greenhood (*Pterostylus lustra*) and the endemic Wombat Bush-pea (*Pultenaea reflexifolia* var *reflexifolia*).

Current Management

Wombat State Forest – Main section is currently managed by DSE for timber harvesting and recreational values.

It has at least 32 Special Protection Zones totalling 6,808 ha for the protection of many EVCs including Riparian Forest, Herb-rich Foothill Forest, Shrubby Foothill Forest (including some old growth), Shrubby Dry Forest, Sedgy Riparian Wooland, Heathy Dry Forest (including some old growth) and Damp Forest.

There are also Special Protection Zones to protect habitat for the Powerful Owl, Greater Glider and Spot-tailed Quoll, and for threatened flora and designated water supply catchment areas.

There are also Special Management Zones for the protection of many of the same assets listed under SPZs. Some 11,618 ha are covered by SMZs in the Wombat State Forest – Main section.

Apart from individual pursuits such as walking, horse-riding, trail-bike riding and cycling, organised recreational use of the forest includes car rallies. Regular rubbish dumping is a problem in this forest, and trail-bikes contribute to increased fragmentation and localised erosion.

Wombat State Forest – Bullarto North section covers about 5,747 hectares.

Preliminary analysis assessed the area to be primarily of high conservation significance, except for some patches of medium conservation significance vegetation in the south of this forest area), 69% of its EVCs being under-reserved within the Central Victorian Uplands bioregion. Two of its EVCs, Riparian Forest (78 ha) and Creekline Herb-rich Woodland (69 ha), are considered to be vulnerable within the Central Victorian Uplands Bioregion.

The area has some good links to the Upper Loddon State Forest and other large areas of native vegetation along five creek corridors (Kangaroo Creek, Loddon River, Kangaroo Creek (2), Snodgrass Creek and Leitches Creek) that flow to the north. This is in addition to strong links with the main forest area of Wombat State Forest to the south.

Wombat State Forest – Bullarto North section has important habitat for threatened fauna, with recent records for a range of species including the state-listed Powerful Owl, Musk Duck and Brush-tailed Phascogale (all vulnerable). Also present are at least four rare and threatened plants including the state-listed Brooker's Gum (*Eucalyptus brookeriana*), Hairy Beard-heath (*Leucopogon microphyllus* var. *pilibundus*) and the endemic Wombat Bush-pea (*Pultenaea reflexifolia* var *reflexifolia*).

Summary of results from the Vegetation Quality Assessment:

Complete results for the vegetation quality assessment and accompanying map for Wombat State Forest – Bullarto North section are in Appendix 5.

Current Management

Wombat State Forest – Bullarto North section is currently managed by DSE for timber harvesting and recreational values.

It has nine Special Protection Zones totalling 2,118 ha for the protection of many EVCs including Herb-rich Foothill Forest, Shrubby Foothill Forest, Shrubby Dry Forest, Grassy Dry Forest, Sedgy Riparian Woodland, Heathy Dry Forest and Creekline Herb-rich Woodland.

There are also Special Protection Zones to

protect habitat for the Powerful Owl.

There are also at least four Special Management Zones totalling 752 ha for the protection of EVCs Shrubby Dry Forest, Herb-rich Foothill Forest, Shrubby Foothill Forest and Sedgy Riparian Woodland, as well as Powerful Owl Habitat and designated water supply catchment.

Wombat State Forest – West section covers about 4,888 hectares.

Preliminary analysis found this section to be of high conservation significance, with some patches of very high conservation significance vegetation in the north. In all 75% of its EVCs are under-represented within the Central Victorian Uplands and Goldfields bioregions.

Two EVCs present are classified as vulnerable within the Goldfields bioregion: Sedgy Riparian Woodland (86 ha) and Valley Grassy Forest.

Wombat State Forest – West section has important habitat for threatened fauna, with recent records for a range of species including the state-listed Powerful Owl (vulnerable), Eastern Great Egret (vulnerable), Intermediate Egret (critically endangered), Masked Owl (endangered) and Musk Duck (vulnerable). Also present are at least four rare and threatened plants including the state-listed Wiry Bossiaea (*Bossiaea cordigera*), Creeping Grevillea (*Grevillea repens*) and Satinwood (*Nematolepis squamea* subsp. *Squamea*).

Summary of results from the Vegetation Quality Assessment:

Complete results for the vegetation quality assessment and accompanying map for Wombat State Forest – West section are in Appendix 5.

Current Management

Wombat State Forest – West section is currently managed by DSE for timber harvesting and recreational values.

It has eight Special Protection Zones totalling 976 ha for the protection of many EVCs including Herb-rich Foothill Forest, Shrubby Foothill Forest, Grassy Dry Forest, Sedgy Riparian Woodland, Heathy Dry Forest and Creekline Herb-rich Woodland.

There are Special Protection Zones to protect habitat for threatened flora and designated water supply catchment areas.

There are also two Special Management Zones totalling 1,601 ha for the protection of the EVCs Shrubby Dry Forest, Herb-rich Foothill Forest and Shrubby Foothill Forest, as well as threatened flora and a designated water supply catchment.

Wombat State Forest – North-west section is 2,820 hectares in size.

Numerous creeks and gullies of the Loddon River catchment are present throughout the forest.

Preliminary analysis using a modelled mapping dataset shows this forest area as generally having medium conservation significance, though with many areas of high and very high conservation significance vegetation around the edges of the block, particularly associated with Valley Grassy Forest EVC. Some 289 hectares of this EVC occur within the north-west section. It is classified as vulnerable within the Goldfields bioregion. Very small patches (less than one hectare) of Grassy Woodland (vulnerable) and Stream Bank Shrubland (endangered) EVCs are found there as well.

Wombat State Forest – North-west section has important habitat for threatened fauna, with recent records for a range of species including the state-listed Brush-tailed Phascogale (vulnerable), and FFG listed Common Bent-wing Bat. Also present are at least three rare and threatened plants including the nationally endangered Matted Flax-lily (*Dianella amoena*), state-listed Scented Bush-pea (*Pultenea graveolens*) and Fryerstown Grevillea (*Grevillea obtecta*).

Current Management

The Wombat State Forest – North-west section is currently managed by DSE for timber harvesting and recreational values.

It has eight Special Protection Zones totalling 1,944 ha (or approximately 70% of this forest area) for the protection of EVCs including Grassy Dry Forest, Valley Grassy Forest and Heathy Dry Forest (all including some old

growth), and for the protection of habitat for the Powerful Owl.

There are also 20 Special Management Zones totalling 633 ha for the protection of the EVCs Heathy Dry Forest (including some old growth) and Grassy Dry Forest, and habitat for the Powerful Owl.

Threats

We have identified four key threats common to the natural values for each of the priority sites in the Wombat landscape:

1. Commercial and illegal firewood harvesting and collection.
2. Inappropriate fire management.
3. Pest plants and animals.
4. Fragmentation by roads and tracks (a lesser threat).

Trees continue to be selectively logged for commercial firewood in the state forest areas. This reduces the availability of habitat for ground-dwelling fauna and invertebrates. If larger-scale timber harvesting were allowed to continue again in the future, it could further affect the habitat values of the area. The loss of hollow-bearing trees as a result of past timber harvesting practices is a key concern to the ecological integrity and habitat availability of Wombat State Forest.

It has been observed that inappropriate and sometimes poorly controlled fuel reduction burning threatens the ecological integrity of Wombat State Forest. It is important that fire management considers the ecological needs of the vegetation and the flora and fauna that depend upon it. Forest areas are commonly burnt in a systematic manner, based on logging coupes, or more commonly using roads and tracks as the control lines, rather than through consideration of ecological requirements by burning to target priority Ecological Vegetation Classes. Furthermore, there have been cases in recent years where habitat trees were not protected and fires burnt hotter and further than planned.

Riparian weeds, Montpellier broom, gorse and blackberry are particular threats to the area. There are significant weed incursions, particularly along roadsides and around the perimeter of bushland areas including state forest areas.

Key pest animals within the area are foxes, pigs and cats, with some recent sightings of Sambar Deer also causing concern.

The large network of roads and tracks through the state forest areas has resulted in unnecessary fragmentation of the vegetation. Some of the tracks have been formed by off-road use by trail-bikes. Localised off-road trail-bike riding has caused localised erosion, which in some areas has become significant.

Other more minor threats that affect the Wombat landscape include:

- Dumping rubbish that can contain dangerous objects for animals and humans alike, and also plants that become environmental weeds. Ultimately the cost of cleaning up other people's rubbish reduces the budget that could be spent on managing the forest.
- The use of barbed wire along boundary fences for areas of public land. This can pose a significant threat to wildlife, especially affecting gliders, birds and bats.

2.2.5.3 Recommendations for future management

General recommendations for management of the landscape

In relation to community attitudes to management of the Wombat State Forest, a survey of 1200 people undertaken by DSE clearly indicated that protection of biodiversity values is the most important issue to the community (DSE, 2004). In fact, 80% of people indicated that biodiversity protection was very important, compared to 15% of people who considered sawlog production as very important. Also, 87% considered catchment protection very important and 18% considered firewood collection very important. This survey is the most detailed indication of community attitudes on forest management in the Wombat Forest.

In order to protect the conservation values of the forest, including all four sections discussed above, we recommend that

Wombat State Forest be reclassified as a State Park to allow for greater protection of its natural values and removal of key threats. The VNPA recommends that the following management issues be assessed and modified to improve the local environment:

1. Reassessing the harvesting of trees for commercial and private firewood supply, with the option of sourcing firewood as a by-product of ecological thinning and, in the longer term, from plantations and private woodlots.
2. Systematic and sustained removal of key pest animals and weeds.
3. Assessment of impacts of local trail-bike riding and areas that should be zoned as restricted areas.
4. Improved fire management which considers the ecological requirements of EVCs and local flora and fauna, particularly significant species. This should include a monitoring program.
5. Protection of future hollow bearing trees, particularly from any future logging.
6. A community education program.

The presence of dumped rubbish and barbed wire along the perimeter of some areas of fencing, and lack of track maintenance, suggests a general need for improved resourcing and on-ground management.

Increased resourcing for on-ground management will be essential to address key threats adequately within the Wombat State Forest.

Tenure

We recommend that the four sections of the Wombat State Forest be reclassified as State Park and combined with Lerderderg State Park.

A survey of community attitudes towards the Wombat State Forest clearly demonstrated a desire to see it protected for its biodiversity values. **Photo: courtesy Tibor Hegedis**

3. Discussion, Key Themes & General Findings

Detailed recommendations for each zone are contained in previous chapters, but a number of general themes and findings emerged as the report was developed. These are discussed in this section – they are:

1. New Parks – the building blocks for connectivity.
2. Priority Areas and the reserve system.
3. Investing in ecological management.
4. Building connections across the landscape.
5. Building community leadership and knowledge.
6. Timber harvesting and firewood.
7. Managing ecological dimensions of fire.

3.1 New parks – the building blocks for connectivity

We expect the areas identified as priorities in this project to be viewed as just the first public land pieces of a larger picture. The largest areas of intact vegetation and habitat in Victoria are on public land, hence the obvious first step in building a more connected landscape is to ensure the protection and good management of these areas. This is also likely to be the most efficient and effective mechanism for the enhancement of biodiversity.

The areas (totalling 111,436 ha) of state forest identified in this report are the building blocks or foundations of a large-scale biolink from the Grampians to the Alps. We have looked at current levels of connectivity as part of the methodology of prioritising each location, and there are excellent opportunities in some cases for changing land tenure to increase the security and quality of the linking vegetation.

The identification process (see chapter 1) led to a high proportion of nominations of state forest areas, and a smaller number of areas that have already been reserved (nature conservation reserves).

In all cases the nominators were keen to see improved management, but in the case of state forest areas they identified the continuing threat of timber harvesting as a key threat to the integrity of the location. To a lesser extent, other activities generally unrestricted in state forest, such as prospecting, and uncontrolled recreation activities such as four-wheel driving and trail-bike riding (both off-road and in causing degradation of tracks), are also of some concern.

The chief reason for identifying a change in tenure as a positive outcome is the difference in the focus of the relevant legislation and its management objectives. The National Parks Act (1975) mainly relating to national and state parks, and the Crown Land (Reserves) Act (1978) for conservation reserves, align with the preferred management options of most local environment groups. Proposals for changes in land tenure were assessed against public land categories to determine relevant land tenure – State Park, Nature Conservation Reserve, etc.

Some 25,000 ha of the areas identified consist of vegetation types that are under-represented in the reserve system. The addition of these areas would contribute to achieving national targets. These under-represented vegetation types are usually distributed as smaller areas within larger areas of more common vegetation types. For this reason, it is difficult to separate the under-represented vegetation types as manageable reserves from the large blocks they occur in, so they should be managed and developed as a larger network of parks.

Many local groups are also keen to see consolidation of roads, better signage, ecological interpretation, community education and promotion as part of the ongoing management of these areas once they are part of the park and protected areas estate. Such programs should be supported by specific funding packages as part of the transition from state forest to parks and reserves.

The majority of the priority sites that we have identified as part of this project are in the Goldfields and Central Victorian bioregions, generally on hilly country that is less fertile. There are big gaps in good stands of

ECOLOGICAL VEGETATION CLASS (EVC)	EVC BIOREGIONAL CONSERVATION STATUS	EVC NAME	AREA OF EVC IN PRIORITY SMALL PKS (HA)	CURRENT TOTAL CONS RES[1]	CURRENT CONS RES/PRE-1750[2]	POTENTIAL CONS RES/PRE-1750
Goldfields Bioregion						
21	Vulnerable	Shrubby Dry Forest	128.28	5	2.17%	**57.95%**
75	Vulnerable	Sandstone Ridge Shrubland/ Heathy Woodland Mosaic	137.63	0	0.00%	**99.73%**
178	Depleted	Herb-rich Foothill Forest/Shrubby Foothill Forest Complex	7.84	0	0.00%	**98.00%**
198	Vulnerable	Sedgy Riparian Woodland	86.66	25	14.45%	**64.54%**
Central Victorian Uplands Bioregion						
22	Depleted	Grassy Dry Forest	2659.46	31705	14.19%	**15.38%**
23	Depleted	Herb-rich Foothill Forest	14402.78	14854	10.00%	**19.69%**
178	Depleted	Herb-rich Foothill Forest/Shrubby Foothill Forest Complex	3268.12	480	7.56%	**59.00%**

1. The total area of this vegetation type within the bioregion that is protected in conservation reserves (hectares).

2. The percentage of the original pre1750 extant of that vegetation type that is protected in conservation reserves.

Table 2: EVCs that would become adequately represented if high priority Small Parks areas were reserved.

vegetation on the fertile plains that intersect the higher areas of poorer soils. There is still a need to fill in the gaps strategically, particularly to enable ecological function across the landscape (see section 3.4.0, Building connections across the landscape, for more detail).

3.2 Priority Areas and the reserve system

The principle of a comprehensive, adequate and representative (CAR) reserve system was formally agreed to by the Commonwealth and Victoria in 1997. Guidelines include the requirement that at least 15% of the pre-European extent of different forest and woodland communities should be reserved (JANIS 1997). While the new Australia's Strategy for the National Reserve System 2009-2030 no longer specifies an adequacy target, it is widely acknowledged that 15% of pre-European extent is a minimum starting point in building a climate-change-resilient parks estate.

Within our 17 identified high priority areas, which are currently unreserved, 22 different ecological vegetation classes (EVCs), mosaics and complexes are under-represented using the CAR Reserve system. These are shown in Appendix 6. According to mapping datasets and EVC depletion data provided by DSE, if all these high priority sites were reserved, four EVCs would be adequately represented within the reserve system, as well as two complexes and one mosaic. We have undertaken on-ground vegetation assessments of some of these priority locations which have in some instances identified a distribution of EVCs different from those officially recorded. However, as our assessment data has not yet been incorporated into official datasets, we have not used it to adjust our findings. A summary of these EVCs and the potential change in percentage reserved is shown in Table 2.

Additionally, it is also worth noting that should all the 17 state forest areas be

reserved, it would add an additional 25,535 ha of under-represented EVCs to the reserve system. This is almost one quarter of the total area of the state forest sites (111,436 ha). For further details see Appendix 7.

The VNPA recommends:

- Protecting the 111,436 ha of high conservation value state forest indentified in this report in conservation reserves or state parks, or by consolidating them within existing parks.
- Providing specific funding of $20 million over three years for the 111,436 ha of new parks.

3.3 Investing in ecological management

People we consulted in this project are unanimous in wanting to see improved management of the priority areas of public land, irrespective of land tenure. Improved management would include:

- Strategic, integrated and ongoing pest plant and animal management.
- Strategic programs to enhance biodiversity values.
- Long-term monitoring of the effectiveness of management actions, sufficient to allow well-informed adaptive management.
- Implementation of a strategic track or road system with adequate signage.
- Maintenance of amenities that allow visitors to enjoy the area but minimise their impact.

It would also include a local education component, and planning and extension work would extend beyond the boundaries of the park or forest area to include working with adjacent land managers to achieve better results.

Management of Victoria's parks has been undermined by the fact that there are often no clear, adequate or recognised management plans for many smaller conservation reserves. Only the larger national and state parks generally have management plans developed and renewed on a regular basis. Importantly, even iconic parks such as Wilsons Promontory have management plans with few, if any, measurable objectives.

Perhaps to compensate for a lack of capacity to develop meaningful management plans, Parks Victoria is now trialling landscape-scale parks planning. Examples are the development of a generalised plan for a mosaic of small and medium parks on the Gippsland Plains near Yarram, and the combination of five Alpine parks into one management plan. Such broad-scale, non-specific planning scarcely answers obligations under the National Parks Act for a management plan for each park. The detailed habitat-hectare assessments undertaken on six sites in this study (see appendix 6), form a starting point for management plans for these sites.

There is consistent concern among the local environment groups we consulted that Parks Victoria is severely under-resourced to undertake the tasks required to manage adequately the parks and reserves for which they have responsibility. Local people are not only concerned about a lack of expenditure on park infrastructure. They are particularly concerned about long-term ecological threats, the impact of inappropriate activities, and the lack of pest plant and animal control.

There is clear evidence that there needs to be greater investment in all aspects of biodiversity and park management. However, even though local people acknowledge that Parks Victoria does not have enough capacity for the on-ground maintenance and protection needed in the parks that it currently manages, they are keen to see priority areas of state forest identified through this study reserved and managed by Parks Victoria. This of course would require additional and appropriate levels of resourcing for Parks Victoria.

There is also a view that while DSE receives funding to operate in its role as state forest manager, it places no emphasis on achieving

specific biodiversity outcomes. DSE has no plan or processes to support these objectives. Overall Parks Victoria is seen as the better manager.

These views are consistent with views held widely by VNPA members and local Friends groups. The results highlighted here are similar to findings in an earlier report for VNPA on weed management in parks. In 2008 the VNPA asked Biosis Research to make an independent assessment of weed management in Victoria's parks. Biosis interviewed rangers in three parks (Wilsons Promontory and Great Otway national parks, and Warby Range State Park), as well as Parks Victoria head office staff.

They made one particularly clear recommendation: management of environmental weeds needs reliable, recurrent annual funding. This funding must increase significantly if we are to make real inroads into controlling the present treatable weed infestations.

In this study, Parks Victoria staff said they were far more likely to attack a weed problem if they were confident that funding would be available for follow-up works in ensuing years. One-off initiative funding can be useful in some circumstances, but in most cases the weeds will reinfest as badly as before. Adequate, reliable, recurrent funding must be the mainstay of effective weed and pest animal management programs.

The key Biosis findings on weed management are:

- Resourcing for weed control in Victoria's national parks and reserves is currently inadequate, leaving many weed infestations untreated or inadequately treated.
- The skill levels of Parks Victoria staff in employing weed control strategies and measures must be increased to make the most effective use of the resources available.
- Weed management sometimes fails when the program is interrupted or discontinued because other competing priorities for staff time take over, such as during high visitor periods, or wildfire protection or control activities.
- Effective weed control requires reliable ongoing funding, rather than special initiative funding.
- There is no comprehensive baseline data for the extent of weed infestations in Victoria's park system.
- Monitoring of ecological systems must be greatly increased before we can measure the effectiveness of any weed control programs.
- We need to research better biological control methods for some priority environmental weeds.

Probably the most challenging of the recommendations is the issue of monitoring ecological systems. Biosis found that park staff were generally familiar with the weed they were trying to control, but not always as familiar with the ecology of the area the weed was invading. That leaves open the possibility that some control programs could be damaging the natural values of the area instead of improving ecological condition.

The report recognises that many of the pest plant control programs in parks and reserves are well run, and very effective, and that Parks Victoria's "Levels of Protection" program intelligently sets priorities across the state. But those priorities are largely a response to a lack of resources, leaving a great many significant and treatable infestations ignored or inadequately treated.

Importantly, while the level of resourcing for environmental weed management in our national parks is inadequate, it is well ahead of resourcing for weed control in areas of state forest and other public land. The full Biosis Research report is available on the VNPA's website www.vnpa.org.au.

Much of the current scientific thinking about the implications of climate change for biodiversity emphasises the need to improve management of threats such as control of pest animals and weeds, as well as restoring connectivity (see chapter 1). There are good opportunities for improving the resilience and quality of habitat on Victoria's public

land estate, but this requires increases in resources and better process and practices. Management agencies should make a concerted and combined effort to achieve this.

The VNPA recommends that:

- The government commit to significantly increasing funding for ecological management to enable Parks Victoria to adequately manage areas of public land for biodiversity and ecosystem processes.
- Parks Victoria significantly increase funding (by $1 million per annum) for on-ground management for existing parks in Central Victoria.
- Parks Victoria and DSE should establish a clear management stream for the management of ecological systems on public land, and a clearly identified budget.
- Site-specific ecological management plans should be established for all public land in Victoria, particularly Nature Conservation Reserves.
- There should be an independent audit (e.g. by the Commissioner for Environmental Sustainability and/or VEAC) of ecological condition of public land and opportunities to improve management responses.

3.4 Building connections across the landscape

Building a large-scale biolink will take time, money and commitment from people to make it happen. Biolinks are challenging projects, as they require a number of policy tools targeting both public and private land. The first key step in this process should be to secure the foundations by both changing land tenure from state forest to state park or nature conservation reserve, and increasing levels of funding to land managers. The second area of future focus needs to be developing connections across the broader landscape.

A report for the Victoria Naturally Alliance, a coalition of nine leading conservation groups in Victoria ('Ecological processes in Victoria: policy priorities for sustaining biodiversity', McGregor et al 2008) notes that: "To be effective, action must be mutli-scale, integrated, well resourced and sustained. It should involve a wide range of players including all levels of government, landholders, non-government organisations and the corporate and philanthropic sectors."

In addition to the creation of new parks, developing biolinks will require a review of other areas of public land, with a view to improving connectivity. Reviewing riparian land that contains high conservation value habitat, such as critically endangered grassy woodland and grassland, would be an effective first step. The VNPA has in any case been calling on the Victorian Government to reform the current antiquated Crown land water frontage systems which allow uncontrolled grazing on 17,000 kilometres (34,000 kilometres if both sides of the river are counted) of river frontage across the state. Along with better protection and management of public land identified in this report, this would be an important part of a multi-scale and integrated response to building greater connectivity across the landscape (for more information see www.vnpa.org.au).

As well as these important initiatives, we would encourage any future strategic work that aims to increase connectivitiy to take ecological processes into account. As a very preliminary step, we would prioritise the incorporation of creeks and wetlands as well as the protection and restoration of endangered and vulnerable vegetation on the 'plains'.

In recent times, there has been an excessive focus by the Victorian Government in providing financial assistance to streamside landowners using what are referred to as 'market-based mechanisms'. This usually involves a call for expressions of interest to tender for funds which are then used by the successful tendering landowners to protect and manage streamside areas and wetlands. However, the outcome is rarely strategic.

