

# **An Ecological Assessment of Beveridge Road, Beveridge, Victoria**

Beveridge Pastoral Company

January 2008

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Beveridge  
Victoria


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# An Ecological Assessment of Beveridge Road, Beveridge Victoria

Beveridge Pastoral Company

January 2008

Approved by:	<u>Andrew Read</u>
Position:	Partner
Signed:	
Date:	<u>23 January 2008</u>

Environmental Resources Management Australia Pty Ltd Quality System

0074621RP01

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This report was prepared in accordance with the scope of services set out in the contract between Environmental Resources Management Australia Pty Ltd ABN 12 002 773 248 (ERM) and the Client. To the best of our knowledge, the proposal presented herein accurately reflects the Client's intentions when the report was printed. However, the application of conditions of approval or impacts of unanticipated future events could modify the outcomes described in this document. In preparing the report, ERM used data, surveys, analyses, designs, plans and other information provided by the individuals and organisations referenced herein. While checks were undertaken to ensure that such materials were the correct and current versions of the materials provided, except as otherwise stated, ERM did not independently verify the accuracy or completeness of these information sources

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## EXECUTIVE SUMMARY

*Environmental Resources Management Australia Pty Ltd (ERM) was commissioned by Beveridge Pastoral Company to provide an assessment of the ecological features of a property proposed for rezoning at Beveridge Road, Beveridge.*

*The majority of grassland within the study site is modified from the predicted pre-settlement Ecological Vegetation Class benchmark condition. The site has a high abundance of exotic plant species, including a number of noxious and environmental weeds. However, approximately 40% of the site contains a continuous area of native vegetation (a 'remnant patch'). This extensive remnant patch is modified native grassland considered representative of EVC 132\_62: Lighter Soils Plains Grassland (Remnant Patch 1). Basalt rocky knolls were also observed on site, the majority of which were distributed in the western and southern sections of the site. The rocky knolls were classified into three categories to determine which would be included in the recommended detailed Net Gain assessment to determine offsets for removal. Of the 104 rocky knolls identified, only 15 Category A rocky knolls will require a Net Gain assessment as these will require an offset if removed. Nine indigenous trees were also present within the site.*

*The potential implications for the Beveridge Pastoral Company of relevant environmental legislation and policy are outlined in Table 1. No flora or fauna species listed under the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act) or Victorian Flora and Fauna Guarantee Act (FFG Act) have been recorded within the subject site during the present assessment (Table 1). However, five threatened plant and two threatened fauna species were recorded on site during previous surveys. The source of these records is currently being determined. Similarly, three threatened fauna species are considered likely to occur within the study site, due to previous sightings in the vicinity of the site.*

*The conservation significance of indigenous vegetation within the study site is High to Very High in accordance with Victoria's Native Vegetation Management – A Framework for Action (hereafter referred to as the Framework). However, ERM considers the overall conservation significance of the site to be Medium given the abundance of weed species and general habitat modification at the site. This conservation significance rating may increase if the recommended targeted surveys detect threatened flora and fauna species within or adjacent to the study site.*

*The site contains two BioSites. There is no legislative obligation to conserve BioSites. However, the impacts of the proposed development within the study site are more likely to be assessed in detail by regulatory bodies such as DSE (Table 1). The presence of BioSites also increases the probability that threatened species will be recorded within this area.*

*The potential ecological impacts of the proposed development include habitat removal (for common native fauna species), increased fragmentation of patches of remnant vegetation, increased runoff and sediment movement from the study site and a potential short term increase in the abundance of pest plants in the area. These impacts are regulated by the Catchment and Land Protection Act and the State Environment Protection Policy (Waters of Victoria) (Table 1).*