A call for expressions of interest inherently results in a scatter-gun response from land owners, with proposals widely separated. With the resources usually available in such programs, it would take many decades to 'join the dots'. Inevitably, there are wide gaps between successful tenders, and the owners of key stream frontages often do not apply, or submit excessively expensive tenders. A corridor will not function until all the significant gaps are addressed.

An alternative, more strategic approach is to identify the most important places where social and environmental assessment identifies that lengths of unbroken priority corridor could be achieved. Based on priority, the approach is to engage the community to implement an action plan with agreed cost-sharing arrangements over a set period. While this approach loses the perceived economic benefits of the market-mechanism approach for selecting the best value projects, it gains the benefit and social dynamics of the local landowners working together to achieve a shared goal, rather than in a solitary manner on individual tenders.

Though market-mechanism schemes have by now established the acceptable costing range for various types of required conservation works, a balance between the two approaches is still valuable. Calls for expressions of interest often lead to the discovery of environmental gems that turn out to be well worth the investment to protect.

The approach of requiring confidential tenders, while negative in encouraging individual action and counter to the landcare approach, is useful in further developing our understanding of market pricing.

There also needs to be a clear focus on private land through a range of integrated or complimentary strategies, including:

- Native vegetation regulation.
- Land Stewardship and incentive programs including Busk Broker type programs.
- Private protected areas such as undertaken by Bush Heritage or Trust for Nature.
- Conservation Covenants.
- Ongoing support for Landcare groups and conservation networks.
- Conservation planning and monitoring.

In this research we recommend that strategic links be established as a priority for Crosbie NCR, and also within the Mid-Loddon area, which ensures that through permanent protection, and other measures such as restricting stock access, regeneration and restoration of vegetation and other habitat factors, there is an improvement in the potential for species sustainability and survival.

The current investigation into native vegetation being undertaken by the Victorian Environmental Assessment Council (VEAC) will inform this approach, and it is important

Victoria's box-ironbark forests have become an icon of the Central Victorian landscape.
Photo: courtesy Wendy Radford

that the VEAC process produces detailed and specific recommendations for biolinks at a landscape, regional and local scale.

The VNPA recommends that:

- Crown land water frontage licences be replaced by riparian conservation licences, funding be doubled for riparian land programs across the state, and high conservation value and key linkages of Crown riparian land be added to, and managed as part of, the reserve system.
- The VEAC Native Vegetation Investigation identify specific strategic links in the Central Victorian landscape (in multiple directions) to maximise the potential for improving conservation and ecological processes.
- The Government implement a balance between market-mechanism-based incentives and strategic cost-share action plans, which achieve defined outcomes for targeted priority locations, rather than diverting all incentive funding to scattergun 'call for expressions of interest' programs.

3.5 Building community leadership and knowledge

One unique strength of the Central Victorian biolink is the high level of community activity and interest. Various local and regionally focused landscape restoration strategic plans have already been developed by community organisations, like the Connecting Country project in the Mount Alexander Shire, which has produced a Biodiversity Blueprint (see www.connectingcountry.org.au).

Other planning documents, such as local Biodiversity Action Plans and the Landscape Logic project developed by the North Central Catchment Management Authority (CMA), can also help inform local action. Other groups such as the Wedderburn and Mid-Loddon conservation management networks also operate at the landscape scale and aim to improve habitat and increase the extent of vegetation for important species such as Malleefowl in the Wedderburn area and the Bush-stone Curlew in the Mid-Loddon area. These initiatives need to be supported, equipped and built on to ensure strong community leadership and local ownership of landscape-scale initiatives.

Local groups and networks also play a key role in educating and involving the community in the natural values of Central Victoria's landscape – for example, the Bendigo Field Naturalists working with local schools, and the Bendigo and District Environment Council's photography competition for children, focusing on the Wellsford State Forest. A 'Biodiversity Engagement Project' is also being undertaken by the City of Ballarat and the shires of Hepburn, Moorabool and Pyrenees.

When areas of forest or reserve are not widely known or understood by the local community for their natural values, the community is less likely to value them or want to see them conserved. It is also important that local people and other interested people who use these areas, either for recreation, spiritual or cultural reasons, or for industry, are engaged at some level in processes that will affect the areas they enjoy or rely on for a benefit or resource of some kind.

Local and regional groups have considerable knowledge and expertise, but this needs to be supplemented with the best available science to create growing community knowledge. Monash University is in the third and final year of its 'Birds in a Fragmented Landscape' project, which has been running a number of different investigations into the effects of habitat fragmentation on birds in Central Victoria. It also has a project looking at connectivity requirements of various species that can be built into computer models to help locate habitat corridors in the future. Good information is required to inform conservation actions, and reports such as the Victorian State of the Environment Report 2008 (CES 2008) found that there are still many information gaps and that there has been a steady decline in collection of key biological and ecological information since the late 1990s. The Commissioner for Environmental Sustainability recommended that the Victorian Government support and

enhance strategic, coordinated survey efforts across Victoria, and that a single agency be nominated to coordinate such data. Such information is critical, and we encourage a greater effort for the Central Victorian regions to inform conservation planning for large-scale biolinks.

Through its NatureWatch program, the VNPA is also developing community monitoring projects in Central Victoria focusing on threatened flora and fauna and the impacts of fire. NatureWatch aims to:

- Facilitate partnerships between scientists, community and land managers to undertake long-term scientifically sound community monitoring projects.
- Empower the community with awareness, skills, and knowledge to better understand and appreciate nature through active participation in community-based monitoring.
- Inform nature conservation policy and practice through scientifically robust monitoring projects.

For more information on NatureWatch see www.vnpa.org.au.

There is an urgent need to increase resources in community education and awareness of natural values, and fund a substantial ecological research and monitoring program. These are important initiatives that would help develop a regional 'community of effort' towards building greater connectivity and ensuring that our biodiversity is protected and appreciated by all.

The VNPA recommends that:

- A regional community education program tht engages and involves all users and local community representatives interested in the natural landscape of Central Victoria be established to highlight the unique values of the region.
- An extensive program of targeted research and monitoring be developed to inform the conservation planning and management of ecological processes across Central Victoria.
- Funding be sought to establish a local and regional community monitoring project that both educates and informs conservation practice.
- A region-wide series of workshops be convened by peak environment groups to facilitate a shared understanding, vision and governance of a large-scale biolink project.

3.6 Timber harvesting & firewood

Native vegetation on all land tenures across Central Victoria is still subject to timber harvesting for many different purposes, sourcing firewood being the most significant annually. In 2005-06, 65,479 m^3 of firewood was sourced in Victoria. Of this, 72% was sourced from private land and 11% from state forests (DSE, 2009b). Of the firewood sourced from state forests, 97% came from the western region (essentially everything west of the Hume Highway). The Bendigo Forest Management Area's Wood Utilisation Plan shows that the intended volume to be sourced from the district's forests will double in the next three years, from 19,765 m^3 (2010-11) to 44,087 m^3 (2012-13) (DSE 2010).

Together with other pressures such as wildfires in recent years, an increase in prescribed burns and already stressed forests as reported by the vegetation assessments carried out for six sites (see appendix 6) means that continuing or increasing firewood collection from native forests in Central Victoria is not sustainable. It will have significant impacts on the region's biodiversity.

In 2001, the VNPA published a report titled Firewood Business which set out the economic basis for a phased transition to plantations for firewood production (VNPA 2001). Also in 2001, the ECC box-ironbark investigation final report recommended that firewood be increasingly sourced externally to state forests (VEAC 2001). Various studies since have demonstrated the viability of small-scale wood lots as a source of firewood, instead of logging of remnant public forest (see Hamilton 2008). The VEAC Investigation into Red Gum forests, although in a different region, addressed many of the same issues

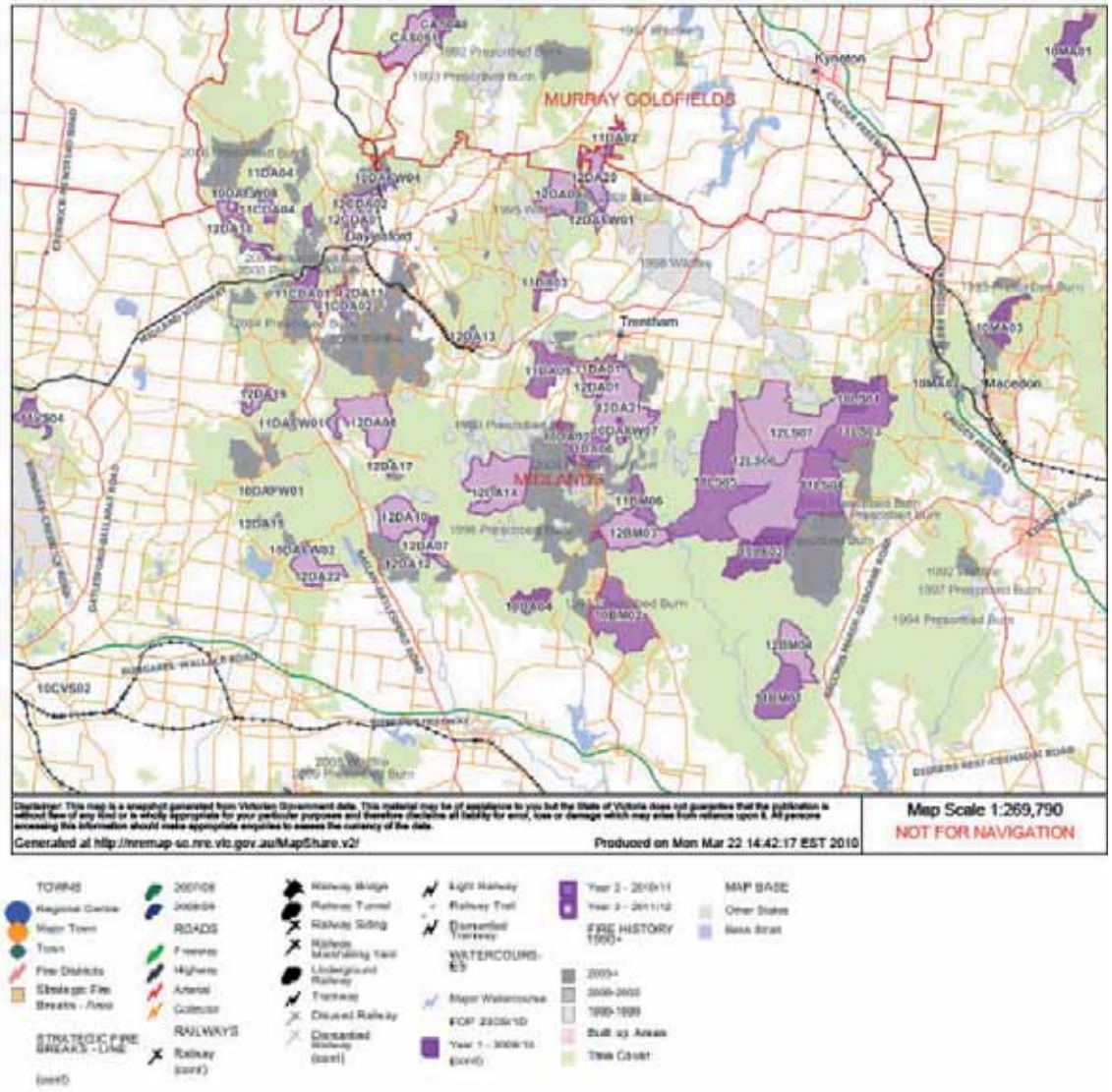
CHAPTER 3

and recommended that "...the government encourage the establishment of firewood plantations and woodlots on suitable cleared areas on public and private land and that incentive funding be provided to assist in their development" (VEAC 2008).

This recommendation was later supported by a second government community engagement panel set up to review the VEAC recommendations (CEP 2008). The panel recommended that: "Government should actively support the development of dry land, mixed species agro-forestry in the River Red Gum region to assist in providing local firewood. This may include incentives to landholders to invest in agro-forestry. The incentives may be linked to existing programs and achieve a dual purpose in tackling salinity, improving biodiversity or storing carbon. This should be sympathetic to local indigenous bird life and provide improved habitat options for local birds."

The VNPA recommends that:

- The government establish a statewide agroforestry program with $10 million funding over four years to offer incentives to private landholders and local governments to develop small-scale firewood lots. The inclusion of some of the recently abandoned plantations formerly owned by Managed Investment Schemes should be considered.



3.7 Managing the ecological dimensions of fire

The issue of planned burning was the subject most often referred to in the initial round of submissions to the 2009 Bushfire Royal Commission. According to the commission's August 2009 Interim Report:

"Generally submissions on this topic raised concerns about the effects of prescribed burning on flora, fauna and on climate change. Many submissions called for further investigation and evidence about the effectiveness of fuel reduction, and its effects on flora and fauna. Equally, there were many submissions stating that the benefits were obvious."

The issue is certainly contentious, and there is strong local concern that many of the planned burns recently undertaken in the region have burned too hot and have been too uniform in distribution. More significantly, perhaps, the implementation of burns in the region is very inconsistent, with no clear guidelines for the season, frequency, intensity and temporal or spatial mosaic of planned burns for the various vegetation communities. We have also heard of poorly planned road infrastructure being hastily developed to assist in fire management.

Most importantly, there has been little monitoring of the long-term effects of natural or planned fire on biodiversity in the region.

In the past five years, and especially after the fires of recent years, public land managers have received extra funding for fire management. This has resulted in increased numbers of prescribed burns in Central Victoria and also increased numbers of planned fires for the next three years (to 2012) as indicated in the current Murray Goldfields Fire Operations Plan. The map of the Wombat landscape area (page 60) shows that the number of fires before 2005 was much less than those since 2005 and those planned over the next three years.

In the highly fragmented landscape of Central Victoria, it is particularly important that fire management be informed by good science. Fire Operations Plans indicate that in most cases, fires are planned for the purposes of reducing fuel loads or protecting human life, property and highly valued assets, even when the areas to be burnt are large and not obviously close to any key property or township. It is of concern that there is little or no monitoring of the effects of planned burns (or wildfire), either for fuel reduction effectiveness or for biodiversity impacts. Accompanying the funding for fuel reduction burns is money for increased roading. Bendigo DSE has indicated that they do not have a strategy for planning their tracks and road infrastructure that also takes into account the removal of redundant roading in these highly fragmented forests (Bate, P, pers comm.. 2009).

There is very limited understanding of suitable fire regimes for these woodlands. A recent study suggests:

> *"Fire may be considered a blunt instrument, and the effects of fire may be variously insignificant to substantial, short- to long-term, and negative to positive. There is no guarantee that the burning of some remnants will not lead to unexpected and undesirable results. As such, the proposed assessment protocols should be looked at in the light of an experimental management program, and fine-tuning (informed by pre- and post-fire monitoring) will be needed in future as our knowledge grows. If in doubt, don't burn. Ecological burning should be avoided in drought years, when plants and animals may already be stressed."*

and

> *"It would seem to be very important to acknowledge that, due to a lack of information on the effects of different fire regimes in Box Ironbark remnants, we need to do a lot more research before we can confidently set long term targets."*

DSE has established 'tolerable fire intervals' for different vegetation types. However, these cannot be relied on because they take account of only a relatively small number of plants species for which we have some knowledge of recovery periods. We don't yet know the recovery capacity of our many birds and animals, let alone the tens of thousands of different insects, fungi and other micro-

organisms that are imperative to the function of our ecosystems.

A paper, 'Planned fires and invertebrate conservation in south east Australia' (New et al), recently published online by the international Journal of Insect Conservation, makes the point (among many other considerations) that:

> *"In general the field [fire ecology] is one in which more scientific information and decidedly les emotion and supposition is needed in formulating practice and policy." (REF)*

The paper also identifies the need for long-unburnt areas to remain in the landscape, and states that any planned fires in fragmented areas should take place only after extensive consultation with ecologists, as recruitment of species, particularly invertebrates, from other areas is problematic.

A ten-year study by Kevin Tolhurst in the Wombat Forest is one of the only known long-term research projects to study the effects of fire on flora and fauna. Its results should be used to inform any prescriptions for planned burning in the region.

Without good data to make decisions, we are possibly wasting large amounts of money and reducing the integrity of our ecosystems with no real benefit to the community, with insufficient scientific basis and little or no monitoring. This is something that would not be acceptable in our hospitals, nor would it be tolerated from our engineers or bridge-builders.

With climate change now upon us, and more frequent fires predicted, land managers in 30 years' time will be desperate for data from long-term scientific monitoring. Whatever fire regimes we may decide upon, we must also set up comprehensive monitoring programs now. This would then allow us to make informed judgments on the effectiveness of different fuel reduction programs.

The VNPA recommends that:

- DSE implement and maintain a program of long-term data collection, monitoring and modelling of the effects of planned burning programs and of wildfires on biodiversity.
- DSE should identify and prescribe a preferred temporal and spatial burn mosaic specific to each ecological vegetation class (EVC), designed by fire ecologists with input from botanists, zoologists, entomologists, mycologists and microbiologists.
- Burns in the Ecological Management Zone (Zone 3) should be performed according to clear prescriptions designed to achieve identified long-term biodiversity objectives. Prescriptions should be expressed in terms of preferred or required fire frequency, intensity seasonality and 'patchiness'. Burns in this zone must also be integrated at the local planning level with fuel reduction burning in other zones to maximise possible mutual benefits.
- There should be a formal re-assessment by DSE of prescriptions and targets for planned burning, including fuel reduction burns and ecological burns, every four years.

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Appendices

Appendix 1 – Summary of Activities in Public Land Categories

ACTIVITY	NATIONAL PARK	STATE PARK	NATIONAL HERITAGE PARK	REGIONAL PARK	NATURE CONSERVATION RESERVES	STATE FORESTS
Recreation and tourism activities						
Nature observation	✓	✓	✓	✓	✓	✓
Picnicking and barbecues	✓	✓	✓	✓	✓	✓
Camping[1]	✓	✓	✓	✓	✓	✓
Bushwalking or short walks	✓	✓	✓	✓	✓	✓
Car touring, four-wheel driving and trail bike riding[2]	✓	✓	✓	✓	✓	✓
Dogs	×	✓[3,4]	✓[4]	✓[4]	×[3]	✓
Visiting historic features	✓	✓	✓	✓	✓	✓
Orienteering and rogaining[4]	✓	✓	✓	✓	✓	✓
Car rallies[4]	×[3]	×[3]	✓[7]	×	×	✓
Horse riding[5]	×[3]	✓[4]	✓[4]	✓[4]	×[3]	✓
Hunting	×[6]	×[6]	×[6]	×[6]	×[6]	✓[6]
Prospecting/ metal detecting						
Metal detecting	×[3,8]	✓[7]	✓[7]	✓	✓[7]	✓
Gold panning	×[8]	✓[7]	✓[7]	✓	×	✓
Gemstone fossicking	×[8]	×	✓[7]	✓	×	✓
Resource industries						
Mineral exploration	×[9]	×[9]	✓[9,10]	✓[10]	✓[10]	✓
Mining	×[9]	×[9]	✓[9,10]	✓[10]	✓[10]	✓
Sawlog and post production	×	×	×	×	×	✓
Firewood	×[11]	×[11]	×[11]	×[11]	×[11]	✓
Apiculture	✓[12]	✓[12]	✓	✓	✓[12]	✓
Eucalyptus oil production	×	×	×	×	×	✓[13]
Other uses						
Environmental education	✓	✓	✓	✓	✓	✓
Approved research	✓	✓	✓	✓	✓	✓
Water production/ distribution	✓	✓	✓	✓	✓	✓
Stone extraction	×[14]	×[14]	×[14]	×[14]	×[14]	✓
Grazing[15]	×	×	×	×	×	✓
Utilities	×[16]	×[16]	×[16]	×[16]	×[16]	✓

1 Camping may be at designated campsites only, and may be excluded from some smaller reserves.

2 Only on roads and tracks formed for the passage of four-wheel vehicles; may be subject to seasonal or permanent closure.

3 Some exceptions.

4 Subject to certain conditions.

5 Only on formed roads or specially designated tracks.

6 Land managers may organise shooting drives to assist in control of feral animals.

7 Some areas may be excluded in management plans.

8 Permitted along Reedy Creek (Chiltern-Pilot National Park).

9 Existing exploration or mining licences continue; Government may approve mining following such exploration.
Specified park and reserve areas (A4, NHP1, D2) will extend only 100 metres below the survace, allowing new exploration and mining under.

10 Restricted under Mineral Resources Development Act 1990.

11 Some firewood may be available from ecological management in parks and reserves. Previously felled firewood can be collected from new parks and reserves.

12 Permitted where an existing use.

13 Confined to areas used since 1995.

14 Extraction for local management use only.

15 Only small areas are suitable for grazing. Light grazing for ecological management may continue in limited areas.

16 Some existing utilities are within recommended parks and reserves. These will generally continue.

Appendix 2 – List of participating groups and individuals

Ballarat Environment Network

Bendigo and district environment council

BEAM Mitchell Environment Group

Castlemaine Field Naturalists

Friends of Box Ironbark

Mid-Loddon Catchment Management Network

Mid-Loddon Conservation Management Network

Wombat Forestcare

Ian McGee, local environmentalist

Jim Radford, Bush Heritage Australia

APPENDICES

Appendix 3 – Results for all sites considered

Location	Hectares	Score Area	Number of BioEVCs	Score- Number of BioEVCs	Number of Thr Fauna	Score Thr Fauna	Number of Thr Flora	Score Thr Flora	Cons Significance	Score Cons Significance	Connectivity
Scoring System:	**<100=1 100-1000=2 1000-5000=3 5000-10000=4 >10000=5**		**1-3=1 4-6=2 7-9=3 10-12=4**		**1-5 =1 6-10=2 11-15=3 16-20=4**		**1-3=1 4-6=2 7-9=3 10-12=4**		**Low=1 Med=2 High=3 Vhigh=4**		**Low=1 Med=2 High=3**
Wombat SF - Main	31448	5	10	4	15	3	21	5	Med	2	High. Part of large block. Linked well to both north and south.
Mount Cole SF	8926	4	11	4	10	2	13	4	High	3	Medium. Moderate links to the east and west across private land.
Wombat SF - West	5085	4	12	4	12	3	4	2	High	3	Medium. Links to vegetation in north and east.
Dunolly SF	7547	4	7	3	12	3	4 (1km)	2	Med	2	High. Part of large block. Particularly linked to the north, west and south.
Kingower SF	4690	3	9	3	13	3	11	4	Med	2	High. Part of large block, with good links south.
Bealiba SF	7954	4	10	4	13	3	2	1	Med	2	High, connected to the north and south.
Pyrenees Range State Forest - Central	14680	5	9	3	9	2	3	1	High	3	High. Part of large block which has links north and south.
Wombat SF - Bullarto Nth	5747	4	8	3	5	2	4	2	High	3	Medium. Links to other large blocks to the north and south. Includes creek link-ages.

Score Connectivity	Any EVCs undere-served by Bioregion? (% per reserve or forest area)	Score Under-reserved EVCs	Considerations to Inform Threat Score			Total Score Conservation	Total Score Threats
			% Cons Res or SPZ	Threats to Habitat Values	WUP - 2009-2011		
	< 50 ha = 1 **50-100 = 2** **100-500 = 3** **>500 = 4**		**Habitat values are significantly threatened = 3** **Habitat values are moderately threatened = 2** **Minor threats exist = 1** **No obvious threats = 0**				
3	1093 ha (3 EVCs)	4	22%	Timber harvest, firewood collection, localised trail-bike riding, pest animals (foxes, pigs, cats), too much fire, lack of flow (drought), weeds esp riparian. (33)	319 ha or 1969 m3 for firewood, and 20 m3 minor produce.	26	3
2	7740 ha (7 EVCs)	4	33%	Timber harvest, firewood collection, localised trailbike riding, pest animals (foxes, pigs, cats), too much fire, weeds. Sambar deer.	87 ha or 150 m3 for firewood.	23	3
2	3818ha (3 EVCs)	4	19%	Timber harvest, firewood collection, localised trail-bike riding, pest animals (foxes, pigs, cats), too much fire, lack of flow (drought), weeds esp riparian. (31)	656 ha or 14298 m3 for fire-wood, and 90 m3 minor produce.	22	3
3	763 ha (2 EVCs)	4	7%	Timber harvest, firewood collection, prospecting, pest animals.	1846 ha or 1745 m3 for firewood and 800 m3 for minor produce.	21	2
3	370 ha (5 EVCs)	3	4%	Timber harvest, firewood collection, prospecting, pest animals, trailbike riding (erosion). Med-high fire risk.	580 ha of 830 m3 for firewood, 30 m3 sawlog and 200 m3 minor produce.	21	2
3	923 ha (4 EVCs)	4	9%	Timber harvest, firewood collection, prospecting, pest animals. Extreme fire risk (Climate change)	1199 ha or 2000 m3 for firewood and 810 m3 for minor produce	21	2
3	4368 ha (6 EVCs)	4	42%	Timber harvest, firewood collection, localised trailbike riding, pest animals (foxes, pigs, cats), too much fire, weeds. Trailbike plan introduced.	482 ha or 6780 m3 for firewood, 865 m3 for sawlog and 1590 m3 minor produce.	21	3
2	3988 ha (3 EVCs)	4	37%	Timber harvest, firewood collection, localised trail-bike riding, pest animals (foxes, pigs, cats), too much fire, lack of flow (drought), weeds esp riparian. (31)	15.7 ha or 750 m3 for firewood.	20	2

APPENDICES

Location	Hectares	Score Area	Number of BioEVCs	Score- Number of BioEVCs	Number of Thr Fauna	Score Thr Fauna	Number of Thr Flora	Score Thr Flora	Cons Significance	Score Cons Significance	Connectivity
Scoring System:	**<100=1 100-1000=2 1000-5000=3 5000-10000=4 >10000=5**		**1-3=1 4-6=2 7-9=3 10-12=4**		**1-5 =1 6-10=2 11-15=3 16-20=4**		**1-3=1 4-6=2 7-9=3 10-12=4**		**Low=1 Med=2 High=3 Vhigh=4**		**Low=1 Med=2 High=3**
Wellsford SF	7122	4	7	3	16	4	7	3	Med	2	Medium. Good links to the south. Other weaker links in all directions.
Tunstalls NCR	1637	3	3	1	6	2	1	1	Med	2	Low. Some weak links to north-east and south.
Crosbie NCR	2058	3	6	2	17	4	2	1	Med	2	High-medium. Good connectivity to the west and south, although on private land.
Mt Hooghly SF	2121	3	8	3	13	3	2	1	Med	2	High. Part of large block. Particularly linked north (NE and NW).
Muckleford SF	3152	3	5	2	18	4	6	2	Med	2	High. Broad links north and east to Castlemaine Block.
Moliagul SF	1396	3	8	3	2	2	1 (1km)	1	Med	2	High. Part of large block. Particu-larly linked north and south.
Mount Disappointment State Forest	15190	5	4	2	7	2	3	1	Med	2	High. Part of western end of eastern forested areas of Victoria
Wombat SF - North West	2820	3	5	2	2	1	3	1	Med	2	High. Part of large block. Linked well to both east and north.

Score Connectivity	Any EVCs undere-served by Bioregion? (% per reserve or forest area)	Score Under-reserved EVCs	Considerations to Inform Threat Score			Total Score Conservation	Total Score Threats
			% Cons Res or SPZ	Threats to Habitat Values	WUP - 2009-2011		
	< 50 ha = 1 **50-100 = 2** **100-500 = 3** **>500 = 4**		**Habitat values are significantly threatened = 3** **Habitat values are moderately threatened = 2** **Minor threats exist = 1** **No obvious threats = 0**				
2	93 ha (4 EVCs)	2	0.7	Timber harvest, firewood collection, too hot fires, trailbikes, pest animals, human impact incl. rubbish dumping, erosion.	921 ha or 3380 m3 for firewood, 120 m3 for sawlog and 340 m3 minor produce.	20	3
1	N/A	0	100%	Pest animals.		10	1
2.5	N/A	0	100	Weeds, pest animals (foxes, cats).		14.5	1
3	436 ha (4 EVCs)	3	12%	Timber harvest, firewood collection, prospecting, pest animals.	76 ha or 190 m3 for firewood and 80 m3 for minor produce.	18	2
3	33 ha (3 EVCs)	1	0	Timber Harvest, firewood colletion, rubbish dumping.	758 ha or 2730 m3 for firewood and 870 m3 minor produce.	17	2
3	102 ha (4 EVCs)	3	8%	Timber harvest, firewood collection, prospecting, pest animals.	585 ha or 470 m3 for firewood and 250 m3 for minor produce.	17	2
3	6 ha (1 EVC)	1	16	Recent fire, rubbish dumping, timber harvest, fire-wood collection, trail bikes, pest plants and animals.	462 ha or 8000 m3 for firewood, 5000 m3 sawlog and 175 m3 minor produce.	16	2
3	290 ha (3 EVCs)	3	69%	Timber harvest, firewood collection, localised trail-bike riding, pest animals (foxes, pigs, cats), too much fire, lack of flow (drought), weeds esp riparian.(31)	37 ha or 30 m3 for firewood.	15	2

APPENDICES

Location	Hectares	Score Area	Number of BioEVCs	Score- Number of BioEVCs	Number of Thr Fauna	Score Thr Fauna	Number of Thr Flora	Score Thr Flora	Cons Significance	Score Cons Significance	Connectivity
Scoring System:	**<100=1 100-1000=2 1000-5000=3 5000-10000=4 >10000=5**		**1-3=1 4-6=2 7-9=3 10-12=4**		**1-5 =1 6-10=2 11-15=3 16-20=4**		**1-3=1 4-6=2 7-9=3 10-12=4**		**Low=1 Med=2 High=3 Vhigh=4**		**Low=1 Med=2 High=3**
Fryers Range SF	3321	3	4	2	4	1	1	1	Med	2	High. Part of a large block. Linked on both sides east and west.
Upper Loddon - west SF	1806	3	4	2	3	1	3	1	Med	2	High. Part of a large block. Linked in all directions and via creeks.
Harvest Home SF	2242	3	6	2	2	1	2 (1km)	1	Med	2	High. Broad links to larger block.
Longbush SF	1283	3	5	2	7	2	1 (1km)	1	Med	2	Med. Joins to large block via good links to the west and northwest.
Timor SF	1379	3	5	2	7	2	2	1	Med	2	Med. Part of larger block (north). Moderate links exist to the south and east.
Mid Loddon Reserves											
Bell Swamp	14	1	2	1	6	2	2	1	V High	4	Med-low. Reliant upon roadside vegetation. No big blocks close.
Happy Jack Reserve	13	1	2	2	2	1	0	0	High-V High	3.5	Very high connectivity.On Bullock Ck and adjacent veg.
Yunah Road NFR	>5	1	2	1	4	1	0	0	High	3	Very high connectivity.

Score Connectivity	Any EVCs undere-served by Bioregion? (% per reserve or forest area)	Score Under-reserved EVCs	Considerations to Inform Threat Score			Total Score Conservation	Total Score Threats
			% Cons Res or SPZ	Threats to Habitat Values	WUP - 2009-2011		
	< 50 ha = 1 **50-100 = 2** **100-500 = 3** **>500 = 4**		**Habitat values are significantly threatened = 3** **Habitat values are moderately threatened = 2** **Minor threats exist = 1** **No obvious threats = 0**				
3	311 ha (2 EVCs)	3	0	Deer, trail bikes, wallaby browsing, hot fires. Timber harvest, firewood collection. Weeds (blackberry, gorse).	108 ha or 400 m3 for firewood.	15	2
3	277 ha (1 EVC)	3	0	Wallaby browsing, hot fires, weeds (blackberry, gorse), pest animals (foxes, cats).	No timber harvest for 3 yrs.	15	2
3	407 ha (4 EVCs)	3	10%	Timber harvest, firewood collection, prospecting, pest animals.	420 ha or 50 m3 sawlog 860 m3 for firewood and 305 m3 for minor produce	15	2
2	144 ha (4 EVCs)	3	436%	Timber harvest, firewood collection, prospecting, pest animals. Dogsledding events. Extreme fire risk (climate change related)		15	2
2	255 ha (4 EVCs)	3	28%	Timber harvest, firewood collection.	242ha or 520 m3 for firewood via thinning 35 m3 for minor produce.	15	2
1.5	N/A	0	100	Lack of water		10.5	2
3	N/A	0	100	Pest plants		10.5	1
3	N/A	0	100			9	1

APPENDICES

Location	Hectares	Score Area	Number of BioEVCs	Score- Number of BioEVCs	Number of Thr Fauna	Score Thr Fauna	Number of Thr Flora	Score Thr Flora	Cons Significance	Score Cons Significance	Connectivity
Scoring System:	**<100=1 100-1000=2 1000-5000=3 5000-10000=4 >10000=5**		**1-3=1 4-6=2 7-9=3 10-12=4**		**1-5 =1 6-10=2 11-15=3 16-20=4**		**1-3=1 4-6=2 7-9=3 10-12=4**		**Low=1 Med=2 High=3 Vhigh=4**		**Low=1 Med=2 High=3**
Woodstock NFR	4 to 8 (with Rec Reserve)	1	2	1	2	1	0	0	High	3	High on Murphy Ck.
Bullock Creek NFR	>10	1	1	1	1	1	0	0	High-V High	3.5	High. Bullock Ck and adjoining veg.
McGlashans NFR	25	1	2	1	1	1	0	0	High-V High	3.5	High. On Spring Creek.
Leichardt NFR	10	1	2	1	0	0	6	2	High	3	High. Located on Bullock Creek
Inglewood SF - Central	786	2	5	2	6	2	7	3	Low	1	High. Part of large block. Particularly linked to the north, west and south.
Pyrenees Range State Forest - West	1210	3	5	2	3	1	0	0	High	3	High. Part of large block which has links north and south.
Lockwood SF	998	2	7	3	6	2	2	1	Med	2	Med-high.
Shelbourne NCR	839	2	3	3	7	2	0	0	Med	2	High. Good links north east to Bendigo Reg Park
Tallarook State Forest	5018	4	4	2	4	1	1	1	Med	2	Medium. Well linked to via vegetation on private land to the west north
Inglewood SF - East	1369	3	5	2	2	1	2	1	Low	1	Med. Part of large block and some links north and east.

Score Connectivity	Any EVCs undere-served by Bioregion? (% per reserve or forest area)	Score Under-reserved EVCs	Considerations to Inform Threat Score			Total Score Conservation	Total Score Threats
			% Cons Res or SPZ	Threats to Habitat Values	WUP - 2009-2011		
	< 50 ha = 1 **50-100 = 2** **100-500 = 3** **>500 = 4**		**Habitat values are significantly threatened = 3** **Habitat values are moderately threatened = 2** **Minor threats exist = 1** **No obvious threats = 0**				
3	N/A	0	100			9	1
3	N/A	0	100			9.5	1
3	N/A	0	100			9.5	1
3	N/A	0	100			10	1
3	18 ha (2 EVCs)	1	0%	Timber harvest, firewood collection, prospecting, pest animals. Euc oil production?		14	2
3	67 ha (1 EVC)	2	22%	Timber harvest, firewood collection, localised trailbike riding, pest animals (foxes, pigs, cats), too much fire, weeds.	167 ha or 3010 m3 for firewood.	14	3
2.5	3 ha (3 EVCs)	0	0	Timber harvest, firewood collection. Pest animals.	314 ha or 2320 m3 for firewood, 80 m3 for sawlog and 100 m3 minor produce.	12.5	1
3	N/A	0	100			12	1
2	0	0	0	Rubbish dumping, timber harvest, firewood collec-tion, trail bikes, pest plants and animals.	153 ha or 1800 m3 for firewood, and 25 m3 minor produce.	12	2
2	53 ha (2 EVCs)	2	3%	Timber harvest, firewood collection, prospecting, pest animals.		12	2

APPENDICES

Location	Hectares	Score Area	Number of BioEVCs	Score- Number of BioEVCs	Number of Thr Fauna	Score Thr Fauna	Number of Thr Flora	Score Thr Flora	Cons Significance	Score Cons Significance	Connectivity
Scoring System:	**<100=1 100-1000=2 1000-5000=3 5000-10000=4 >10000=5**		**1-3=1 4-6=2 7-9=3 10-12=4**		**1-5 =1 6-10=2 11-15=3 16-20=4**		**1-3=1 4-6=2 7-9=3 10-12=4**		**Low=1 Med=2 High=3 Vhigh=4**		**Low=1 Med=2 High=3**
Wedderburn SF - North	349	2	5	2	1	1	1	1	Med	2	High. Part of large block. Good links west also.
Kinglake West State Forest	914	2	4	2	2	1	1	1	Med	2	High Part of eastern forested areas of Victoria
Havelock SF	242	2	3	1	7	2	1	1	Med	2	Med. Part of larger block but moderate links south, west and east.
Inglewood SF - SW	657	2	6	2	4	1	2	1	Low	1	High. Part of large block. Particularly linked to the east, west and south.
Llanelly SF	634	2	4	2	5	1	0	0	Med	2	Med. Part of large block but well linked only to the west.
Glenalbyn SF	277	2	3	1	0	0	4	2	Low-med	1.5	High. Surrounded to east, south and west by larger block.
Inglewood SF - NW	326	2	5	2	1	1	1	1	Low-med	1.5	Med. Part of large block with some links west.
Sunday Morning Hills SF	529	2	7	3	3	1	0	0	Low-med	1.5	Med. Part of larger block to west but linked to the east to other Reserves via creek.

Score Connectivity	Any EVCs undere-served by Bioregion? (% per reserve or forest area)	Score Under-reserved EVCs	Considerations to Inform Threat Score			Total Score Conservation	Total Score Threats
			% Cons Res or SPZ	Threats to Habitat Values	WUP - 2009-2011		
	< 50 ha = 1 **50-100 = 2** **100-500 = 3** **>500 = 4**		**Habitat values are significantly threatened = 3** **Habitat values are moderately threatened = 2** **Minor threats exist = 1** **No obvious threats = 0**				
3	18 ha (2 EVCs)	1	3%	Timber harvest, firewood collection, prospecting, pest animals.		12	2
3	0 ha	0	0	Recent fire, rubbish dumping, timber harvest, fire-wood collection, trail bikes, pest plants and animals.		11	2
2	35 ha (1 EVC)	1	43%	Timber harvest, firewood collection, prospecting, pest animals.	155 ha or 240 m3 for firewood via thinning 30 m3 for minor produce	11	2
3	20 ha (3 EVCs)	1	2%	Timber harvest, firewood collection, prospecting, pest animals.		11	2
2	81 ha (1 EVC)	2	1%	Timber harvest, firewood collection, prospecting, pest animals.		11	2
3	<1 ha (1 EVC)	1	0%	Timber harvest, firewood collection, prospecting, pest animals.		10.5	1
2	11 ha (2 EVCs)	1	0%	Timber harvest, firewood collection, prospecting, pest animals. Euc oil production?		10.5	2
2	47 ha (5 EVCs)	1	10%	Timber harvest, firewood collection, prospecting, pest animals.		10.5	1

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Location	Hectares	Score Area	Number of BioEVCs	Score- Number of BioEVCs	Number of Thr Fauna	Score Thr Fauna	Number of Thr Flora	Score Thr Flora	Cons Significance	Score Cons Significance	Connectivity
Scoring System:	**<100=1 100-1000=2 1000-5000=3 5000-10000=4 >10000=5**		**1-3=1 4-6=2 7-9=3 10-12=4**		**1-5 =1 6-10=2 11-15=3 16-20=4**		**1-3=1 4-6=2 7-9=3 10-12=4**		**Low=1 Med=2 High=3 Vhigh=4**		**Low=1 Med=2 High=3**
Tooborac State Forest	341	2	4	2	1	1	1	1	Med	2	Medium. Broad link north to Box Ironbark Forests
Metcalfe SF	242	2	3	1	3 (1km)	1	2	1	Med	2	Moderate. Good link to the east, less so to the south. West link bisected by Calder.
Mount Piper Nature Conservation Reserve	94	1	2	1	1	1	8	3	Low-med	1.5	Medium. Well linked to the west and to road network
Walmer SF	746	2	2	1	3	1	3	1	Low-med	1.5	High.Good connections in all directions via private land to Castlemaine and Maldon blocks.
Goldie Flora Reserve	350	2	3	1	0	0	0	0	High	3	High, part of bushlands of Black Range
Wandong Regional Park	890	2	4	2	0	0	0	0	Med	2	High Part of western end of eastern forested areas of Victoria
Rise and Shine NCR	111	2	2	1	1	1	2	1	Med	2	Moderate. Good links south and west.
Hughes Creek Flora Reserve	116	2	3	1	5	1	0	0	High	3	Medium. Part of large patch and corridor

Score Connectivity	Any EVCs undere-served by Bioregion? (% per reserve or forest area)	Score Under-reserved EVCs	Considerations to Inform Threat Score			Total Score Conservation	Total Score Threats
			% Cons Res or SPZ	Threats to Habitat Values	WUP - 2009-2011		
	< 50 ha = 1 **50-100 = 2** **100-500 = 3** **>500 = 4**		**Habitat values are significantly threatened = 3** **Habitat values are moderately threatened = 2** **Minor threats exist = 1** **No obvious threats = 0**				
2	N/A	0	0	Roos, tracks, coppicing.	No timber production	10	1
2	35 ha (1 EVC)	1	0	Weeds, pest animals (foxes, cats).	62 ha or 450 m3 for firewood.	10	1
2	N/A	0	100	Weeds (grassy), grazing.		9.5	1
3	0	0	0	Weeds, pest animals (foxes, cats). Coppicing, disturbance.	213 ha or 1360 m3 for firewood.	9.5	2
3	N/A	0	100			9	0
3	N/A	0	100	Recent fire		9	0
2	N/A	0	100	Weeds, pest animals (foxes, cats).		9	0
2	N/A	0	100	Weeds (riparian)		9	1

APPENDICES

Location	Hectares	Score Area	Number of BioEVCs	Score- Number of BioEVCs	Number of Thr Fauna	Score Thr Fauna	Number of Thr Flora	Score Thr Flora	Cons Significance	Score Cons Significance	Connectivity
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Wedderburn SF - South-west	476	2	3	1	2	1	1	1	Low	1	Medium. Linked to large block to the east and north. Less connectivity to the west and south.
Kinglake West Education Reserve	210	2	1	1	1	1	0	0	Low-med	1.5	Part of eastern forested areas of Victoria
Lauriston NCR	223	2	3	1	2	1	0	0	Med	2	Moderate. Links to the south-west which eventually link to Castlemaine block.
Tooborac Nature Conservation Reserve	320	2	2	1	1	1	1	1	Low	1	Medium. Broad link north to Box Ironbark Forests
Mangalore Nature Conservation Reserve	79	1	2	1	0	0	0	0	Very High	4	Low. Weakly connected by road reserves to east and west

Score Connectivity	Any EVCs undere-served by Bioregion? (% per reserve or forest area)	Score Under-reserved EVCs	Considerations to Inform Threat Score			Total Score Conservation	Total Score Threats
			% Cons Res or SPZ	Threats to Habitat Values	WUP - 2009-2011		
	< 50 ha = 1 **50-100 = 2** **100-500 = 3** **>500 = 4**		**Habitat values are significantly threatened = 3** **Habitat values are moderately threatened = 2** **Minor threats exist = 1** **No obvious threats = 0**				
2	1 ha (1 EVC)	1	0%	Timber harvest, firewood collection, prospecting, pest animals.		9	2
3	N/A	0	?	Recent fire		8.5	0
2	N/A	0	100	Weeds, pest animals (foxes, cats).		8	0
2	N/A	0	100	Roos, tracks, coppicing.		8	1
1	N/A	0	100	Significantly disturbed (gold mining), coppicing, rubbish dumping,		7	2

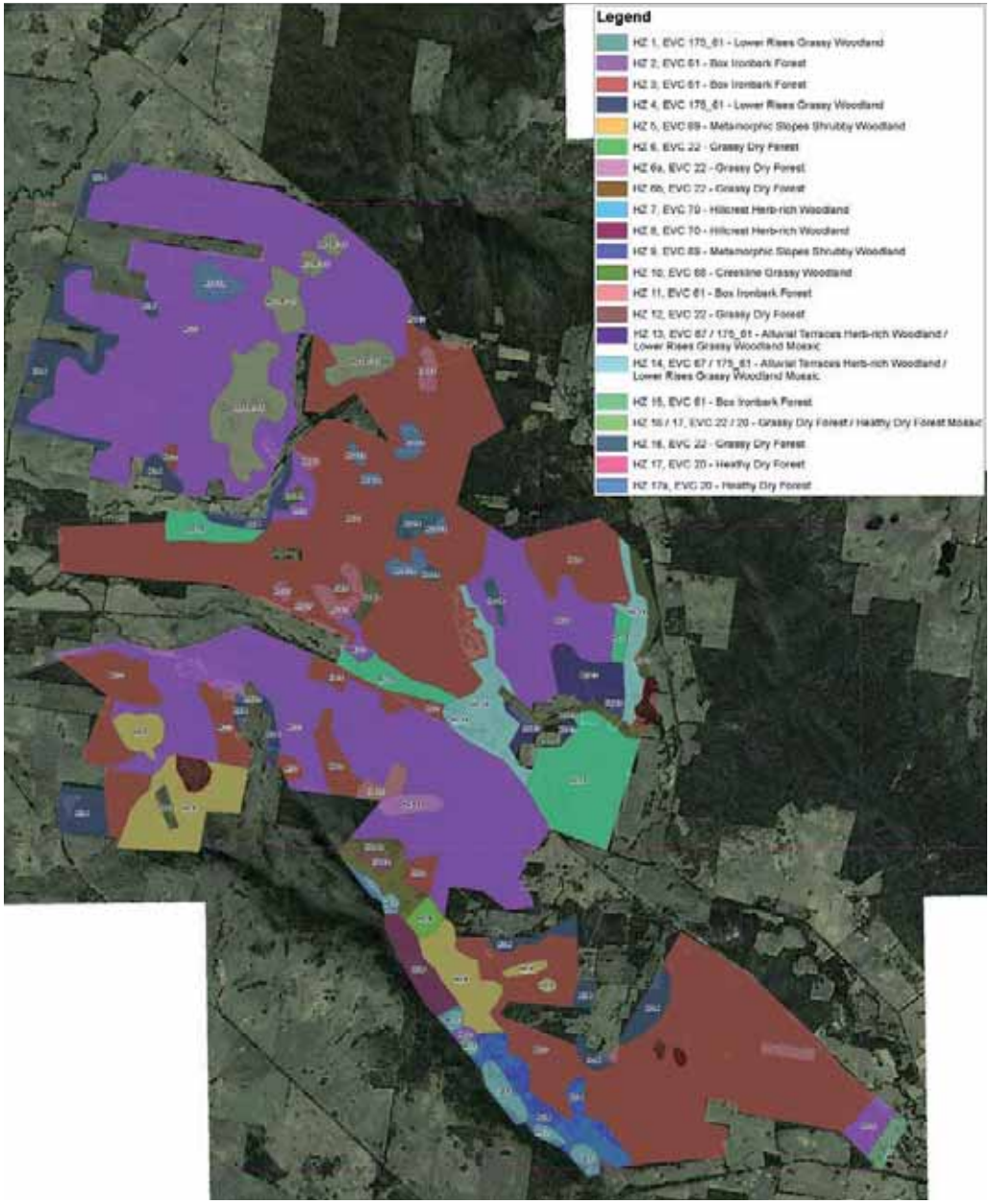
Appendix 4 – Results from Vegetation Quality Assessments

Bealiba State Forest
Crosbie Nature Conservation Reserves
Kingower State Forest
Mt Cole State Forest
Pyrenees State Forest (A and B)
Tunstalls Nature Conservation Reserve
Waanyarra – Dunolly State Forest
Wellsford State Forest
Wombat State Forest – Bullarto North
Wombat State Forest – West

Index to Abbreviated EVC Names (for all reserves)

EVC Name	Abbreviation
Low Rises Grassy Woodland	LRGW
Box Ironbark Forest	BIF
Metamorphic Slopes Shrubby Woodland	MSSW
Herb-rich Foothill Forest	HrFF
Wet Forest	WF
Riparian Forest	RF
Creekline Herb-rich Woodland	CHrW
Grassy Dry Forest	GDF
Grassy Woodland	GW
Hillcrest Herb-rich Woodland	HHrW

EVC Name	Abbreviation
Creekline Grassy Woodland	CGW
Alluvial Terraces Herb-rich Woodland	ATHrW
Shrubby Foothill Forest	SFhF
Shrubby Dry Forest	SDF
Sedgy Riparian Woodland	SRW
Sandstone Ridge Shrubland	SRS
Heathy Woodland	HW
Heathy Dry Forest	HDF



DATUM: GDA 94 VicGrid 94

N

0 1 2

Kilometers

1:55,000

VERSION	01	DATE	3/11/09

LEGEND

*See Habitat Zone legend in top-right corner of map

Sites not accessed

MAP AND SURVEY DETAILS

Surveyed by: Katherine Smedley
and Michelle Savona
24/10/09
Mapping by: Colin Broughton
30/10/09
Generated from: Google Earth Pro
Aerial Photography

NOTES:

Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

MAP 1
HABITAT ZONES
Bealiba State Forest
Ecological Assessment
Victorian National Parks Association

Practical Ecology Pty Ltd
Contracting and Consulting in Environmental Planning and Ecological Restoration
ACN 092 911 277 ABN 88 092 911 277
PO Box 228, Preston VIC 3072
phone: 9484 1555 fax: 94849133
enquiries@practicalecology.com.au

APPENDICES

Bealiba State Forest

Date collected: Habitat Zones 1-12: 22/10/2009; Habitat Zones 12- 17: 23/10/2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Goldfields (G).