**Table 1**

***Outline of legislation and policy potentially applicable to the Site at Beveridge Road, Beveridge.***

<b><i>Legislation/Policy</i></b>	<b><i>Relevance to Beveridge Road, Beveridge Site</i></b>
<i>EPBC Act 1999</i>	<i>EPBC Referral to DEW may be required if threatened species observed in targeted searches</i>
<i>FFG Act 1988</i>	<i>Unlikely to trigger the Act but could still require EES</i>
<i>CALP Act 1994</i>	<i>Conditions on development may be imposed through this Act.</i>
<i>Planning and Environment Act 1987/ Planning and Environment (Planning Schemes) Act 1996</i>	<i>Beveridge Pastoral Company is required to apply for a permit to local councils for vegetation removal.</i>
<i>Victorian Native Vegetation Framework-A Framework for Action</i>	<i>Net Gain and Habitat Hectares assessment required</i>
<i>DSE Advisory List of Threatened Species</i>	<i>Assist DSE to make decisions during the planning process.</i>
<i>Biosites Register</i>	<i>Two Biosites present. Used by DSE to determine significance at a landscape scale</i>
<i>State Environment Protection Policy (Waters of Victoria) 2003</i>	<i>Protection of surface waters of Merri Creek, instream habitat and maintenance of fish passage.</i>
<i>River Red Gum Protection Policy (Policy 22.10)</i>	<i>Conditions may be imposed on development by Whittlesea City Council.</i>

*In the event vegetation within Remnant Patch 1 is removed from the site, an offset would be required, depending on conservation significance and Habitat Hectares scores. A detailed Net Gain assessment is required to determine offsets required for removal of Category A rocky knolls or indigenous grassland (Remnant Patch 1).*

*ERM has made a number of recommendations in regards to the ecological implications of development at the site. In particular, it is recommended that:*

- A comprehensive flora and Net Gain assessment be undertaken in areas identified as remnant grassland. The assessment should be undertaken during*

*Spring/ Summer. The assessment will allow the proponent to identify areas of higher quality remnant grassland within the site (i.e. those areas of grassland that should be retained);*

- *Trees 1 to 9 be retained (Annex A);*
- *Category A rocky knolls be retained, and that Category B rocky knolls be retained where possible. Further, we recommend that clusters of either Category A or B rocky knolls are retained, in preference to isolated Category A rocky knolls. It is recognised that this may potentially present an obstacle to development of some areas of the site. Therefore, priority is placed on:*
  - *clusters of Category A & B rocky knolls located within BioSites;*
  - *the large cluster of Category A rocky knolls in the southern section of the Site, to the south of the existing homestead (shaded purple, Annex A).*
- *Native vegetation clearance primarily be limited to the removal of Category C rocky knolls, with some vegetation removal within Category B where necessary and unavoidable;*
- *Any offset requirements for vegetation removal at the site be met through a combination of vegetation retention, weed management and revegetation activities. For example, Beveridge Pastoral Company could revegetate/rehabilitate the area adjacent to Merri Creek (within the study site) and improve connectivity within the site (such as the formation of links between the Beveridge Rail Reserve and Merri Creek);*
- *Targeted Spring/ Summer surveys for five threatened flora species be undertaken at the site for Pale Swamp Everlasting, Small Scurf-pea, Swamp Everlasting, Swamp Fireweed, and Wetland Blown-grass;*
- *Targeted Spring/ Summer surveys be undertaken at the site for Striped Legless Lizard, Growling Grass Frog, Golden Sun Moth, Brown Toadlet and Fat-tailed Dunnart;*
- *A detailed Spring flora assessment be carried out along Merri Creek prior to development (with the particular aim of identifying any FFG Act listed species); and*
- *Noxious weeds within the study site be actively managed prior to development of the site and as necessary thereafter.*



## GLOSSARY

<b>CALP Act:</b>	<i>Victorian Catchment and Land Protection Act 1994</i>
<b>DBH:</b>	Diameter at Breast Height
<b>DEW:</b>	Department of the Environment and Water Resources (Federal)
<b>DNRE:</b>	Department of Natural Resources and Environment
<b>DSE:</b>	Department of Sustainability and Environment (Victoria)
<b>EPBC Act:</b>	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
<b>ERM:</b>	Environmental Resources Management Pty Ltd
<b>ESO:</b>	Environmental Significance Overlay
<b>EVC:</b>	Ecological Vegetation Class
<b>FFG Act:</b>	<i>Victorian Flora and Fauna Guarantee Act 1988</i>
<b>FIS:</b>	Flora Information System
<b>The Framework:</b>	<i>Victoria's Native Vegetation Management – A Framework for Action</i>
<b>HHA:</b>	Habitat Hectare Assessment
<b>HZ:</b>	Habitat Zone
<b>P &amp; E Act:</b>	<i>Planning and Environment Act 1987</i>
<b>PPWCMA:</b>	Port Phillip and Westernport Catchment Management Authority
<b>SEPP (WoV)</b>	<i>State Environment Protection Policy (Waters of Victoria) 2003</i>
<b>STZ:</b>	Scattered Tree Zone
<b>VPO:</b>	Vegetation Protection Overlay
<b>VPP:</b>	Victorian Planning Provisions
<b>WONS:</b>	Weeds of National Significance