EVC Name		LRGW	BIF	BIF	LRGW	MSSW	GDF	GDF
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 6a
Site Condition	Large Old Trees	0	0	2	2	0	2	2
	Tree Canopy Cover	2	0	2	2	2	2	2
	Lack of Weeds	9	9	9	9	9	13	13
	Understorey	5	5	10	10	15	20	20
	Recruitment	3	5	5	5	5	5	5
	Organic Matter	3	3	3	5	3	5	5
	Logs	2	2	4	4	4	5	5
Subtotal		**24**	**24**	**35**	**37**	**38**	**52**	**52**
Landscape Context (as derived from DSE Interactive maps)		16	15	18	16	16	16	17
Habitat Score		**40**	**39**	**53**	**53**	**54**	**68**	**69**
Habitat Score (out of 1.0)		0.40	0.39	0.53	0.53	0.54	0.68	0.69
Area of Habitat Zone (ha)		24.81	2885.1	2969.77	394.2	318.36	22.17	27.63
Habitat Hectares (area x habitat score)		9.92	1125.2	1573.98	208.93	171.91	15.08	19.06
Bioregion		G	G	G	G	G	G	G
EVC Conservation Status		V	D	D	V	D	D	D
Conservation Significance	Cons. status x Habitat score	HIGH	MEDIUM	MEDIUM	VERY HIGH	MEDIUM	HIGH	HIGH
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**HIGH**	**MEDIUM**	**MEDIUM**	**VERY HIGH**	**MEDIUM**	**HIGH**	**HIGH**

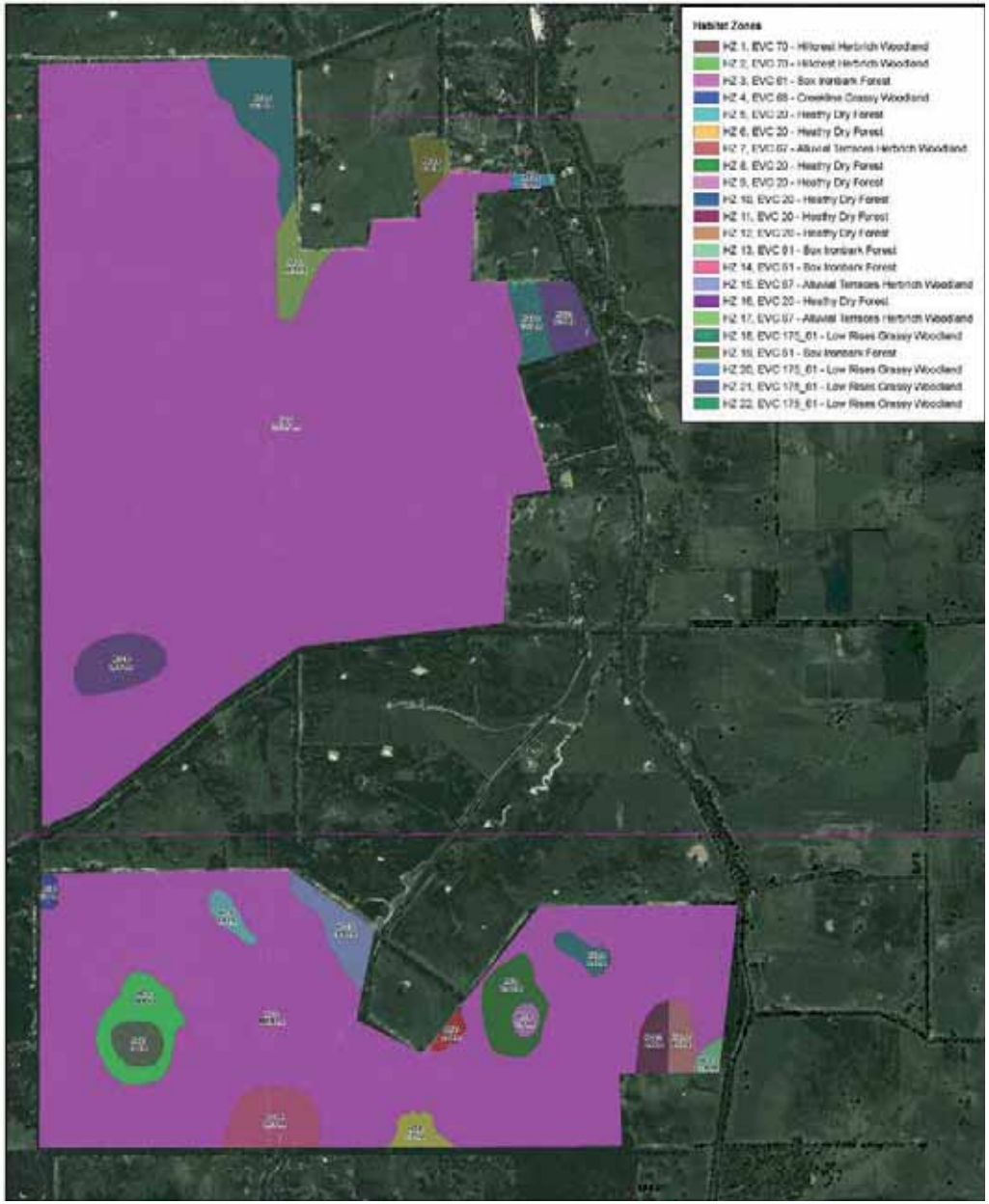
Bealiba State Forest (continued)

EVC Name		GDF	HHrW	HHrW	MSSW	CGW	BIF/MSSW Mosaic
Habitat Zones		HZ 6b	HZ 7	HZ 8	HZ 9	HZ 10	HZ 11
Site Condition	Large Old Trees	2	2	3	2	7	2
	Tree Canopy Cover	2	2	2	2	3	2
	Lack of Weeds	13	9	0	9	0	13
	Understorey	20	15	5	20	5	15
	Recruitment	5	5	5	5	5	5
	Organic Matter	5	3	0	5	3	3
	Logs	5	4	4	5	5	4
Subtotal		**52**	**40**	**19**	**48**	**28**	**44**
Landscape Context (as derived from DSE Interactive maps)		16	16	16	17	15	17
Habitat Score		**68**	**56**	**35**	**65**	**43**	**61**
Habitat Score (out of 1.0)		0.68	0.56	0.35	0.65	0.43	0.61
Area of Habitat Zone (ha)		89.46	91.68	64.92	130.93	89.25	23.54
Habitat Hectares		60.83	51.34	22.72	85.10	38.38	14.36
Bioregion		G	G	G	G	G	G
EVC Conservation Status		D	D	D	D	E	N/a
Conservation Significance	Cons. status x Habitat score	HIGH	MEDIUM	MEDIUM	HIGH	VERY HIGH	N/a
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**HIGH**	**MEDIUM**	**MEDIUM**	**HIGH**	**VERY HIGH**	**N/a**

APPENDICES

Bealiba State Forest (continued)

EVC Name		GDF/ATHrW/ *LR*GW Mosaic	ATHrW/*LR*GW Mosaic	ATHrW/*LR*GW Mosaic	BIF	GDF	HDF	HDF
Habitat Zones		HZ 12	HZ 13	HZ 14	HZ 15	HZ 16	HZ 17	HZ 17a
Site Condition	Large Old Trees	2	3	3	2	0	0	0
	Tree Canopy Cover	2	2	2	2	0	2	2
	Lack of Weeds	9	13	6	13	9	9	9
	Understorey	10	15	10	15	15	15	15
	Recruitment	3	5	5	5	5	5	5
	Organic Matter	3	3	5	3	5	5	5
	Logs	4	2	4	4	4	2	2
Subtotal		**33**	**43**	**35**	**44**	**38**	**37**	**37**
Landscape Context (as derived from DSE Interactive maps)		16	17	16	17	18	17	17
Habitat Score		**49**	**60**	**51**	**61**	**56**	**54**	**54**
Habitat Score (out of 1.0)		0.49	0.60	0.51	0.61	0.56	0.54	0.54
Area of Habitat Zone (ha)		12.6	111.86	188.1	356.48	39.46	66.41	95.3
Habitat Hectares		6.17	67.12	95.93	217.45	22.1	35.86	51.46
Bioregion		G	G	G	G	G	G	G
EVC Conservation Status		N/a	N/a	N/a	D	D	LC	LC
Conservation Significance	Cons. status x Habitat score	N/a	N/a	N/a	HIGH	MEDIUM	LOW	LOW
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**N/a**	**N/a**	**N/a**	**HIGH**	**MEDIUM**	**LOW**	**LOW**



LEGEND
*See Habitat Zone legend in top right corner of map

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley
and Michelle Savona
24/10/09
Mapping by: Colin Broughton
30/10/09
Generated from: Google Earth Pro
Aerial Photography

NOTES:
Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

MAP 1
HABITAT ZONES
Crosbie NCR
Ecological Assessment
Victorian National Parks Association

Practical Ecology Pty Ltd

DATUM: GDA 94 VicGrid 94

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VERSION	01	DATE	3/11/09

APPENDICES

Crosbie Nature Conservation Reserve

Date collected: Habitat Zones 1-18: 19/10/2009; Habitat Zones 18- 22: 20/10/2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Goldfields (G).

EVC Name		HHrW	HHrW	BIF	CGW	HDF	HDF	ATHrW
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 7
Site Condition	Large Old Trees	0	0	2	7	0	0	7
	Tree Canopy Cover	0	0	2	2	0	0	2
	Lack of Weeds	4	0	13	6	13	13	6
	Understorey	20	15	10	10	10	15	10
	Recruitment	5	3	3	3	3	5	3
	Organic Matter	5	3	5	5	5	5	5
	Logs	4	4	4	4	4	4	4
Subtotal		**38**	**25**	**39**	**37**	**35**	**42**	**37**
Landscape Context (as derived from DSE Interactive maps)		17	17	17	17	17	16	17
Habitat Score		**55**	**42**	**56**	**54**	**52**	**58**	**54**
Habitat Score (out of 1.0)		0.55	0.42	0.56	0.54	0.52	0.58	0.54
Area of Habitat Zone (ha)		9.6	24.6	1213.7	2.8	5.6	7.2	3.6
Habitat Hectares		5.3	10.3	679.7	1.5	2.9	4.2	1.9
Bioregion		G	G	G	G	G	G	G
EVC Conservation Status		D	D	D	E	LC	LC	E
Conservation Significance	Cons. status x Habitat score	MEDIUM	MEDIUM	MEDIUM	VERY HIGH	LOW	LOW	VERY HIGH
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**MEDIUM**	**MEDIUM**	**VERY HIGH**	**LOW**	**LOW**	**VERY HIGH**

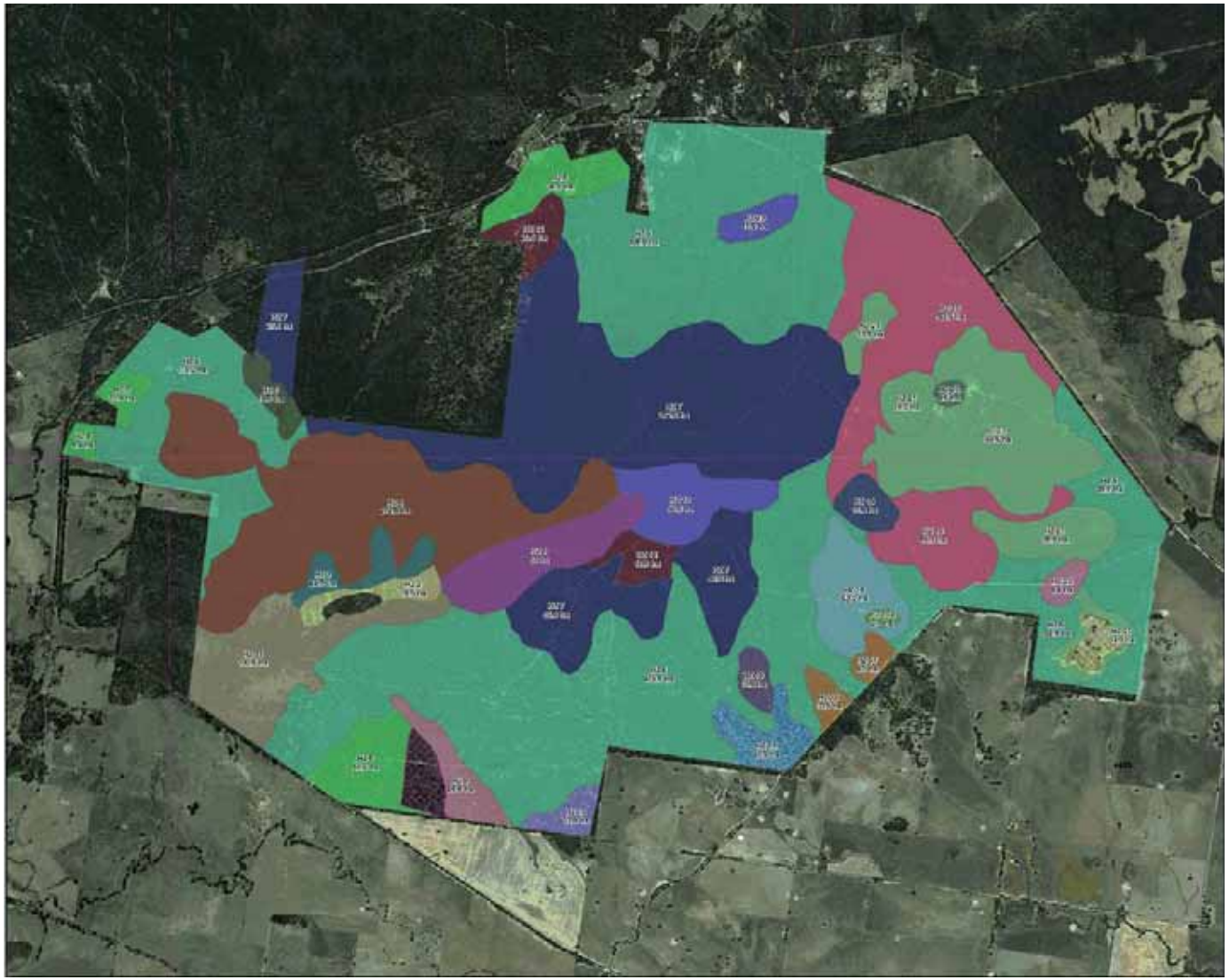
Crosbie Nature Conservation Reserve (continued)

EVC Name		HDF	HDF	HDF	HDF	HDF	BIF	BIF
Habitat Zones		HZ 8	HZ 9	HZ 10	HZ 11	HZ 12	HZ 13	HZ 14
Site Condition	Large Old Trees	0	0	0	2	2	2	2
	Tree Canopy Cover	0	0	0	2	2	2	2
	Lack of Weeds	13	13	13	13	13	13	13
	Understorey	15	10	10	15	15	15	15
	Recruitment	5	3	3	5	3	3	3
	Organic Matter	5	5	5	5	5	5	5
	Logs	4	4	4	4	4	4	4
Subtotal		**42**	**35**	**35**	**46**	**44**	**44**	**44**
Landscape Context (as derived from DSE Interactive maps)		16	16	16	16	17	17	17
Habitat Score		**58**	**51**	**51**	**62**	**60**	**60**	**61**
Habitat Score (out of 1.0)		0.58	0.51	0.51	0.62	0.61	0.61	0.61
Area of Habitat Zone (ha)		21.2	3.6	6.4	9.4	8.4	3.4	24.3
Habitat Hectares		12.3	1.8	3.3	5.8	5.1	2.1	14.8
Bioregion		G	G	G	G	G	G	G
EVC Conservation Status		LC	LC	LC	LC	LC	D	D
Conservation Significance	Cons. status x Habitat score	LOW	LOW	LOW	MEDIUM	MEDIUM	HIGH	HIGH
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**LOW**	**LOW**	**LOW**	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**

APPENDICES

Crosbie Nature Conservation Reserve (continued)

EVC Name		ATHrW	HDF	ATHrW	LRGW	BIF	LRGW	LRGW	LRGW
Habitat Zones		HZ 15	HZ 16	HZ 17	HZ 18	HZ 19	HZ 20	HZ 21	HZ 22
Site Condition	Large Old Trees	9	0	5	5	2	7	2	2
	Tree Canopy Cover	4	0	4	4	2	4	4	4
	Lack of Weeds	9	13	9	9	13	13	13	13
	Understorey	15	10	10	15	5	15	15	20
	Recruitment	10	3	5	5	1	5	5	5
	Organic Matter	3	5	3	5	5	5	5	5
	Logs	5	4	3	4	4	5	4	5
Subtotal		**55**	**35**	**39**	**47**	**32**	**54**	**48**	**54**
Landscape Context (as derived from DSE Interactive maps)		17	17	17	17	16	16	16	16
Habitat Score		**72**	**52**	**56**	**64**	**48**	**70**	**64**	**70**
Habitat Score (out of 1.0)		0.72	0.52	0.56	0.64	0.48	0.70	0.64	0.70
Area of Habitat Zone (ha)		16.8	20.8	15.3	32.6	8.9	2.8	13.5	11.3
Habitat Hectares		12.1	10.8	8.6	20.1	4.3	2.0	8.6	7.9
Bioregion		G	G	G	G	G	G	G	G
EVC Conservation Status		E	LC	E	V	D	V	V	V
Conservation Significance	Cons. status x Habitat score	VERY HIGH	LOW	VERY HIGH	VERY HIGH	MEDIUM	VERY HIGH	VERY HIGH	VERY HIGH
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**VERY HIGH**	**LOW**	**VERY HIGH**	**VERY HIGH**	**MEDIUM**	**VERY HIGH**	**VERY HIGH**	**VERY HIGH**



MAP 1
HABITAT ZONES
Kingower State Forest
Ecological Assessment
Victorian National Parks Association

Habitat Zones

Other sites
Degraded Treeless Vegetation
Logging Coupe
Site not assessed

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Savona
24/10/09
Mapping by: Colin Broughton
30/10/09
Generated from: Google Earth Pro Aerial Photography

NOTES:

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Datum: GDA 94 VicGrid 94

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VERSION	02	DATE	3/11/09

Practical Ecology Pty Ltd

APPENDICES

Kingower State Forest

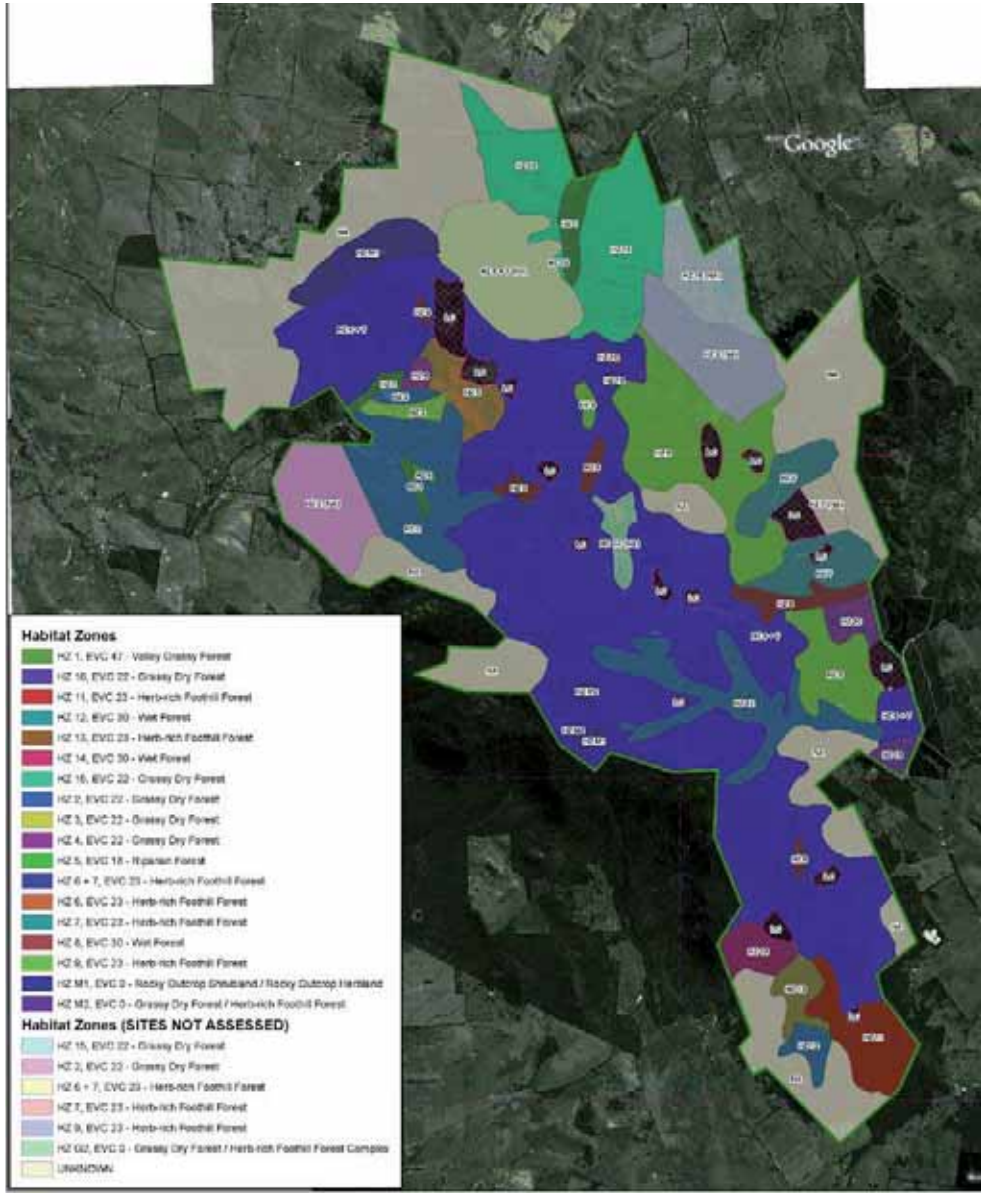
Date collected: Habitat Zones 1-14: 21/10/2009; Habitat Zones 14- 23: 22/10/2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Goldfields (G).