# 1 INTRODUCTION

## 1.1 BACKGROUND

Environmental Resources Management Australia Pty Ltd (ERM) was commissioned by Beveridge Pastoral Company to provide an assessment of the ecological features of a property proposed for rezoning at Beveridge Road, Beveridge. The property is currently zoned as Green Wedge Zone (GWZ) and it is proposed that the land will be rezoned from the Green Wedge Zone (GWZ) to a zone that provides for residential development (potentially the Residential 1 Zone with a Development Plan Overlay, or a Comprehensive Development Zone).

## 1.2 OBJECTIVES

The objectives of this assessment are to:

- Ensure that Beveridge Pastoral Company is aware of its' obligations in relation to relevant biodiversity policy and legislation;
- Identify and describe flora and fauna species (including any threatened species), populations, Ecological Vegetation Classes (EVCs<sup>1</sup>) and habitats that may occur within the study site;
- Evaluate the conservation significance of the site overall;
- Evaluate any impacts that are likely to occur as a result of the potential loss of vegetation and habitat at the site;
- Recommend measures to minimise the impacts of potential development on native flora and fauna and their habitats; and
- Provide advice in relation to Victoria's "Net Gain" policy, detailing which areas of the Site may require a Net Gain assessment for offsets, if they are not retained.

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<sup>1</sup>An EVC consists of one or a number of floristic communities that appear to be associated with a recognisable environmental niche (Woodgate *et al.*1994).

### 1.3 *RELEVANT LEGISLATION AND POLICY*

The legislation and policy that underpins biodiversity conservation in Victoria is discussed below.

#### 1.3.1 *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* applies to seven “matters of national environmental significance”. Under the Act, actions that are likely to have a significant impact upon matters of national environmental significance require approval from the Environment Minister to undertake those actions. An action includes any project, development, undertaking, activity or series of activities. Consideration of these matters of national environmental significance has been undertaken for this report.

If the site is shown to contain Nationally listed species, an EPBC referral to the Department of the Environment, Water, Heritage and the Arts (DEWHA) will be required under the Act.

#### 1.3.2 *Flora and Fauna Guarantee Act 1988*

The Victorian *Flora and Fauna Guarantee Act 1998 (FFG Act)* provides a legal framework for enabling and promoting the conservation of all Victoria’s native flora and fauna, and to enable management of potentially threatening processes. The *FFG Act* principally applies to public land, although it also contains a schedule of listed plant and communities used to identify conservation significance of flora on private land. A permit from DSE is required to kill, injure or disturb flora species that are members of listed communities or protected flora from public land. A permit is not required under the *FFG Act* for private land unless the land is declared ‘critical habitat’ for the species.

An evaluation of the likelihood of the presence of significant flora and fauna species on the study site, including those listed under the *FFG Act* that have previously been recorded in the vicinity of the site, has been undertaken.

A permit is unlikely to be required under the *FFG Act*, given the site is located on private land and is considered unlikely to be declared 'critical habitat' for FFG listed species.

**Important Note:** DSE and other regulators generally critically evaluate any proposal which includes modifying listed species or their habitats. This may form part of a justification for DSE (or other bodies) to recommend the State Environment Minister require an Environmental Effects Statement (EES) for the development of the site (as has been required in the past). We would consider this to be highly unlikely and would not recommend that Beveridge Pastoral Company notify the Minister under the *Environment Effects Act 1978* at this stage.

### 1.3.3 *Catchment and Land Protection Act 1994*

The *Catchment and Land Protection Act 1994* (CALP Act) is the principle legislation relating to the management of pest plants and animals in Victoria. Under this Act, landowners have a responsibility to avoid causing or contributing to land degradation, including taking all reasonable steps to conserve soil, protect water resources, eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds and where possible, eradicate established pest animals, as declared under the Act.

This site contains a number of pest plants and animals listed under the CALP Act. The Victorian government may impose further conditions on the development through the CALP Act.

### 1.3.4 *Planning and Environment Act 1987*

The *Planning and Environment Act 1987* is the primary legislation that provides the foundation of the planning schemes in Victoria.

The Whittlesea Planning Scheme (Clause 52.17), pursuant to the P&E Act, requires a permit to remove, destroy or lop native vegetation on a landholding of more than 0.4 hectares, unless certain exemptions apply.

DSE is a mandatory referral authority for any vegetation clearance involving:

- Removal of more than 15 trees with a diameter less than 40 cm at 1.3 metres above ground;
- Removal of more than five trees with a diameter more than 40 cm at 1.3 metres above ground;
- Removal of more than 0.5 hectare of vegetation in an Ecological Vegetation Class with Bioregional Conservation Status of Endangered, Vulnerable or Rare;

- Removal of more than one hectare of vegetation in an Ecological Vegetation Class with Bioregional Conservation Status of Depleted or Least Concern;
- Any vegetation clearance on Crown Land or where a property vegetation plan applies to the site; or
- Any vegetation clearance where a Vegetation Protection Overlay applies to the site.

*Clause 22.10: River Red Gum Protection Policy* under the Whittlesea Planning Scheme applies to the protection of River Red Gums located in urban and rural areas. The Policy states that (amongst others):

- Any planning proposal for development on land which contains one or more remnant River Red Gums should be accompanied by a comprehensive site analysis and arborists report;
- Generally the majority of River Red Gums proposed for retention should be sited in public open space reserves and/or road reserves;
- Where a tree is to be located in a lot, the lot should be large enough to accommodate a suitable development envelope that does not disturb the tree or its root system;
- Generally only those trees independently assessed as presenting a danger to people and property should be removed;
- Trees identified for retention should be appropriately protected during the construction phase, and thereafter their health regularly monitored by an appropriate environmental consultant where located on public land;
- Any tree nominated on a development and/or subdivision plan for protection should be located within an appropriate tree protection zone. The protection zone must be large enough to ensure that the trunk and canopy remain intact and that the root system is not severely damaged or destroyed during the construction phase; and
- Any planning permit for subdivision which contains a protected tree on a lot should include a requirement that the protected tree, protection envelope, development envelope and any conditions relating thereto be nominated on the relevant title.

As the proposed development of the site will involve the removal of native vegetation, a permit for the removal of vegetation at the site will be required under *Clause 52.17* of the Whittlesea Planning Scheme.

Under the P&E Act, Beveridge Pastoral Company will be required to apply for a planning permit from Whittlesea City Council. Any planning permission granted is likely to include a series of conditions which are developed in collaboration with the State government and a series of referral bodies.

The site contains two River Red Gums. The Whittlesea City Council may impose further conditions on the development through the River Red Gum Protection Policy (*Clause 22.10*), as detailed above.

*Clause 81.01* outlines the incorporated documents for the planning scheme. This includes the Native Vegetation Act as discussed below:

### **1.3.5 *Victoria's Native Vegetation Management - A Framework for Action***

*Victoria's Native Vegetation Management - A Framework for Action* ("the Framework") was incorporated into the Victorian Planning Provisions in 2003. Under the Framework, the key goal for native vegetation in Victoria is for "a reversal across the entire landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain" (DNRE 2002a).

In terms of proposed native vegetation clearance, a three-step approach must be taken in order to apply the principles of Net Gain. This involves:

- Firstly avoiding adverse impacts, particularly by avoiding vegetation clearance;
- Secondly, where these impacts cannot be avoided, exploring appropriate options to minimise those impacts; and
- Thirdly, identifying appropriate offset options in response to clearing (DNRE 2002a).

The Framework has had a major impact on the planning and development process within Victoria. Net Gain and Habitat Hectare assessments will be need to be undertaken as part of the application process.