EVC Name		HHrW	HHrW	HHrW	MSSW	BIF	LRGW	BIF
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 7
Site Condition	Large Old Trees	7	9	9	3	2	7	0
	Tree Canopy Cover	2	2	2	2	2	4	0
	Lack of Weeds	9	0	4	9	9	9	13
	Understorey	20	5	10	20	15	15	10
	Recruitment	5	0	0	5	5	10	5
	Organic Matter	5	3	3	5	3	3	3
	Logs	5	2	2	5	2	5	4
Subtotal		**53**	**21**	**30**	**49**	**38**	**53**	**35**
Landscape Context (as derived from DSE Interactive maps)		18	17	17	17	17	16	18
Habitat Score		**71**	**38**	**47**	**66**	**55**	**69**	**53**
Habitat Score (out of 1.0)		0.71	0.38	0.47	0.66	0.55	0.69	0.53
Area of Habitat Zone (ha)		53	16.5	24.6	272.4	1044	98.9	502.2
Habitat Hectares		37.6	6.3	25.1	179.8	574.2	68.2	266.2
Bioregion		G	G	G	G	G	G	G
EVC Conservation Status		D	D	D	D	D	V	D
Conservation Significance	Cons. status x Habitat score	HIGH	MEDIUM	MEDIUM	HIGH	MEDIUM	VERY HIGH	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**HIGH**	**MEDIUM**	**MEDIUM**	**HIGH**	**MEDIUM**	**VERY HIGH**	**MEDIUM**

Kingower State Forest (continued)

EVC Name		MSSW	GGW	BIF	GGW	BIF	MSSW	LRGW
Habitat Zones		HZ 8	HZ 9	HZ 10	HZ 11	HZ 12	HZ 13	HZ 14
Site Condition	Large Old Trees	1	2	5	5	2	1	2
	Tree Canopy Cover	2	1	2	2	2	2	4
	Lack of Weeds	13	7	9	4	13	9	9
	Understorey	10	15	15	10	10	15	15
	Recruitment	5	5	5	5	5	5	3
	Organic Matter	3	0	5	3	3	5	5
	Logs	4	4	4	5	2	4	5
Subtotal		**38**	**34**	**45**	**34**	**37**	**41**	**43**
Landscape Context (as derived from DSE Interactive maps)		17	15	15	16	18	18	15
Habitat Score		**55**	**49**	**60**	**50**	**55**	**59**	**58**
Habitat Score (out of 1.0)		0.55	0.49	0.60	0.50	0.55	0.59	0.58
Area of Habitat Zone (ha)		14.8	26.6	13.9	100.6	38	50.2	28.9
Habitat Hectares		8.1	13.0	8.3	50.3	20.9	29.6	16.8
Bioregion		G	G	G	G	G	G	G
EVC Conservation Status		D	V	D	V	D	D	V
Conservation Significance	Cons. status x Habitat score	MEDIUM	HIGH	HIGH	VERY HIGH	MEDIUM	MEDIUM	VERY HIGH
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**HIGH**	**HIGH**	**VERY HIGH**	**MEDIUM**	**MEDIUM**	**VERY HIGH**

APPENDICES



LEGEND
*See additional Habitat Zone legend above

Logging Coupe

MAP 1
HABITAT ZONES
Mt Cole SF
Ecological Assessment
Victorian National Parks Association

Practical Ecology Pty Ltd

DATUM: GDA 94 VicGrid 94

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VERSION	01	DATE	14/12/09

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Savona 24/10/09
Mapping by: Colin Broughton 14/12/09
Generated from: Google Earth Pro Aerial Photography

NOTES:
Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

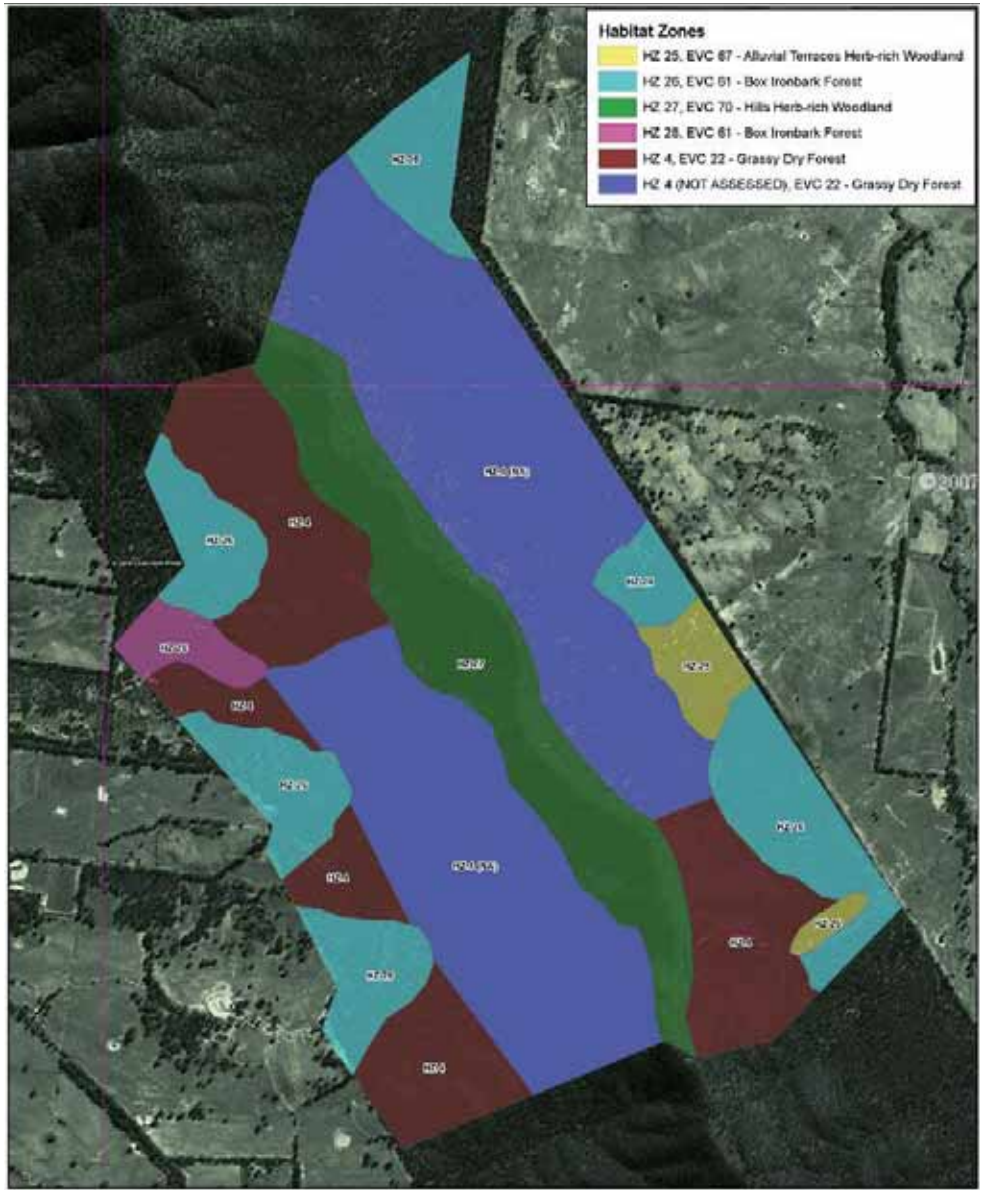
Mt Cole State Forest

Date collected: Wednesday 2 December 2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Central Victorian Uplands (CVU).

EVC Name		VGF	GDF	GDF	GDF	RF	HrFF	HrFF	WF
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 7	HZ 8
Site Condition	Large Old Trees	3	2	2	2	3	2	2	2
	Tree Canopy Cover	4	0	0	0	2	4	2	0
	Lack of Weeds	9	13	13	13	9	13	13	13
	Understorey	15	15	10	15	15	20	15	15
	Recruitment	3	3	0	5	3	3	5	5
	Organic Matter	5	5	3	5	3	5	3	3
	Logs	5	4	5	4	4	5	5	5
Subtotal		**44**	**42**	**33**	**44**	**39**	**52**	**45**	**43**
Landscape Context (as derived from DSE Interactive maps)		17	15	17	17	18	17	17	19
Habitat Score		**61**	**57**	**50**	**61**	**57**	**69**	**62**	**62**
Habitat Score (out of 1.0)		0.61	0.57	0.5	0.61	0.57	0.69	0.62	0.62
Area of Habitat Zone		86.88	553.63	32.71	16.57	4.82	88.41	262.08	110.85
Habitat Hectares (area x habitat score)		53.00	315.57	16.36	10.11	2.75	61.01	162.49	68.73
Bioregion		CVU	CVU	CVU	CVU	CVU	CVU	CVU	CVU
EVC Conservation Status		V	D	D	D	V	D	D	LC
Conservation Significance	Cons. status x Habitat score	VERY HIGH	MEDIUM	MEDIUM	HIGH	VERY HIGH	HIGH	HIGH	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**VERY HIGH**	**MEDIUM**	**MEDIUM**	**HIGH**	**VERY HIGH**	**HIGH**	**HIGH**	**MEDIUM**

Mt Cole State Forest (continued)

EVC Name		HrFF	GDF	HrFF	WF	HrFF	WF	GDF
Habitat Zones		HZ 9	HZ 10	HZ 11	HZ 12	HZ 13	HZ 14	HZ 15
Site Condition	Large Old Trees	0	0	5	3	7	2	0
	Tree Canopy Cover	2	0	4	4	4	0	0
	Lack of Weeds	13	13	9	13	13	13	13
	Understorey	15	15	15	20	15	15	15
	Recruitment	3	3	1	3	3	0	5
	Organic Matter	5	5	3	3	3	3	5
	Logs	5	5	5	5	5	5	5
Subtotal		**43**	**41**	**42**	**51**	**50**	**38**	**42**
Landscape Context (as derived from DSE Interactive maps)		17	17	17	17	17	17	17
Habitat Score		**60**	**58**	**59**	**68**	**67**	**55**	**59**
Habitat Score (out of 1.0)		0.6	0.58	0.59	0.68	0.67	0.55	0.59
Area of Habitat Zone		825.02	88.56	160.77	294.12	61.35	70.48	681.32
Habitat Hectares (area x habitat score)		495.01	51.36	94.85	200.00	41.10	38.76	401.98
Bioregion		CVU	CVU	CVU	CVU	CVU	CVU	CVU
EVC Conservation Status		D	D	D	LC	D	LC	D
Conservation Significance	Cons. status x Habitat score	HIGH	MEDIUM	MEDIUM	MEDIUM	HIGH	LOW	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**HIGH**	**LOW**	**MEDIUM**



LEGEND
*See additional Habitat Zone legend above

MAP 1
HABITAT ZONES
Pyranees Ranges SF (Part A)
Ecological Assessment
Victorian National Parks Association

Practical Ecology Pty Ltd

DATUM: GDA 94 VicGrid 94

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VERSION	01	DATE	15/12/09

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Sawons
24/10/09
Mapping by: Colin Broughton
15/12/09
Generated from: Google Earth Pro
Aerial Photography

NOTES:
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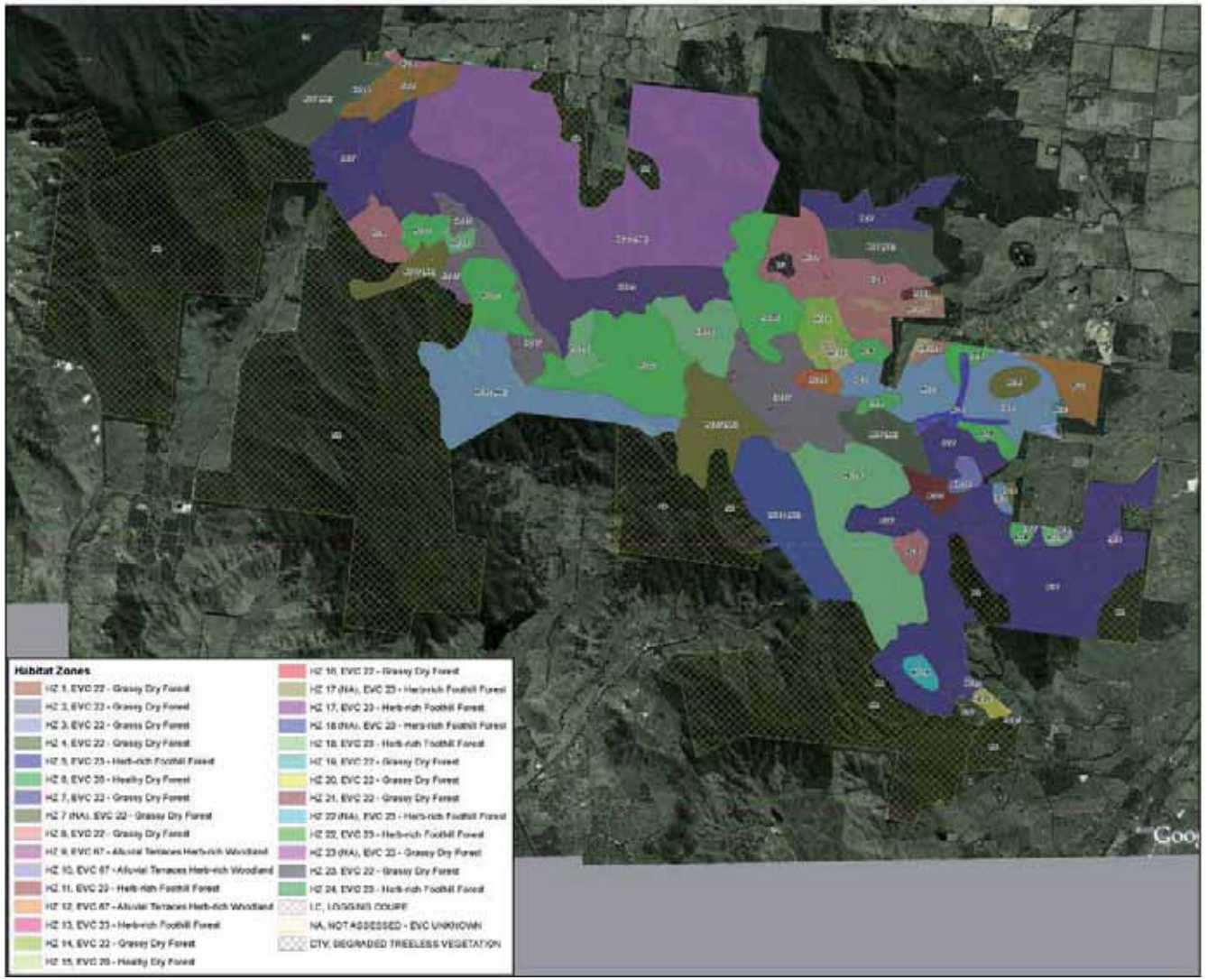
APPENDICES



LEGEND
*Refer to additional legend in lower-left corner of map

MAP 1
HABITAT ZONES
Pyranees Ranges SF (Part B)

Ecological Assessment
Victorian National Parks Association

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Savona
24/11/09
Mapping by: Colin Broughton
15/12/09
Generated from: Google Earth Pro Aerial Photography

NOTES:

Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

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VERSION	01	DATE	15/12/09

Practical Ecology Pty Ltd

Pyrenees Ranges State Forest

Date collected: Monday 30 November 2009 and Tuesday 1 December 2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Goldfields (G) and Central Victorian Uplands (CVU).

EVC Name	GDF	GDF	GDF	GDF	HrFF	HDF	GDF	GDF	ATHrW	AtHrW
Habitat Zones							HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 7	HZ 8	HZ 9	HZ 10
Site Condition	Large Old Trees						3	2	3	3	5	3	2	3	4	2
	Tree Canopy Cover						2	4	4	4	2	2	0	2	2	4
	Lack of Weeds						13	13	9	6	9	13	9	9	9	6
	Understorey						20	15	15	10	10	15	15	10	5	15
	Recruitment						5	5	5	5	10	5	5	5	5	5
	Organic Matter						3	3	5	5	3	5	3	3	3	3
	Logs						4	4	4	4	5	4	4	4	4	5
Subtotal							**50**	**46**	**45**	**37**	**44**	**47**	**38**	**36**	**32**	**40**
Landscape Context (as derived from DSE Interactive maps)							17	17	17	17	17	17	17	17	17	17
Habitat Score							**67**	**63**	**62**	**54**	**61**	**64**	**55**	**53**	**49**	**57**
Habitat Score (out of 1.0)							0.67	0.63	0.62	0.54	0.61	0.64	0.55	0.53	0.49	0.57
Area of Habitat Zone							213.87	6.86	343.48	757.54	40.66	131.79	1924.79	274.82	5.56	32.3
Habitat Hectares (area x habitat score)							143.29	4.32	212.96	409.07	24.80	84.35	1058.63	145.65	2.72	18.41
Bioregion							G	G	G	G	G	G	G	G	G	G
EVC Conservation Status							D	D	D	D	D	LC	D	D	E	E
Conservation Significance	Cons. status x Habitat score						HIGH	HIGH	HIGH	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	VERY HIGH	VERY HIGH
	Threatened species: presence						N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes						N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance						**HIGH**	**HIGH**	**HIGH**	**MEDIUM**	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**VERY HIGH**	**VERY HIGH**

Pyrenees Ranges State Forest (continued)

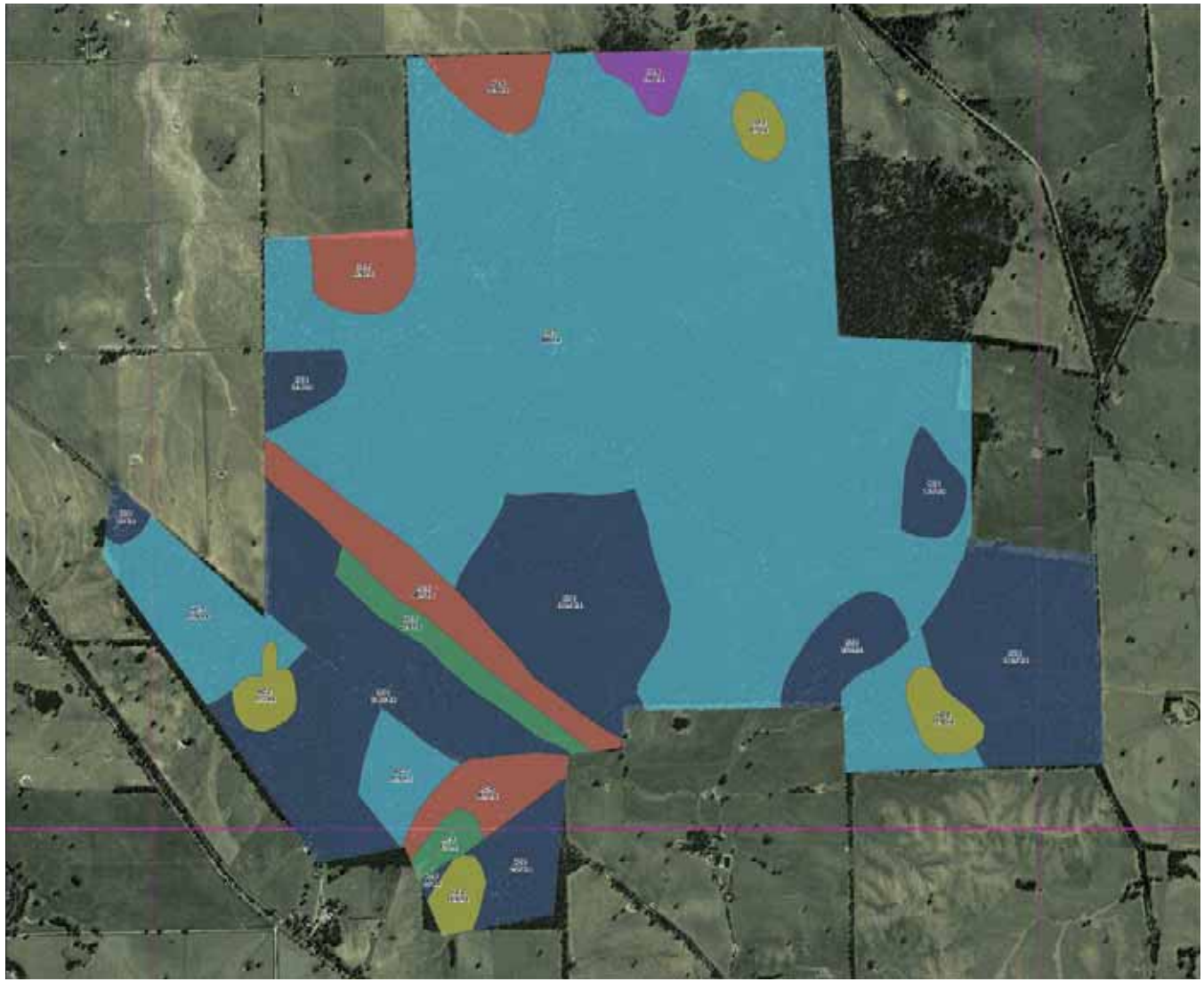
EVC Name	HrFF	ATHrW	HrFF	GDF	HDF	GDF	HrFF	HrFF	GDF	GDF

Habitat Zones		HZ 11	HZ 12	HZ 13	HZ 14	HZ 15	HZ 16	HZ 17	HZ 18	HZ 19	HZ 20
Site Condition	Large Old Trees	2	5	2	3	2	2	2	2	2	3
	Tree Canopy Cover	2	2	2	0	2	0	4	0	2	2
	Lack of Weeds	9	6	13	13	13	13	13	13	13	9
	Understorey	15	10	20	20	20	15	15	10	15	15
	Recruitment	5	5	5	5	5	5	5	5	3	5
	Organic Matter	5	5	5	5	5	3	5	3	3	3
	Logs	4	4	4	4	4	4	4	4	4	4
Subtotal		**42**	**37**	**51**	**50**	**51**	**42**	**48**	**37**	**42**	**41**
Landscape Context (as derived from DSE Interactive maps)		17	17	17	17	18	17	17	17	17	17
Habitat Score		**59**	**54**	**68**	**67**	**69**	**59**	**65**	**54**	**59**	**58**
Habitat Score (out of 1.0)		0.59	0.54	0.68	0.67	0.69	0.59	0.65	0.54	0.59	0.58
Area of Habitat Zone		63.3	93.04	153.93	81.51	25.32	32.8	764.1	1003.65	29.5	21.86
Habitat Hectares (area x habitat score)		37.35	50.24	104.67	54.61	17.47	19.35	496.67	541.97	17.41	12.68
Bioregion		G	G	CVU	CVU	CVU	CVU	CVU	CVU	G	G
EVC Conservation Status		D	E	D	D	LC	D	D	D	D	D
Conservation Significance	Cons. status x Habitat score	MEDIUM	VERY HIGH	HIGH	HIGH	MEDIUM	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**VERY HIGH**	**HIGH**	**HIGH**	**MEDIUM**	**MEDIUM**	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**

Pyrenees Ranges State Forest (continued)

EVC Name		GDF	HrFF	GDF	HrFF	ATHrW	BIF	HHrW	BIF
Habitat Zones		HZ 21	HZ 22	HZ 23	HZ 24	HZ 25	HZ 26	HZ 27	HZ 28
Site Condition	Large Old Trees	3	2	2	2	4	2	4	2
	Tree Canopy Cover	2	0	4	2	2	2	2	2
	Lack of Weeds	0	13	13	9	6	9	2	9
	Understorey	5	15	10	10	10	15	10	10
	Recruitment	1	5	5	3	5	5	5	3
	Organic Matter	2	5	3	3	5	5	4	5
	Logs	4	5	5	4	4	4	5	4
Subtotal		**17**	**45**	**42**	**34**	**36**	**42**	**32**	**36**
Landscape Context (as derived from DSE Interactive maps)		17	19	19	17	17	17	18	17
Habitat Score		**34**	**64**	**61**	**51**	**53**	**59**	**50**	**53**
Habitat Score (out of 1.0)		0.34	0.64	0.61	0.51	0.53	0.59	0.50	0.53
Area of Habitat Zone		3.8	1144.02	2127.23	11.96	27.12	207.7	162.48	18.97
Habitat Hectares (area x habitat score)		1.29	732.17	1297.61	6.10	14.37	122.54	81.24	10.05
Bioregion		G	CVU	G	G	G	G	G	G
EVC Conservation Status		D	D	D	D	E	D	D	D
Conservation Significance	Cons. status x Habitat score	MEDIUM	HIGH	HIGH	MEDIUM	VERY HIGH	MEDIUM	MEDIUM	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**HIGH**	**HIGH**	**MEDIUM**	**VERY HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**