### **1.3.6 *Department of Sustainability and Environment Advisory List of Threatened Species***

The Department of Sustainability and Environment is the author of the *Advisory List of Threatened Vertebrate Fauna in Victoria - 2003* (DSE 2003) and the *Advisory List of Rare or Threatened Plants in Victoria - 2005* (DSE 2005a). These lists provide a "significance rating" for individual species within Victoria. The purpose of these lists is to assist regulators make decisions

regarding planning processes (DSE 2003). Species on these lists may be referred to as “Victorian Rare or Threatened Species” (VROT) or of “State significance”.

A number of flora and fauna species on the Advisory Lists are recorded on the site. The source of these records is currently being determined. There are no legal requirements or consequences that flow from inclusion of a species in this advisory list. However, DSE has concern for State threatened species and will expect greater detail in assessment and mitigation measures to protect these species and their potential habitat.

### 1.3.7 *Biosites Register*

Sites of Biological Significance are called ‘BioSites’. BioSites, and their register, have been developed by DSE to categorise significance of flora and fauna (or their habitats) at a *landscape scale*. As with other policies, the purpose of the BioSites Register is to assist regulators make planning decisions, particularly within a broad area such as a municipality or region.

DSE have four categories of significance, these are:

- ***International or National Significance***– if the particular occurrence of an asset substantially contributes to the presence/conservation of that attribute in Australia;
- ***State Significance*** – if the particular occurrence of an attribute substantially contributes to the presence/conservation of that attribute in Victoria;
- ***Regionally Significant*** – if the particular occurrence of that attribute substantially contributes to the presence/conservation of the attribute in the Phillip and Westernport area.; and
- ***Locally Significant*** – all remnant stands of native vegetation within a fragmented landscape (DSE 2005b).

Two Biosites are registered in the local area and encroach on the Beveridge Road site. The nationally significant BioSite 4854: Hernes Swamp is located in the north-west corner of the site. BioSite 5130: Beveridge Rail Reserve - Camoola Swamp is located along the western site boundary and has state significance. There is no legislative obligation to conserve BioSites. However, the impacts of the proposed development on the site are more likely to be assessed in detail by regulatory bodies such as DSE if a BioSite is present. The presence of a BioSite also increases the probability that threatened species will be recorded within this area.

### 1.3.8 *State Environment Protection Policy (Waters of Victoria) (SEPP (WoV) (2003)*

The overarching legislative requirement for water quality in Victoria is the State Environment Protection Policy (Waters of Victoria) (SEPP (WoV) (SEPP,

2003). The goals of the SEPP are to protect the beneficial uses of Victoria's waterways. The SEPP (WoV) provide the indicators and water quality objectives relevant for waterways covered by surface water segments within the SEPP.

The SEPP (WoV) relates to the protection of surface waters in Merri Creek, maintenance of fish passage and protection of in-stream habitat. The main impact of this policy will be at the construction phase where the potential for impacts on surface water quality of Merri Creek could occur. Accordingly, mitigation measures may be required.

#### 1.4

#### STUDY AREA

The proposed development site is located approximately 42 kilometres north of Melbourne at Beveridge Road, Beveridge and is bound by a railway line to the west, Beveridge Road to the south, the Meriang Highway to the east and Hadfield Road to the north. The property is approximately 895 hectares in area (*Annex A*).

The site has been used for livestock grazing and cropping for an extended period of time, and continues to be used for these purposes. Livestock graze the majority of the paddocks on the site. Super phosphates are generally added to grazed paddocks (Jack Dowell, Site Manager, *pers. comm.* November 2007). The widespread occurrence of rocky knolls has restricted the area where cropping can occur at the site. A dwelling and associated outbuildings are located in the centre of the site. The dwelling is currently occupied.

Merri Creek flows from the north boundary, through the approximate centre of the site, to the south-eastern corner of the property. Merri Creek was not currently flowing at the time of the assessment, although it is likely to flow during periods of higher rainfall (Jack Dowell, Site Manager, *pers. comm.* November 2007). The creek contains a number of remnant pools of varying depths. The riparian vegetation was strongly exotic, however in-stream vegetation was comprised of both emergent and submerged indigenous vegetation. River Red Gums and woody shrubs provide snags and debris in the channel. Ten small dams were also located across the site (*Annex A*). At the time of the assessment the dams contained little water and the banks were heavily pugged by cattle.