APPENDICES



MAP 1
HABITAT ZONES
Tunstalls NCR
Ecological Assessment
Victorian National Parks Association

Habitat Zones

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Sevona
24/10/09
Mapping by: Colin Broughton
30/10/09
Generated from: Google Earth Pro Aerial Photography

NOTES:

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VERSION	02	DATE	3/11/09

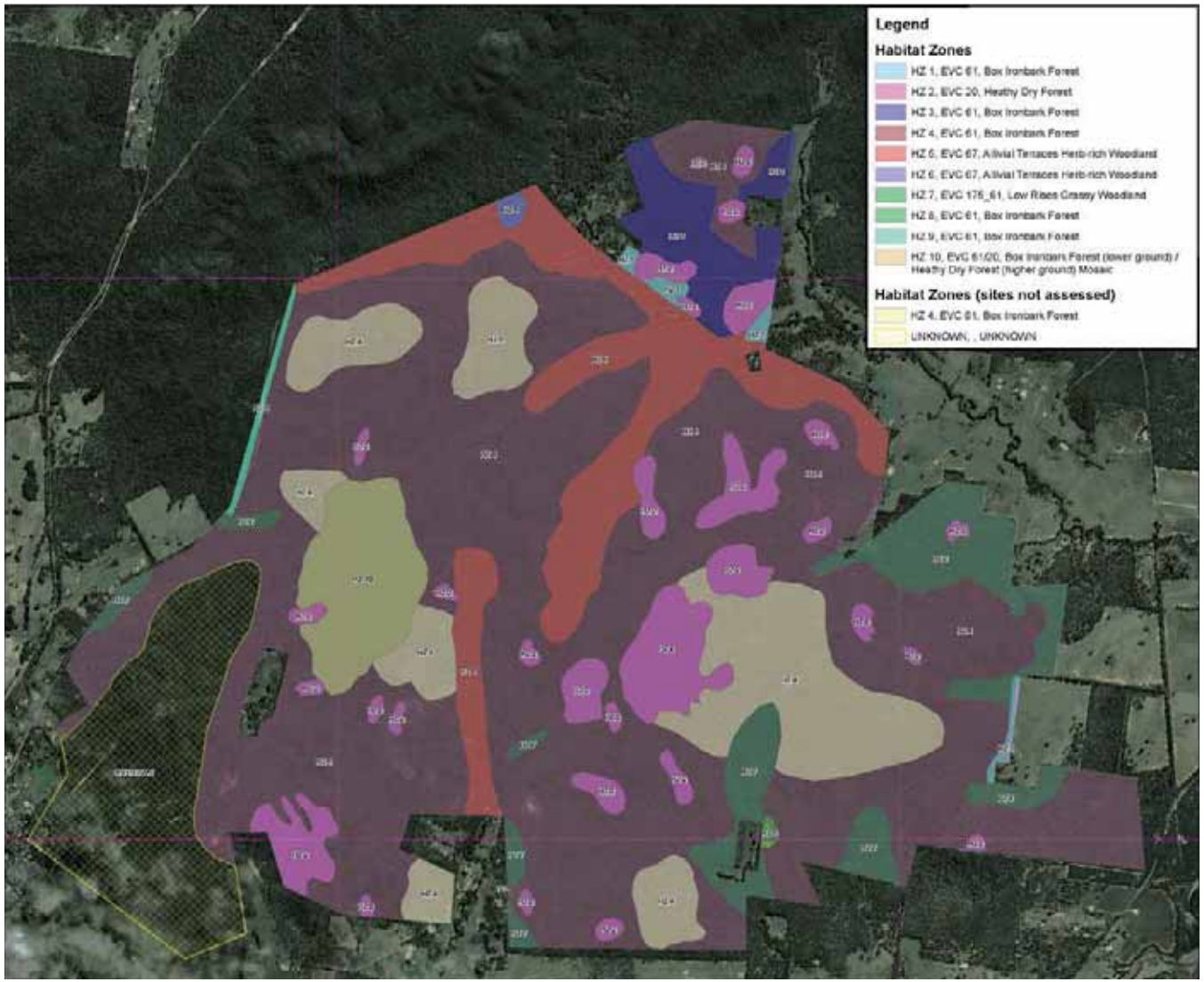
Practical Ecology Pty Ltd

Tunstalls Nature Conservation Reserve

Date collected: Habitat Zones 23/10/2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Goldfields.

EVC Name		BIF	BIF	BIF	LRGW	LRGW	MSSW
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6
Site Condition	Large Old Trees	9	5	5	9	9	5
	Tree Canopy Cover	2	2	2	4	4	2
	Lack of Weeds	9	9	9	9	0	9
	Understorey	15	15	10	10	5	15
	Recruitment	5	5	5	5	5	5
	Organic Matter	5	5	3	3	3	5
	Logs	4	4	2	3	5	4
Subtotal		**49**	**45**	**36**	**43**	**31**	**45**
Landscape Context (derived from DSE Interactive maps)		16	15	16	15	15	15
Habitat Score		**65**	**60**	**52**	**58**	**46**	**60**
Habitat Score (out of 1.0)		0.65	0.60	0.52	0.58	0.46	0.60
Area of Habitat Zone (ha)		445.3	44.4	960.3	118.1	8.3	11.9
Habitat Hectares		289.4	26.6	499.4	68.5	3.8	7.1
Bioregion		G	G	G	G	G	G
EVC Conservation Status		D	D	D	V	V	D
Conservation Significance	Cons. status x Habitat score	HIGH	HIGH	MEDIUM	VERY HIGH	HIGH	HIGH
	Threatened species: presence	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**HIGH**	**HIGH**	**MEDIUM**	**VERY HIGH**	**HIGH**	**HIGH**

APPENDICES



MAP 1
HABITAT ZONES
Waanyarra / Dunolly SF

Ecological Assessment
Victorian National Parks Association

LEGEND
*Refer to additional legend on map

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Savona
24/12/09
Mapping by: Colin Broughton
05/01/10
Generated from: Google Earth Pro Aerial Photography

NOTES:

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Datum: GDA 94 VicGrid 94

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VERSION	01	DATE	05/01/10

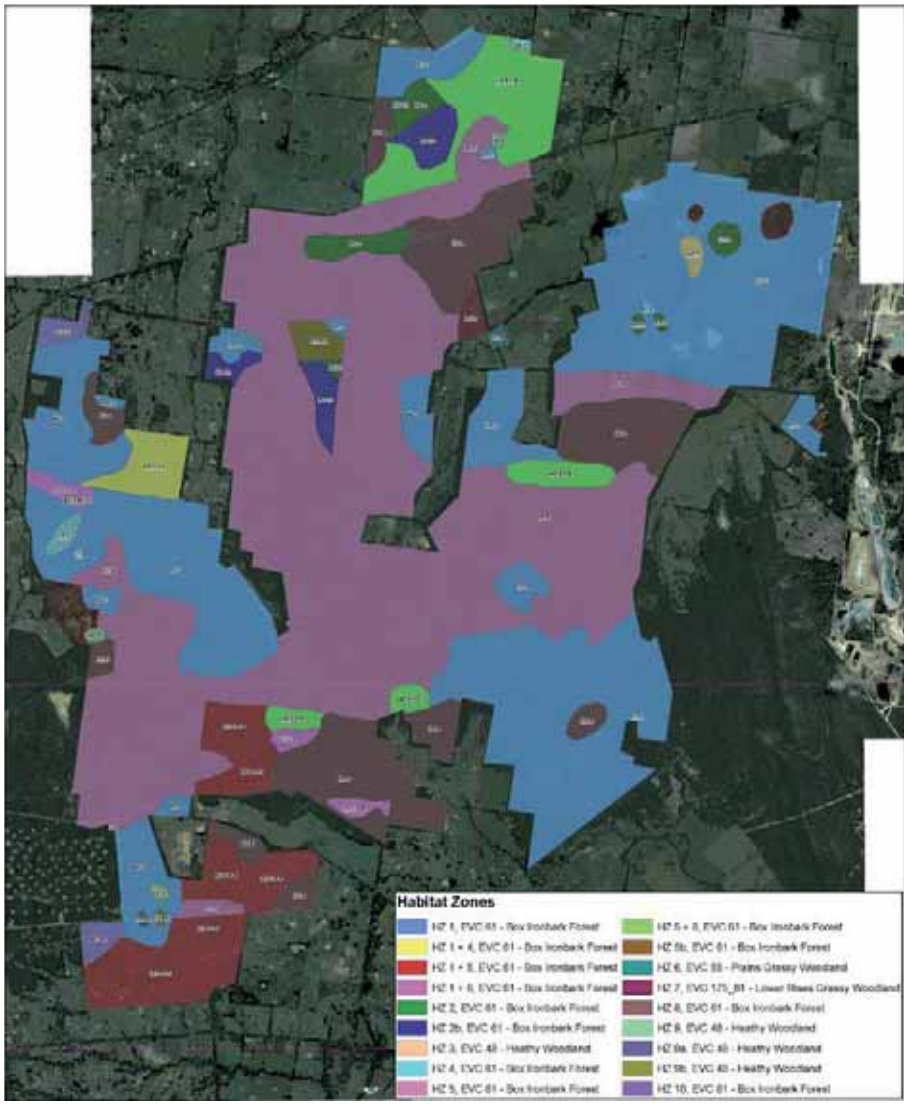
Practical Ecology Pty Ltd

Waanyarra/Dunolly State Forest

Date collected: 29 December 2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Goldfields (G).

EVC Name		BIF HDF	BIF	BIF	ATHrW	ATHrW	*LR*GW	BIF	BIF	
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 7	HZ 8	HZ 9
Site Condition	Large Old Trees	2	0	2	0	2	0	2	0	0
	Tree Canopy Cover	2	0	2	2	4	2	2	0	2
	Lack of Weeds	13	13	13	13	6	9	9	13	4
	Understorey	10	15	10	10	10	10	10	15	10
	Recruitment	1	3	3	1	3	3	3	3	3
	Organic Matter	3	5	3	3	3	5	3	3	3
	Logs	2	3	4	2	4	2	4	4	9
Subtotal		**33**	**39**	**37**	**31**	**32**	**31**	**33**	**38**	**31**
Landscape Context (as derived from DSE Interactive maps)		18	18	18	18	17	18	17	17	17
Habitat Score		**51**	**57**	**55**	**49**	**49**	**49**	**50**	**55**	**48**
Habitat Score (out of 1.0)		0.51	0.57	0.55	0.49	0.49	0.49	0.50	0.55	0.48
Area of Habitat Zone		20.08	302.08	113.89	2645.13	394.49	6.37	269.38	3.49	11.88
Habitat Hectares (area x habitat score)		10.24	172.19	62.64	1296.11	193.30	3.12	1.92	1.92	5.70
Bioregion		G	G	G	G	G	G	G	G	G
EVC Conservation Status		D	LC	D	D	E	E	V	D	D
Conservation Significance	Cons. status x Habitat score	MEDIUM	LOW	MEDIUM	MEDIUM	VERY HIGH	VERY HIGH	VERY HIGH	MEDIUM	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**LOW**	**MEDIUM**	**MEDIUM**	**VERY HIGH**	**VERY HIGH**	**VERY HIGH**	**MEDIUM**	**MEDIUM**

APPENDICES



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*See additional Habitat Zone legend above
Sites Not Assessed

MAP 1
HABITAT ZONES
Wellsford SF
Ecological Assessment
Victorian National Parks Association

Practical Ecology Pty Ltd

DATUM: GDA 94 VicGrid 94

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MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Savona
24/10/09
Mapping by: Colin Broughton
15/11/09
Generated from: Google Earth Pro
Aerial Photography

NOTES
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VERSION 01 DATE 16/11/09

Wellsford State Forest

Date collected: 20th and 21st October 2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Goldfields (G).

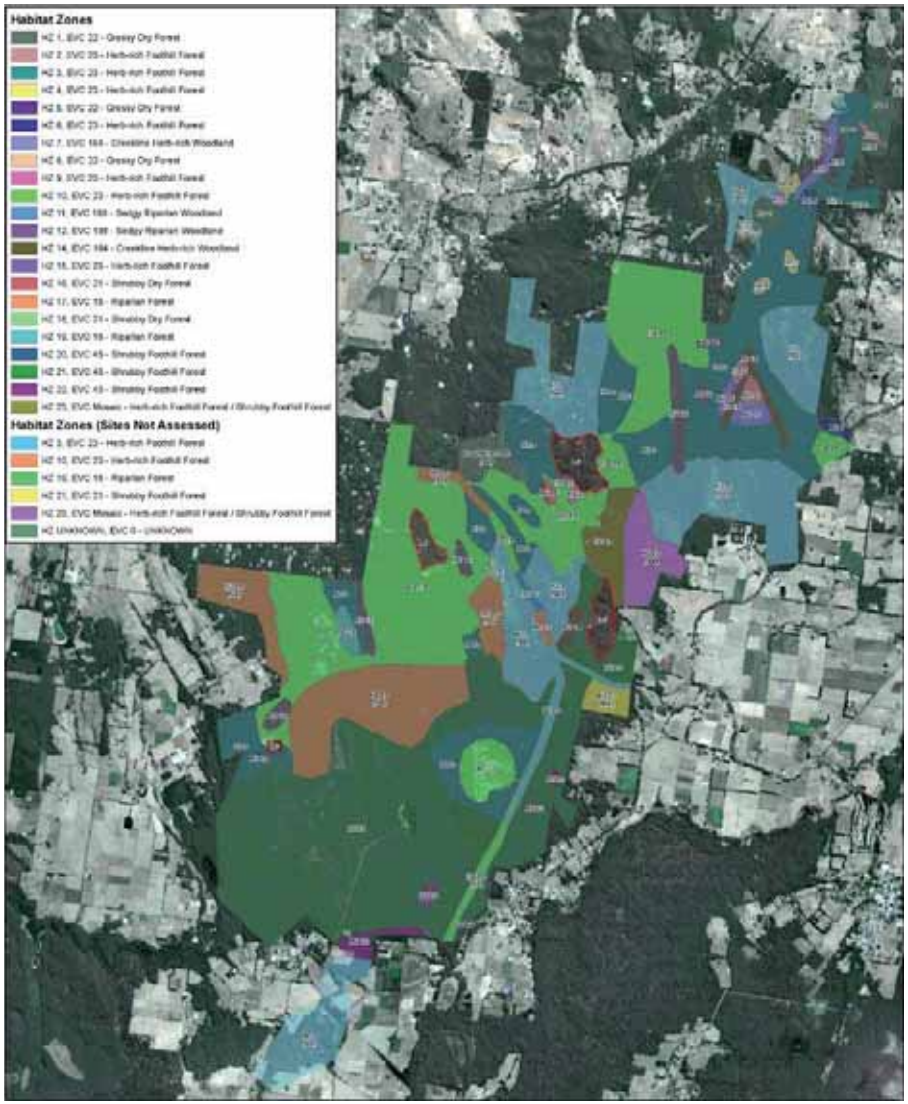
EVC Name		BIF	BIF	BIF	HW	BIF	BIF	BIF	PGW	LRGW	BIF
Habitat Zones		HZ 1	HZ 2	2b	HZ 3	HZ 4	HZ 5	HZ 5b	HZ 6	HZ 7	HZ 8
Site Condition	Large Old Trees	2	0	0	2	0	0	0	9	2	0
	Tree Canopy Cover	0	0	0	4	0	2	2	4	4	2
	Lack of Weeds	13	13	13	13	13	13	13	9	13	13
	Understorey	10	15	15	20	5	15	15	20	15	10
	Recruitment	5	5	5	10	1	3	3	5	5	5
	Organic Matter	3	3	3	3	3	5	5	5	5	5
	Logs	4	4	4	4	2	2	4	5	4	4
Subtotal		**37**	**40**	**40**	**56**	**24**	**40**	**40**	**57**	**48**	**39**
Landscape Context (as derived from DSE Interactive maps)		17	17	17	17	17	18	18	17	17	17
Habitat Score		**54**	**47**	**47**	**73**	**41**	**58**	**58**	**74**	**65**	**56**
Habitat Score (out of 1.0)		0.54	0.47	0.47	0.73	0.41	0.58	0.58	0.74	0.65	0.56
Area of Habitat Zone		2370.04	104.17	104.85	13.71	24.6	2791.61	34.3	6.72	19.3	717.23
Habitat Hectares (area x habitat score)		1279.82	48.96	49.28	10.01	10.1	1619.13	19.90	4.97	12.55	401.65
Bioregion		G	G	G	G	G	G	G	G	G	G
EVC Conservation Status		D	D		D	D	D	D	D	V	D
Conservation Significance	Cons. status x Habitat score	MEDIUM	MEDIUM	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	VERY HIGH	VERY HIGH	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**MEDIUM**	**MEDIUM**	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**VERY HIGH**	**VERY HIGH**	**MEDIUM**

APPENDICES

Wellsford State Forest (continued)

EVC Name			HW	HW	HW	BIF
Habitat Zones			HZ 9	HZ 9a	HZ 9b	HZ 10
	Site Condition	Large Old Trees	0	0	0	7
		Tree Canopy Cover	2	2	2	2
		Lack of Weeds	13	13	13	13
		Understorey	15	15	15	20
		Recruitment	3	3	3	10
		Organic Matter	3	3	3	5
		Logs	2	2	2	2
Subtotal			**38**	**38**	**38**	**59**
Landscape Context (as derived from DSE Interactive maps)			17	17	17	17
Habitat Score			**55**	**55**	**55**	**76**
Habitat Score (out of 1.0)			0.55	0.55	0.55	0.76
Area of Habitat Zone			12.89	2.99	2.73	49.5
Habitat Hectares (area x habitat score)			7.09	1.64	1.50	37.62
Bioregion			G	G	G	G
EVC Conservation Status			D	D	D	D
	Conservation Significance	Cons. status x Habitat score	MEDIUM	MEDIUM	MEDIUM	HIGH
		Threatened species: presence	N/a	N/a	N/a	N/a
		Other site attributes	N/a	N/a	N/a	N/a
		Overall Conservation Significance	**MEDIUM**	**MEDIUM**	**MEDIUM**	**HIGH**

There are a number of mosaics between two different habitat zones in Wellsford State Forest. Information on these is provided below:
- Habitat Zones 1 and 4 = Box Ironbark Forest, no habitat hectare scores as a mosaic between two different habitat zones. Area = 80.19 hectares.
- Habitat Zones 1 and 5 = Box Ironbark Forest, no habitat hectare scores as a mosaic between two different habitat zones. Area = 41.75 hectares.
- Habitat Zones 1 and 8 = Box Ironbark Forest, no habitat hectare scores as a mosaic between two different habitat zones. Area = 52.46 hectares.
- Habitat Zones 5 and 8 = Box Ironbark Forest, no habitat hectare scores as a mosaic between two different habitat zones. Area = 336.98 hectares.



LEGEND

*See additional Habitat Zone legend above

Logging Coupe

Note: All Habitat Zones occuring in this map are in Central Victorian Uplands Bioregion

MAP 1
HABITAT ZONES
Wombat State Forset
Bullarto Nth Section
Ecological Assessment
Victorian National Parks Association

Practical Ecology Pty Ltd

DATUM: GDA 94 VicGrid 94

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VERSION	01	DATE	19/1/10

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Savona
24/12/09
Mapping by: Colin Broughton
19/1/10
Generated from: Google Earth Pro
Aerial Photography

NOTES:
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APPENDICES

Daylesford State Forest- Bullarto North Section

Date collected: 17 December 2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Central Victorian Uplands (CVU).

EVC Name		GDF	HrFF	HrFF	HrFF	GDF	HrFF	CHrW	GDF
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 7	HZ 8
Site Condition	Large Old Trees	2	2	3	2	2	2	3	2
	Tree Canopy Cover	4	4	2	2	2	2	4	4
	Lack of Weeds	13	13	13	13	13	7	7	7
	Understorey	15	10	10	5	15	15	15	10
	Recruitment	3	1	1	1	5	5	5	1
	Organic Matter	5	3	3	3	3	3	3	3
	Logs	5	2	4	4	4	3	5	2
Subtotal		**47**	**35**	**36**	**30**	**44**	**37**	**42**	**29**
Landscape Context (as derived from DSE Interactive maps)		16	16	17	16	16	16	16	17
Habitat Score		**63**	**51**	**53**	**46**	**60**	**53**	**58**	**46**
Habitat Score (out of 1.0)		0.63	0.51	0.53	0.46	0.6	0.53	0.58	0.46
Area of Habitat Zone		57.62	23.9	1864.94	1.75	26.91	21.81	16.52	23.64
Habitat Hectares (area x habitat score)		36.30	12.19	988.42	0.81	16.15	11.60	9.58	10.87
Bioregion		CVU	CVU	CVU	CVU	CVU	CVU	CVU	CVU
EVC Conservation Status		D	D	D	D	D	D	V	D
Conservation Significance	Cons. status x Habitat score	HIGH	MEDIUM	MEDIUM	MEDIUM	HIGH	MEDIUM	VERY HIGH	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**HIGH**	**MEDIUM**	**VERY HIGH**	**MEDIUM**

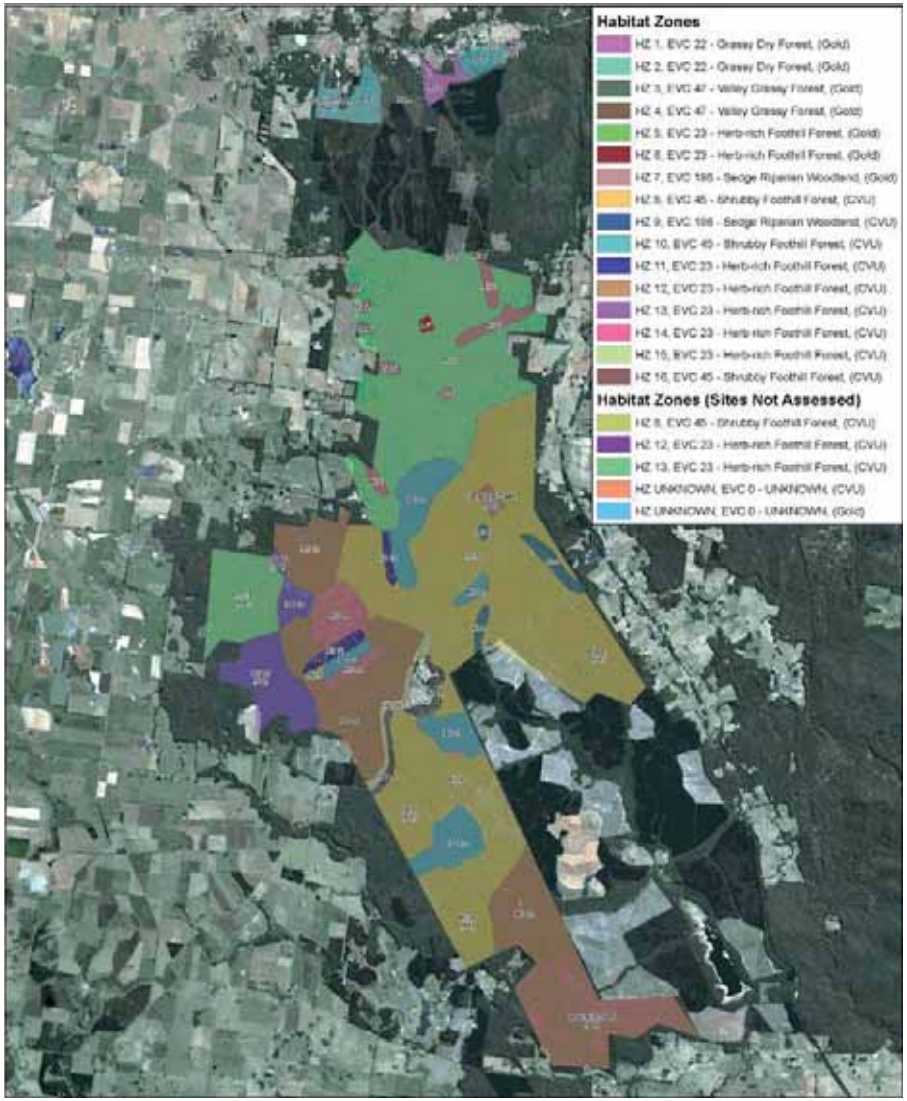
Daylesford State Forest (continued)- Bullarto North Section

EVC Name		HrFF	HrFF	SRW	SRW	CHrW	CHrW	HrFF	SDF
Habitat Zones		HZ 9	HZ 10	HZ 11	HZ 12	HZ 13	HZ 14	HZ 15	HZ 16
Site Condition	Large Old Trees	2	2	0	3	5	5	3	5
	Tree Canopy Cover	2	0	4	4	4	4	2	2
	Lack of Weeds	0	9	9	9	0	9	9	13
	Understorey	10	15	15	15	10	10	15	20
	Recruitment	3	5	3	5	3	3	3	5
	Organic Matter	3	3	3	3	3	3	5	3
	Logs	4	2	0	5	4	4	5	4
Subtotal		**24**	**36**	**34**	**44**	**29**	**38**	**42**	**52**
Landscape Context (as derived from DSE Interactive maps)		16	17	17	17	17	17	17	18
Habitat Score		**40**	**53**	**51**	**61**	**46**	**55**	**59**	**70**
Habitat Score (out of 1.0)		0.40	0.53	0.51	0.61	0.46	0.55	0.59	0.7
Area of Habitat Zone		3.06	1583.11	12.95	82.32	53.68	43.92	25.94	6.72
Habitat Hectares (area x habitat score)		1.22	839.05	6.60	50.23	24.69	24.16	15.30	4.70
Bioregion		CVU	CVU	CVU	CVU	CVU	CVU	CVU	CVU
EVC Conservation Status		D	D	D	D	v	v	D	LC
Conservation Significance	Cons. status x Habitat score	MEDIUM	MEDIUM	MEDIUM	HIGH	HIGH	VERY HIGH	MEDIUM	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**	**VERY HIGH**	**MEDIUM**	**MEDIUM**

APPENDICES

Daylesford State Forest (continued)- Bullarto North Section

EVC Name		RF	SDF	RF	SFF	SFF	SFF	HrFF/SFF Mosaic
Habitat Zones		HZ 17	HZ 18	HZ 19	HZ 20	HZ 21	HZ 22	HZ 23
Site Condition	Large Old Trees	2	3	2	0	2	2	N/a
	Tree Canopy Cover	2	2	4	0	2	2	N/a
	Lack of Weeds	13	13	9	13	13	7	N/a
	Understorey	15	15	15	15	15	15	N/a
	Recruitment	3	1	3	5	5	5	N/a
	Organic Matter	3	3	5	3	5	5	N/a
	Logs	4	2	4	4	4	4	N/a
Subtotal		**42**	**39**	**42**	**40**	**46**	**40**	N/a
Landscape Context (as derived from DSE Interactive maps)		18	18	16	17	16	16	N/a
Habitat Score		**60**	**57**	**58**	**57**	**62**	**56**	N/a
Habitat Score (out of 1.0)		0.60	0.57	0.58	0.57	0.62	0.56	N/a
Area of Habitat Zone		8.25	6.72	96.09	2.17	1383.29	38.28	171.09
Habitat Hectares (area x habitat score)		4.95	3.83	55.73	1.24	857.64	21.44	N/a
Bioregion		CVU	CVU	CVU	CVU	CVU	CVU	CVU
EVC Conservation Status		V	LC	V	LC	LC	LC	N/a
Conservation Significance	Cons. status x Habitat score	VERY HIGH	LOW	VERY HIGH	LOW	MEDIUM	LOW	N/a
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**VERY HIGH**	**LOW**	**VERY HIGH**	**LOW**	**MEDIUM**	**LOW**	**N/a**



LEGEND

*See additional Habitat Zone legend above

Logging Coupe

Note: BioRegion names are abbreviated in legend as follows:
Gold = Goldfields
CVU = Central Victorian Uplands

MAP 1
HABITAT ZONES
Wombat State Forest
West Section
Ecological Assessment
Victorian National Parks Association

Practical Ecology Pty Ltd

DATUM: GDA 94 VicGrid 94

N

1:40,000
(When printed at A3)

VERSION	01	DATE	19/1/10

MAP AND SURVEY DETAILS
Surveyed by: Katherine Smedley and Michelle Savona
24/12/09
Mapping by: Colin Broughton
19/1/10
Generated from: Google Earth Pro
Aerial Photography

NOTES:
Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of this map. All the information appears accurate at publication, nature and circumstances are constantly changing.

APPENDICES

Daylesford State Forest- West Section

Date collected: Friday 18 December 2009. Assessors: Katherine Smedley and Michelle Savona. Bioregion: Central Victorian Uplands (CVU) and Goldfields (G).

EVC Name		GDF	GDF	VGF	VGF	HrFF	HrFF	SRW	SFhF
Habitat Zones		HZ 1	HZ 2	HZ 3	HZ 4	HZ 5	HZ 6	HZ 7	HZ 8
Site Condition	Large Old Trees	2	2	2	3	2	2	2	2
	Tree Canopy Cover	2	2	2	2	2	2	4	2
	Lack of Weeds	7	9	9	7	13	7	13	13
	Understorey	15	15	10	15	15	15	15	15
	Recruitment	1	3	1	5	3	3	3	5
	Organic Matter	3	5	3	5	3	3	5	3
	Logs	2	4	4	5	4	4	5	4
Subtotal		**32**	**40**	**31**	**42**	**42**	**36**	**47**	**44**
Landscape Context (as derived from DSE Interactive maps)		15	15	15	15	16	16	16	16
Habitat Score		**47**	**55**	**46**	**57**	**58**	**52**	**63**	**60**
Habitat Score (out of 1.0)		0.47	0.55	0.46	0.57	0.58	0.52	0.63	0.6
Area of Habitat Zone		34.62	74.7	25.07	17.58	983.05	5.82	80.05	1755.57
Habitat Hectares (area x habitat score)		16.27	41.1	11.53	10.02	570.17	3.03	50.43	1053.34
Bioregion		G	G	G	G	G	G	G	CVU
EVC Conservation Status		D	D	V	V	D	D	V	LC
Conservation Significance	Cons. status x Habitat score	MEDIUM	MEDIUM	HIGH	VERY HIGH	MEDIUM	MEDIUM	VERY HIGH	MEDIUM
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**MEDIUM**	**MEDIUM**	**HIGH**	**VERY HIGH**	**MEDIUM**	**MEDIUM**	**VERY HIGH**	**MEDIUM**

Daylesford State Forest- West Section (continued)

EVC Name		SRW	SFhF	HrFF	HrFF	HrFF	HrFF	HrFF	SFhF
Habitat Zones		HZ 9	HZ 10	HZ 11	HZ 12	HZ 13	HZ 14	HZ 15	HZ 16
Site Condition	Large Old Trees	0	2	2	2	0	0	0	2
	Tree Canopy Cover	4	2	2	2	0	0	0	0
	Lack of Weeds	9	13	9	13	13	13	7	7
	Understorey	15	10	15	15	10	15	15	10
	Recruitment	3	1	3	3	5	5	3	3
	Organic Matter	5	3	5	5	3	5	3	3
	Logs	4	4	4	4	4	4	2	2
Subtotal		**38**	**35**	**40**	**44**	**35**	**42**	**30**	**27**
Landscape Context (as derived from DSE Interactive maps)		16	16	16	16	16	16	16	16
Habitat Score		**54**	**51**	**56**	**60**	**51**	**58**	**46**	**43**
Habitat Score (out of 1.0)		0.54	0.51	0.56	0.6	0.51	0.58	0.46	0.43
Area of Habitat Zone		45.92	307.57	39.83	772.59	227.5	110.47	41.52	35.87
Habitat Hectares (area x habitat score)		24.8	156.86	22.31	463.55	116.03	64.07	19.10	15.42
Bioregion		CVU	CVU	CVU	CVU	CVU	CVU	CVU	CVU
EVC Conservation Status		V	LC	D	D	D	D	D	LC
Conservation Significance	Cons. status x Habitat score	VERY HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	LOW
	Threatened species: presence	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Other site attributes	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
	Overall Conservation Significance	**VERY HIGH**	**LOW**	**MEDIUM**	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**LOW**

APPENDICES

Appendix 5 – Flora Lists supplied by the Castlemaine Field Naturalists Club

BELLS SWAMP PLANT LIST – 54 RECORDS

Botanic name	Common name	Botanic name	Common name	Botanic name	Common name
Acacia pycnantha	Golden Wattle	* *Cirsium vulgare*	Spear Thistle	*Marsilea drummondii*	Common Nardoo
Acacia verniciflua	Varnish Wattle	*Damasonium minus*	Star-fruit	*Mimulus prostratus*	Small Monkey-flower
* *Acetosella vulgaris*	Sheep Sorrel	*Daviesia leptophylla*	Narrow-leaf Bitter-pea	*Muehlenbeckia florulenta*	Tangled Lignum
Amphibromus nervosus	Common Swamp Wallaby-grass	*Eleocharis acuta*	Common Spike-sedge	*Myriophyllum crispatum*	Upright Water-milfoil
		Elymus scaber var scaber	Common Wheat-grass	*Ottelia ovalifolia ssp ovalifolia*	Swamp Lily
* *Arctotheca calendula*	Cape Weed	*Eucalyptus camaldulensis*	River Red Gum	*Potamogeton tricarinatus s.l.*	Floating Pond-weed
Austrodanthonia caespitosa	Common Wallaby-grass	*Haloragis aspera*	Rough Raspwort	*Ranunculus pumilio*	Ferny Small-fl Buttercup
Austrodanthonia duttoniana	Brown-back Wallaby-grass	# *Helichrysum luteoalbum*	Jersy Cudweed	* *Romulea rosea var australis*	Onion-grass
Austrodanthonia eriantha	Hill Wallaby-grass	* *Helminthotheca echioides*	Bristly Ox-tongue	* *Rosa rubiginosa*	Sweet Briar
Austrodanthonia setacea	Bristly Wallaby-grass	* *Hordeum glaucum*	Blue Barley-grass	* *Rumex conglomeratus*	Clustered Dock
Austrostipa scabra ssp falcata	Rough Spear-grass	*Hydrocotyle sibthorpioides*	Shining Pennywort	* *Salvia verbenaca*	Wild Sage
* *Avena fatua*	Wild Oat	*Isotoma fluviatilis*	Swamp Isotome	* *Sanguisorba minor*	Salad Burnet
* *Avena sativa*	Oat	*Juncus amabilis*	Hollow Rush	* *Sonchus asper*	Rough Sow-thistle
* *Bromus catharticus*	Prairie Grass	*Juncus subsecundus*	Finger Rush	* *Sonchus oleraceus*	Common Sow-thistle
* *Bromus diandrus*	Great Brome	* *Lactuca serriola*	Prickly Lettuce	* *Trifolium campestre var campestre*	Hop Clover
* *Bromus hordeaceus* ssp *hordaceus*	Soft Brome	*Lobelia concolor*	Poison Pratia	* *Triticum aestivum*	Wheat
Carex inversa	Knob Sedge	*Lobelia pratioides*	Poison Lobelia	*Walwhalleya proluta*	Rigid Panic
Centipeda cunninghamii	Old Man Weed	* *Lolium rigidum*	Wimmera Rye-grass		
Chloris truncata	Windmill Grass	* *Lophopyrum ponticum*	Tall Wheat-grass		

Produced: June 28, 2009
From Castlemaine Plant List Castlemaine Field Naturalists Club

FRYERS RIDGE PLANT LIST (AREAS G,H) – 282 RECORDS

Botanic name	Common name	Botanic name	Common name	Botanic name	Common name
Acacia acinacea	Gold-dust Wattle	*Arthropodium minus*	Small Vanilla-lily	*Cassinia arcuata*	Coffee Bush
Acacia aculeatissima	Thin-leaf Wattle	*Arthropodium strictum*	Chocolate lily	*Cassytha glabella*	Slender Dodder-laurel
Acacia aspera	Rough Wattle	*Asplenium flabellifolium*	Necklace Fern	*Cassytha melantha*	Coarse Dodder-laurel
Acacia dealbata	Silver Wattle	*Astroloma humifusum*	Cranberry Heath	* *Centaurium tenuiflorum*	Branched Centaury
Acacia genistifolia	Spreading Wattle	*Austrodanthonia fulva*	Copper-awned Wallaby-gr	*Centipeda cunninghamii*	Old Man Weed
Acacia gunnii	Ploughshare Wattle	*Austrostipa mollis*	Supple Spear-grass	* *Cerastium glomeratum*	C'n Mouse-ear Chickweed
Acacia lanigera var whanii	Woolly Wattle	*Austrostipa rudis*	Veined Spear-grass	*Cheilanthes austrotenuifolia*	Green Rock-fern
Acacia mearnsii	Black Wattle	*Austrostipa scabra ssp falcata*	ough Spear-grass	*Cheilanthes sieberi* ssp *sieberi*	Narrow Rock-fern
Acacia mitchellii	Mitchell's Wattle	*Billardiera cymosa*	Sweet Apple-berry	*Chiloglottis valida*	Common Bird-orchid
Acacia oxycedrus	Spike Wattle	*Blechnum fluviatile*	Ray Water-fern	*Chrysocephalum baxteri*	White Everlasting
Acacia paradoxa	Hedge Wattle	*Blechnum nudum*	Fishbone Water-fern	*Chrysocephalum semipapposum*	Clustered Everlasting
Acacia provincialis	Wirilda	*Bossiaea prostrata*	Creeping Bossiaea	* *Cicendia filiformis*	Slender Cicendia
Acacia pycnantha	Golden Wattle	*Brachyloma daphnoides*	Daphne Heath	* *Cicendia quadrangularis*	Square Cicendia
Acacia sporadica	Wattle	*Brachyscome diversifolia*	Tall Daisy	* *Cirsium vulgare*	Spear Thistle
Acaena agnipila	Hairy Sheep's-burr	*Brachyscome perpusilla*	Rayless Daisy	*Comesperma ericinum*	Heath Milkwort
Acaena echinata	Sheep's-burr	* *Briza maxima*	Quaking Grass	*Comesperma volubile*	Love Creeper
Acaena novae-zelandiae	Bidgee-widgee	* *Briza minor*	Lesser Quaking-grass	*Correa reflexa*	Common Correa
Acianthus pusillus	Small Mosquito Orchid	*Brunonia australis*	Blue Pincushion	# *Cotula australis*	Common Cotula
Acrotriche serrulata	Honey-pots	*Bulbine bulbosa*	Bulbine Lily	*Craspedia variabilis*	Billy Buttons
Adiantum aethiopicum	Common Maiden-hair	*Burchardia umbellata*	Milkmaids	*Crassula decumbens* var *decumbens*	Spreading Crassula
* *Agrostis capillaris* v *aristata*	Brown-top Bent	*Bursaria spinosa* ssp *spinosa*	Sweet Bursaria	*Crassula helmsii*	Swamp Crassula
* *Aira* sp	Quicksilver Grass	*Caladenia carnea* s.l.	Pink Fingers	*Crassula sieberiana*	Sieber Crassula
Ajuga australis	Austral Bugle	*Caladenia cucullata*	Hood Orchid	*Cyanicula caerulea*	Blue Caladenia
* *Allium vineale*	Crow Garlic	*Caladenia dilatata* s.l.	Greencomb Spider-orchid	*Cyathea australis*	Rough Tree-fern
Amyema miquelii	Box Mistletoe	*Caladenia gracilis*	Musky Hood	*Cymbonotus preissianus*	Austral Bear's-ear
Amyema pendula	Drooping Mistletoe	*Callistemon sieberi*	River Bottlebrush	*Cyperus gunnii* ssp *gunnii*	Flecked Flat-sedge
* *Anagallis arvensis*	Pimpernel	*Calochilus robertsonii*	Purple Beard-orchid	*Cyrtostylis reniformis*	Small Gnat-orchid
* *Aphanes arvensis*	Parsley Piert	*Calochlaena dubia*	Common Ground-fern	*Daucus glochidiatus*	Austral Carrot
Aphanes australiana	Australian Piert	* *Cardamine hirsuta*	Common Bitter-cress	*Daviesia leptophylla*	Narrow-leaf Bitter-pea
Aphelia pumilio	Dwarf Aphelia	*Carex appressa*	Tall Sedge	*Daviesia ulicifolia* ssp *ruscifoli*	Gorse Bitter-pea
* *Arctotheca calendula*	Cape Weed	*Carex fascicularis*	Tassel Sedge	*Derwentia perfoliata*	Digger's Speedwell
Arthropodium fimbriatum	Nodding Chocolate-lily	*Carex tereticaulis*	Hollow Sedge	*Dianella admixta*	Black-anther Flax-lily

APPENDICES

FRYERS RIDGE PLANT LIST (AREAS G,H) – 282 RECORDS

Botanic name	Common name	Botanic name	Common name	Botanic name	Common name
Dichelachne crinita	Long-hair Plume-grass	* *Galium murale*	Small Bedstraw	*Joycea pallida*	Red-anther Wallaby-grass
Dichondra repens	Kidney-weed	* *Genista monspessulana*	Cape Broom	* *Juncus acutus* ssp *acutus*	Sharp Rush
Dillwynia cinerascens	Grey Parrot-pea	*Geranium affin solanderi*	Austral Cranesbill	*Juncus amabilis*	Hollow Rush
Dillwynia phylicoides	Small-leaf Parrot-pea	*Glossodia major*	Wax-lip Orchid	* *Juncus articulatus*	Jointed Rush
Dillwynia ramosissima	Bushy Parrot-pea	*Gompholobium huegelii*	Common Wedge-pea	# *Juncus bufonius*	Toad Rush
Dillwynia sericea	Showy Parrot-pea	*Gonocarpus tetragynus*	Common Raspwort	*Juncus holoschoenus*	Joint-leaf Rush
Diuris pardina	Leopard Orchid	*Goodenia blackiana*	Black's Goodenia	*Juncus pallidus*	Pale Rush
Drosera macrantha ssp *macrantha*	Climbing Sundew	*Gratiola peruviana*	Austral Brooklime	*Juncus planifolius*	Broad-leaf Rush
Drosera peltata ssp *auriculata*	Tall Sundew	*Grevillea alpina*	Downy Grevillea	*Juncus remotiflorus*	Diffuse Rush
Drosera peltata ssp *peltata*	Pale Sundew	*Grevillea obtecta*	Fryerstown Grevillea	*Juncus sarophorus*	Broom Rush
Drosera whittakeri ssp *aberanns*	Scented Sundew	*Hakea decurrens* ssp *physocarpa*	Bushy Needlewood	*Juncus subsecundus*	Finger Rush
Einadia hastata	Saloop	*Hardenbergia violacea*	Purple Coral-pea	*Juncus usitatus*	Billabong Rush
Eleocharis acuta	Common Spike-sedge	*Helichrysum scorpioides*	Button Everlasting	*Kennedia prostrata*	Running Postman
Eleocharis sphacelata	Tall Spike-sedge	*Hibbertia fasciculata* v *prostrata*	Bundled Guinea-flower	*Lagenophora huegelii*	Coarse Bottle-daisy
Epacris impressa	Common Heath	*Hibbertia riparia*	Erect Guinea-flower	* *Lathyrus angulatus*	Angular Pea
Epilob.billardierianum ssp ciner.	Grey W-herb	* *Hirschfeldia incana*	Hoary Mustard	*Lepidosperma curtisiae*	Little Sword-sedge
* *Erophila verna*	Whitlow Grass	* *Holcus lanatus*	Yorkshire Fog	*Lepidosperma laterale*	Variable Sword-sedge
Eucalyptus albens	White Box	*Hovea heterophylla*	Common Hovea	*Lepidosperma semiteres*	Wire Rapier-sedge
Eucalyptus dives	Broad-leaved Peppermint	*Hyalosperma demissum*	Moss Sunray	*Leptorhynchos squamatus*	Scaly Buttons
Eucalyptus leucoxylon ss *pruinosa*	Yellow Gum	*Hydrocotyle callicarpa*	Small Pennywort	*Leptorhynchos tenuifolius*	Wiry Buttons
Eucalyptus macrorhyncha	Red Stringybark	*Hydrocotyle foveolata*	Yellow Pennywort	*Leptospermum myrsinoides*	Heath Tea-tree
Eucalyptus melliodora	Yellow Box	*Hydrocotyle laxiflora*	Stinking Pennywort	*Leucochrysum albicans*	Hoary Sunray
Eucalyptus nortonii	Mealy Bundy	*Hydrocotyle sibthorpioides*	Shining Pennywort	*Leucopogon ericoides*	Pink Beard-heath
Eucalyptus obliqua	Messmate Stringybark	*Hypericum gramineum*	Small St John's Wort	*Leucopogon fletcheri* s *brevisepal*	Twin-flower Beard-heath
Eucalyptus ovata	Swamp Gum	* *Hypochoeris glabra*	Smooth Cat's-ear	*Leucopogon virgatus*	Common Beard-heath
Eucalyptus polyanthemos s *vestita*	Red Box	* *Hypochoeris radicata*	Cat's-ear	*Levenhookia dubia*	Hairy Stylewort
Eucalyptus tricarpa	Red Ironbark	*Hypolepis rugosula*	Ruddy Ground-fern	*Lobelia anceps*	Angled Lobelia
Euchiton involucratus	Star Cudweed	*Hypoxis vaginata* var *vaginata*	Yellow Star	*Lobelia gibbosa*	Tall Lobelia
Euphrasia collina ssp *collina*	Purple Eyebright	*Indigofera australis*	Austral Indigo	*Lomandra filiformis*	Wattle Mat-rush
Exocarpos cupressiformis	Cherry Ballart	*Isolepis inundata*	Swamp Club-sedge	*Lomandra longifolia*	Spiny-headed Mat-rush
Gahnia radula	Thatch Saw-sedge	# *Isolepis marginata*	Little Club-rush	*Lomandra multiflora* ssp *multiflor*	Many-flowered Mat-rush
Galium gaudichaudii	Rough Bedstraw	*Isotoma fluviatilis*	Swamp Isotome	*Luzula meridionalis* v *densiflora*	Common Wood-rush

FRYERS RIDGE PLANT LIST (AREAS G,H) – 282 RECORDS

Botanic name	Common name	Botanic name	Common name	Botanic name	Common name
Lythrum hyssopifolia	Small Loosestrife	*Prostanthera denticulata*	Rough Mint-bush	*Stuartina muelleri*	Spoon Cudweed
Microseris sp 3	Yam Daisy	*Pteridium esculentum*	Austral Bracken	*Stylidium ameria*	Grass Trigger-plant
Microtis unifolia	Common Onion-orchid	*Pterostylis curta*	Blunt Greenhood	*Stylidium inundatum*	Hundreds and Thousands
Millotia tenuifolia	Soft Millotia	*Pterostylis melagramma*	Tall Greenhood	* *Taraxacum officinale* sp agg.	Dandelion
* *Moenchia erecta*	Erect Chickweed	*Pterostylis nana*	Dwarf Greenhood	*Tetratheca ciliata*	Pink-bells
Monotoca scoparia	Prickly Broom-heath	*Pterostylis nutans*	Nodding Greenhood	*Thelymitra aristata*	Great Sun-orchid
Myosotis australis	Austral Forget-me-not	*Pterostylis parviflora*	Tiny Greenhood	*Thelymitra megcalyptra*	Scented Sun-orchid
Olearia myrsinoides	Silky Daisy-bush	*Pterostylis robusta*	Large Striped Greenhood	*Thelymitra pauciflora* s.l.	Slender Sun-orchid
Opercularia varia	Variable Stinkweed	*Pultenaea daphnoides*	Large-leaf Bush-pea	*Themeda triandra*	Kangaroo Grass
Oxalis perennans	Grassland Wood-sorrel	*Pultenaea humilis*	Dwarf Bush-pea	*Thysanotus patersonii*	Twining Fringe-lily
Ozothamnus obcordatus	Grey Everlasting	*Pultenaea largiflorens*	Twiggy Bush-pea	*Thysanotus tuberosus*	Common Fringe-lily
* *Parentucellia latifolia*	Red Bartsia	*Pultenaea pedunculata*	Matted Bush-pea	*Tricoryne elatior*	Yellow Rush-lily
Pelargonium rodneyanum	Magenta Stork's-bill	*Ranunculus lappaceus*	Australian Buttercup	* *Trifolium angustifolium*	Narrow-leaf Clover
Pentapogon quadrifidus	Five-awned Spear-grass	*Rhytidosporum procumbens*	White Marianth	* *Trifolium arvense* var *arvense*	Hare's-foot Clover
Persoonia rigida	Hairy Geebung	* *Romulea rosea* var *australis*	Onion-grass	* *Trifolium campestre* var *campestre*	Hop Clover
* *Petrorhagia dubia*	Velvet Pink	* *Rosa rubiginosa*	Sweet Briar	* *Trifolium dubium*	Suckling Clover
Pheladenia deformis	Blue-beard Caladenia	* *Rubus fruticosus* sp agg	Blackberry	*Triglochin procera*	Water Ribbons
Philotheca verrucosa	Fairy Wax-flower	*Rubus parvifolius*	Small-leaved Bramble	*Triptilodiscus pygmaeus*	Common Sunray
Pimelea curviflora	Curved Rice-flower	*Rumex brownii*	Slender Dock	* *Ulex europaeus*	Gorse
Pimelea humilis	Common Rice-flower	*Schoenus apogon*	Common Bog-sedge	*Velleia paradoxa*	Spur Velleia
Pimelea linifolia	Slender Rice-flower	*Sebaea ovata*	Yellow Sebaea	* *Veronica arvensis*	Wall Speedwell
* *Plantago lanceolata*	Flat-weed	*Senecio glomeratus*	Annual Fireweed	*Veronica gracilis*	Slender Speedwell
Plantago varia	Variable Plantain	*Senecio phelleus*	Slender Groundsel	*Viola hederacea*	Ivy-leaf Violet
Platylobium formosum	Handsome Flat-pea	* *Senecio vulgaris*	Common Groundsel	*Wahlenbergia gracilenta*	Annual Bluebell
* *Poa pratensis*	Kentucky Meadow-grass	*Siloxerus multiflorus*	Small Wrinklewort	*Wahlenbergia* spp	Bluebell
Poa sieberiana var *sieberiana*	Grey Tussock-grass	*Solenogyne dominii*	Smooth Solenogyne	*Wahlenbergia stricta* ssp *stricta*	Tall Bluebell
Podolepis jaceoides	Showy Podolepis	* *Spergularia rubra*	Red Sand-spurrey	*Wurmbea dioica*	Common Early Nancy
Podolobium procumbens	Trailing Podolobium	*Spyridium parvifolium*	Dusty Miller	*Xerochrysum viscosum*	Sticky Everlasting
Pomax umbellata	Pomax	*Stackhousia monogyna*	Creamy Candles		
Poranthera microphylla	Small Poranthera	* *Stellaria pallida*	Lesser Chickweed		
Prasophyllum affin odoratum	Scented Leek-orchid	*Stellaria pungens*	Prickly Starwort		

APPENDICES

MUCKLEFORD FOREST PLANT LIST. INCLUDES STATE FOREST AND CONS RESERVE – 272 RECORDS

Botanic name	Common name	Botanic name	Common name	Botanic name	Common name
Acacia acinacea	Gold-dust Wattle	*Austrodanthonia eriantha*	Hill Wallaby-grass	*Carpobrotus modestus*	Inland Pigface
Acacia aculeatissima	Thin-leaf Wattle	*Austrodanthonia setacea*	Bristly Wallaby-grass	*Cassinia arcuata*	Coffee Bush
Acacia aspera	Rough Wattle	*Austrostipa mollis*	Supple Spear-grass	*Cassinia diminuta*	Sticky Cassinia
Acacia aspera x pycnantha	Hybrid Wattle	*Austrostipa scabra ssp falcata*	Rough Spear-grass	*Cassytha glabella*	Slender Dodder-laurel
+ *Acacia baileyana*	Cootamundra Wattle	* *Avena fatua*	Wild Oat	* *Centaurium tenuiflorum*	Branched Centaury
Acacia dealbata	Silver Wattle	*Billardiera cymosa*	Sweet Apple-berry	*Centipeda cunninghamii*	Old Man Weed
Acacia genistifolia	Spreading Wattle	*Boronia anemonifolia* ssp *anemonif*	Sticky Boronia	*Centrolepis strigosa* ssp *strigosa*	Hairy Centrolepis
Acacia gunnii	Ploughshare Wattle	*Brachyloma daphnoides*	Daphne Heath	* *Cerastium glomeratum*	C'n Mouse-ear Chickweed
Acacia paradoxa	Hedge Wattle	*Brachyscome debilis*	Weak Daisy	*Chamaescilla corymbosa*	Blue Stars
Acacia pycnantha	Golden Wattle	*Brachyscome perpusilla*	Rayless Daisy	*Cheilanthes austrotenuifolia*	Green Rock-fern
Acaena echinata	Sheep's-burr	* *Briza maxima*	Quaking Grass	*Cheilanthes sieberi* ssp *sieberi*	Narrow Rock-fern
Acianthus caudatus	Mayfly Orchid	* *Briza minor*	Lesser Quaking-grass	*Chrysocephalum apiculatum* sp agg	Common Everlasting
Acianthus pusillus	Small Mosquito Orchid	* *Bromus rubens*	Red Brome	*Chrysocephalum semipapposum*	Clustered Everlasting
Acrotriche serrulata	Honey-pots	*Brunonia australis*	Blue Pincushion	* *Cicendia quadrangularis*	Square Cicendia
Actinobole uliginosum	Flannel Cudweed	*Bulbine bulbosa*	Bulbine Lily	* *Cirsium vulgare*	Spear Thistle
* *Aira* sp	Quicksilver Grass	*Burchardia umbellata*	Milkmaids	*Clematis microphylla*	Small-leaved Clematis
Ajuga australis	Austral Bugle	*Bursaria spinosa* ssp *spinosa*	Sweet Bursaria	*Correa reflexa*	Common Correa
Allocasuarina luehmannii	Buloke	*Caladenia carnea* s.s.	Pink Fingers	*Corunastylis ciliata*	Fringed Midge-orchid
Allocasuarina verticillata	Drooping Sheoak	*Caladenia clavescens*	Castlemaine Spider-orchid	*Corunastylis despectans*	Sharp Midge-orchid
Amyema miquelii	Box Mistletoe	*Caladenia cucullata*	Hood Orchid	*Corunastylis* sp *affin rufa*	Dark Midge-orchid
* *Anagallis arvensis*	Pimpernel	*Caladenia dilatata* s.l.	Greencomb Spider-orchid	* *Cotula bipinnata*	Ferny Cotula
* *Aphanes arvensis*	Parsley Piert	*Caladenia fuscata*	Dusky Fingers	*Craspedia variabilis*	Billy Buttons
Aphanes australiana	Australian Piert	*Caladenia gracilis*	Musky Hood	*Crassula decumbens* var *decumbens*	Spreading Crassula
* *Arctotheca calendula*	Cape Weed	* *Callitriche brutia* var *brutia*	Thread Water-starwort	*Crassula helmsii*	Swamp Crassula
Arthropodium fimbriatum	Nodding Chocolate-lily	*Calocephalus citreus*	Lemon Beauty-heads	*Crassula sieberiana*	Sieber Crassula
Arthropodium milleflorum	Pale Vanilla-lily	*Calochilus robertsonii*	Purple Beard-orchid	*Cyanicula caerulea*	Blue Caladenia
Arthropodium minus	Small Vanilla-lily	*Calytrix tetragona*	Common Fringe-myrtle	*Cymbonotus preissianus*	Austral Bear's-ear
Arthropodium strictum	Chocolate lily	* *Cardamine hirsuta*	Common Bitter-cress	*Cyperus lhotskyanus*	Flat-sedge
* *Asparagus asparagoides*	Bridal Creeper	* *Carduus tenuiflorus*	Winged Thistle	*Cyrtostylis reniformis*	Small Gnat-orchid
Asperula conferta	Common Woodruff	*Carex appressa*	Tall Sedge	*Daucus glochidiatus*	Austral Carrot
Astroloma humifusum	Cranberry Heath	*Carex tereticaulis*	Hollow Sedge	*Daviesia leptophylla*	Narrow-leaf Bitter-pea

MUCKLEFORD FOREST PLANT LIST. INCLUDES STATE FOREST AND CONS RESERVE – 272 RECORDS

Botanic name	Common name	Botanic name	Common name	Botanic name	Common name
Daviesia ulicifolia ssp *ruscifoli*	Gorse Bitter-pea	* *Euphorbia peplus*	Petty Spurge	*Hypoxis vaginata* var *vaginata*	Yellow Star
Dianella admixta	Black-anther Flax-lily	*Euphrasia collina* ssp *collina*	Purple Eyebright	*Indigofera australis*	Austral Indigo
Dianella tarda	Late-flower Flax-lily	*Eutaxia microphylla* v *microphylla*	Common Eutaxia	* *Isolepis levynsiana*	Tiny Flat-sedge
Dillwynia cinerascens	Grey Parrot-pea	*Exocarpos cupressiformis*	Cherry Ballart	*Joycea pallida*	Red-anther Wallaby-grass
Dillwynia hispida	Red Parrot-pea	* *Fumaria bastardii*	Bastard's Fumitory	*Juncus amabilis*	Hollow Rush
Dillwynia sericea	Showy Parrot-pea	*Galium gaudichaudii*	Rough Bedstraw	# *Juncus bufonius*	Toad Rush
Diuris chryseopsis	Golden Moths	* *Galium murale*	Small Bedstraw	* *Juncus capitatus*	Capitate Rush
Diuris pardina	Leopard Orchid	* *Genista monspessulana*	Cape Broom	*Juncus filicaulis*	Thread Rush
Diuris sulphurea	Tiger Orchid	*Geranium affin solanderi*	Austral Cranesbill	*Juncus flavidus*	Yellow Rush
Dodonaea viscosa	Sticky Hop-bush	*Geranium retrorsum*	Grassland Cranesbill	*Juncus holoschoenus*	Joint-leaf Rush
Drosera macrantha ssp *macrantha*	Climbing Sundew	*Glischrocaryon behrii*	Golden Pennants	*Juncus homalocaulis*	Wiry Rush
Drosera peltata ssp *auriculata*	Tall Sundew	*Glossodia major*	Wax-lip Orchid	*Juncus pallidus*	Pale Rush
Drosera peltata ssp *peltata*	Pale Sundew	*Gnaphalium indutum*	Tiny Cudweed	*Juncus remotiflorus*	Diffuse Rush
Drosera whittakeri ssp *aberanns*	Scented Sundew	*Gompholobium huegelii*	Common Wedge-pea	*Juncus subsecundus*	Finger Rush
Einadia hastata	Saloop	*Gonocarpus tetragynus*	Common Raspwort	*Juncus vaginatus*	Clustered Rush
Einadia nutans ssp *nutans*	Nodding Saltbush	*Goodenia blackiana*	Black's Goodenia	*Kennedia prostrata*	Running Postman
Eleocharis acuta	Common Spike-sedge	*Goodenia pinnatifida*	Cut-leaf Goodenia	*Lachnagrostis filiformis*	Common Blown-grass
Elymus scaber var *scaber*	Common Wheat-grass	*Grevillea alpina*	Downy Grevillea	*Lagenophora huegelii*	Coarse Bottle-daisy
Eriochilus cucullatus	Parson's Bands	*Hakea decurrens* ssp *physocarpa*	Bushy Needlewood	* *Lathyrus angulatus*	Angular Pea
* *Erophila verna*	Whitlow Grass	*Hardenbergia violacea*	Purple Coral-pea	*Leptorhynchos squamatus*	Scaly Buttons
Eucalyptus albens	White Box	*Hibbertia exutiacies*	Spiky Guinea-flower	*Leptorhynchos tenuifolius*	Wiry Buttons
Eucalyptus baxteri	Brown Stringybark	*Hovea heterophylla*	Common Hovea	*Leptospermum myrsinoides*	Heath Tea-tree
Eucalyptus camaldulensis	River Red Gum	*Hyalosperma demissum*	Moss Sunray	*Leucopogon virgatus*	Common Beard-heath
Eucalyptus leucoxylon ss *pruinosa*	Yellow Gum	*Hybanthus floribundus*	Shrub Violet	*Levenhookia dubia*	Hairy Stylewort
Eucalyptus macrorhyncha	Red Stringybark	*Hydrocotyle callicarpa*	Small Pennywort	* *Linaria pelisseriana*	Pelisser's Toad-flax
Eucalyptus melliodora	Yellow Box	*Hydrocotyle foveolata*	Yellow Pennywort	*Lobelia gibbosa*	Tall Lobelia
Eucalyptus microcarpa	Grey Box	*Hydrocotyle laxiflora*	Stinking Pennywort	*Lomandra filiformis*	Wattle Mat-rush
Eucalyptus nortonii	Mealy Bundy	*Hypericum gramineum*	Small St John's Wort	*Lomandra multiflora* ssp *multiflor*	Many-flowered Mat-rush
Eucalyptus polyanthemos s *vestita*	Red Box	* *Hypochoeris glabra*	Smooth Cat's-ear	*Luzula meridionalis* v *densiflora*	Common Wood-rush
Eucalyptus tricarpa	Red Ironbark	* *Hypochoeris radicata*	Cat's-ear	*Luzula meridionalis* v *flaccida*	Common Wood-rush
Euchiton involucratus	Star Cudweed	*Hypoxis glabella* var *glabella*	Tiny Star	*Maireana enchylaenoides*	Wingless Bluebush

APPENDICES

MUCKLEFORD FOREST PLANT LIST. INCLUDES STATE FOREST AND CONS RESERVE – 272 RECORDS

Botanic name	Common name	Botanic name	Common name	Botanic name	Common name
* *Marrubium vulgare*	Horehound	*Pterostylis nana*	Dwarf Greenhood	*Stuartina muelleri*	Spoon Cudweed
Melicytus dentatus	Tree Violet	*Pterostylis nutans*	Nodding Greenhood	*Stylidium ameria*	Grass Trigger-plant
Microseris sp 3	Yam Daisy	*Pterostylis parviflora*	Tiny Greenhood	*Stylidium inundatum*	Hundreds and Thousands
Microtis parviflora	Slender Onion-orchid	*Pterostylis plumosa*	Bearded Greenhood	*Tetratheca ciliata*	Pink-bells
Microtis unifolia	Common Onion-orchid	*Pterostylis* sp affin parviflora	Red-tip Greenhood	*Thelymitra antennifera*	Rabbit-ears
Millotia tenuifolia	Soft Millotia	*Pterostylis* sp affin revoluta	Large Autumn Greenhood	*Thelymitra aristata*	Great Sun-orchid
* *Moenchia erecta*	Erect Chickweed	*Pterostylis striata*	Striped Greenhood	*Thelymitra ixioides*	Spotted Sun-orchid
* *Moraea miniata*	Two-leaf Cape-tulip	*Pultenaea largiflorens*	Twiggy Bush-pea	*Thelymitra megcalyptra*	Scented Sun-orchid
Notodanthonia semiannularis	Wetland Wallaby-grass	*Pultenaea pedunculata*	Matted Bush-pea	*Thelymitra pauciflora* s.l.	Slender Sun-orchid
Olearia teretifolia	Cypress Daisy-bush	*Ranunculus lappaceus*	Australian Buttercup	*Thelymitra rubra*	Salmon Sun-orchid
Ophioglossum lusitanicum	Austral Adder's-tongue	*Ranunculus pumilio*	Ferny Small-fl Buttercup	*Themeda triandra*	Kangaroo Grass
Oxalis perennans	Grassland Wood-sorrel	*Ranunculus robertsonii*	Slender Buttercup	*Thysanotus patersonii*	Twining Fringe-lily
* *Oxalis purpurea*	Large-flower Wood-sorrel	*Ranunculus sessiliflorus*	Annual Buttercup	* *Trifolium arvense* var *arvense*	Hare's-foot Clover
Ozothamnus obcordatus	Grey Everlasting	*Rhytidosporum procumbens*	White Marianth	* *Trifolium campestre* var *campestre*	Hop Clover
* *Parentucellia latifolia*	Red Bartsia	* *Romulea minutiflora*	Small-flower Onion-grass	*Triglochin procera*	Water Ribbons
Pelargonium rodneyanum	Magenta Stork's-bill	* *Romulea rosea* var *australis*	Onion-grass	*Triptilodiscus pygmaeus*	Common Sunray
* *Petrorhagia dubia*	Velvet Pink	*Rumex brownii*	Slender Dock	*Typha* sp	Bulrush (Cumbungi)
Philotheca verrucosa	Fairy Wax-flower	* *Rumex crispus*	Curled Dock	*Velleia paradoxa*	Spur Velleia
Pimelea humilis	Common Rice-flower	*Sebaea ovata*	Yellow Sebaea	*Veronica gracilis*	Slender Speedwell
Pimelea linifolia	Slender Rice-flower	*Senecio glomeratus*	Annual Fireweed	* *Vulpia bromoides*	Squirrel-tail Fescue
* *Plantago lanceolata*	Flat-weed	*Senecio phelleus*	Slender Groundsel	*Wahlenbergia gracilenta*	Annual Bluebell
Plantago varia	Variable Plantain	*Senecio quadridentatus*	Cotton Fireweed	*Wahlenbergia stricta* ssp stricta	Tall Bluebell
Pleurosorus rutifolius	Blanket Fern	*Siloxerus multiflorus*	Small Wrinklewort	*Wurmbea dioica*	Common Early Nancy
* *Poa bulbosa*	Bulbous Meadow-grass	*Solenogyne dominii*	Smooth Solenogyne	*Xerochrysum viscosum*	Sticky Everlasting
Poa morrisii	Soft Tussock-grass	* *Sonchus asper*	Rough Sow-thistle		
* *Poa pratensis*	Kentucky Meadow-grass	* *Sonchus oleraceus*	Common Sow-thistle		
Poa sieberiana var *sieberiana*	Grey Tussock-grass	* *Spergula arvensis*	Corn Spurrey		
Podolepis jaceoides	Showy Podolepis	* *Spergula pentandra*	Five-stamen Corn-spurrey		
Poranthera microphylla	Small Poranthera	*Stackhousia monogyna*	Creamy Candles		
Pterostylis cycnocephala	Swan Greenhood	* *Stellaria media*	Chickweed		
Pterostylis melagramma	Tall Greenhood	* *Stellaria pallida*	Lesser Chickweed		

Appendix 6 – EVCs within High Priority sites under-represented in the reserve system

EVC	EVC BIOREGIONAL CONSERVATION STATUS	EVC NAME	AREA OF UNDER-RESERVED EVCS IN PRIORITY SMALL PKS (HA)	CURRENT TOTAL CONS RES	CURRENT PRE-1750	CURRENT CONS RES/PRE-1750	POTENTIAL CONS RES/ PRE-1750
Goldfields Bioregion							
21	Vulnerable	Shrubby Dry Forest	128.28	5	230	2.17%	57.95%
47	Vulnerable	Valley Grassy Forest	864.09	1969	21427	9.19%	13.22%
48	Depleted	Heathy Woodland	439.15	1624	15962	10.17%	12.93%
55	Endangered	Plains Grassy Woodland	13.67	385	33422	1.15%	1.19%
67	Endangered	Alluvial Terraces Herb-rich Woodland	55.31	1597	18123	8.81%	9.12%
68	Endangered	Creekline Grassy Woodland	60.37	688	25861	2.66%	2.89%
75	Vulnerable	Sandstone Ridge Shrubland/Heathy Woodland Mosaic	137.63	0	138	0.00%	99.73%
76	Endangered	Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic	566.13	2441	103288	2.36%	2.91%
81	Vulnerable	Alluvial Terraces Herb-rich Woodland/ Creekline Grassy Woodland Mosaic	21.61	155	13667	1.13%	1.29%
175	Vulnerable	Grassy Woodland	2342.3	9545	411430	2.32%	2.89%
178	Depleted	Herb-rich Foothill Forest/Shrubby Foothill Forest Complex	7.84	0	8	0.00%	98.00%
198	Vulnerable	Sedgy Riparian Woodland	86.66	25	173	14.45%	64.54%
851	Endangered	Stream Bank Shrubland	0.36	154	1946	7.91%	7.93%
Central Victorian Uplands Bioregion							
152	Endangered	Alluvial Terraces Herb-rich Woodland/ Plains Grassy Woodland Complex	0.02	19	7030	0.27%	0.27%
68	Endangered	Creekline Grassy Woodland	0.94	42	5633	0.75%	0.76%
164	Vulnerable	Creekline Herb-rich Woodland	69.11	943	7560	12.47%	13.39%
22	Depleted	Grassy Dry Forest	2659.46	31705	223491	14.19%	15.38%
128	Vulnerable	Grassy Forest	8.02	68	10080	0.67%	0.75%
23	Depleted	Herb-rich Foothill Forest	14402.78	14854	148595	10.00%	19.69%
178	Depleted	Herb-rich Foothill Forest/Shrubby Foothill Forest Complex	3268.12	480	6353	7.56%	59.00%
71	Vulnerable	Hills Herb-rich Woodland	185.33	2251	18407	12.23%	13.24%
47	Vulnerable	Valley Grassy Forest	186.45	4503	202516	2.22%	2.32%

Appendix 7 – Area of under-represented EVCs in each high priority Small Parks site

EVC	EVC BIOREGIONAL CONSERVATION STATUS	EVC NAME	AREA OF UNDER-RESERVED EVCS IN PRIORITY SMALL PKS (HA)	CURRENT TOTAL CONS RES	CURRENT PRE-1750	CURRENT CONS RES/PRE-1750	POTENTIAL CONS RES/ PRE-1750
Goldfields Bioregion							
21	Vulnerable	Shrubby Dry Forest	128.28	5	230	2.17%	57.95%
47	Vulnerable	Valley Grassy Forest	864.09	1969	21427	9.19%	13.22%
48	Depleted	Heathy Woodland	439.15	1624	15962	10.17%	12.93%
55	Endangered	Plains Grassy Woodland	13.67	385	33422	1.15%	1.19%
67	Endangered	Alluvial Terraces Herb-rich Woodland	55.31	1597	18123	8.81%	9.12%
68	Endangered	Creekline Grassy Woodland	60.37	688	25861	2.66%	2.89%
75	Vulnerable	Sandstone Ridge Shrubland/Heathy Woodland Mosaic	137.63	0	138	0.00%	99.73%
76	Endangered	Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic	566.13	2441	103288	2.36%	2.91%
81	Vulnerable	Alluvial Terraces Herb-rich Woodland/ Creekline Grassy Woodland Mosaic	21.61	155	13667	1.13%	1.29%
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851	Endangered	Stream Bank Shrubland	0.36	154	1946	7.91%	7.93%
Central Victorian Uplands Bioregion							
152	Endangered	Alluvial Terraces Herb-rich Woodland/ Plains Grassy Woodland Complex	0.02	19	7030	0.27%	0.27%
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178	Depleted	Herb-rich Foothill Forest/Shrubby Foothill Forest Complex	3268.12	480	6353	7.56%	59.00%
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47	Vulnerable	Valley Grassy Forest	186.45	4503	202516	2.22%	2.32%

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