The site contains approximately 104 rocky knolls. Almost all rocky knolls are located in the western and southern sections of the site. Rocky knolls are generally found on elevated sections of the undulating site, rising up to 5 metres above the pasture. The knolls are topped by basalt surface rock.

The site and land to the south are designated under the Whittlesea Planning Scheme (DPCD 2007) as Green Wedge Zone (GWZ) and the land to the east as Green Wedge A Zone (GWAZ). The land to the north and west of the property are designated under the Mitchell Shire Planning Scheme as Farming Zone (FZ). The Merri Creek and land approximately 100 metres either side of the creek is subject to an Environmental Significance Overlay 3 (ESO3): Merri Creek and Environs under the Whittlesea Planning Scheme. A Rural Floodway Overlay (RFO) also covers Merri Creek and the adjacent land. The site is located within the Victorian Volcanic Plains Bioregion of Victoria (DSE 2007a).

## 2.1

## REVIEW OF EXISTING INFORMATION

A review of available literature and information from relevant databases was undertaken to supplement data gathered in the field. ERM has been involved in assessments on other properties near the site. Whilst these reports are confidential and therefore not referenced, this information was used to assist our understanding of the ecological attributes of the site within the context of the wider landscape.

The primary purpose of this literature review was to identify significant<sup>2</sup> species potentially occurring within the study area either permanently or on a seasonal basis.

Information regarding threatened species and other environmentally significant resources within the area was obtained from the following sources:

- Department of Environment and Water (DEW) *Protected Matters Search Tool* [Online] (search area: study site plus five kilometre buffer);
- Department of Sustainability and Environment (DSE) – *Atlas of Victorian Wildlife* (search area: study site plus five kilometre buffer);
- DSE - *Flora Information System* (search area: study site plus five kilometre buffer);
- DSE – Ecological Vegetation Class (EVC) mapping (DSE 2007a; DSE 2003); and
- Site Manager, Jack Dowell, personal communication, October - December 2007.

Information regarding the likely occurrence of specific EVCs within the site was inferred from EVC mapping provided by DSE (DSE 2007a). Benchmarks for EVCs likely to occur on the site were used to confirm their presence in the field and to help determine the conservation significance of the site in accordance with the Framework (DNRE 2002a).

An aerial photograph was reviewed to investigate the nature and extent of plant communities within and surrounding the site, and to gain an understanding of the context of the site in relation to surrounding environments.

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<sup>2</sup>Significant species refers to flora and fauna listed under the *EPBC Act 1999*, *FFG Act 1988* or DSE Advisory lists of Rare or Threatened Species (DSE 2003, 2005b).

The likelihood of the presence of rare or threatened species has been determined after comparing DSE and EPBC database records and assessing the quality and quantity of vegetation present during the site assessment. A six day field assessment of the study site was carried out by two ERM ecologists on 25 - 26 October 2007, 2 November 2007, 27 - 29 November 2007 and 6 December 2007.

The site was traversed by vehicle and on foot to confirm and map the extent and quality of patches of remnant vegetation, rocky knolls and scattered trees. These biological features were recorded to determine precisely which features need to be included in a Net Gain assessment. These were marked with a Global Positioning System (GPS) where possible. The location and Diameter at Breast Height (DBH) of scattered indigenous trees was also recorded during the survey<sup>3</sup>.

Incidental records of flora were recorded throughout the assessment. Where plant species could not be identified in the field, specimens were collected and sent to the Royal Botanic Gardens Sydney for identification.

During the survey particular attention was paid to areas that were likely to support a diversity of native vegetation and habitat types. The assessment also included investigation of biological features and links that occur with other features at the site (such as the Rail Reserve, farm dams and Merri Creek).

Two major habitat types containing indigenous vegetation were identified within the site during the assessment: native grassland and rocky knolls. Each was assessed separately in accordance with the methods described below. It is anticipated that this assessment will provide the Beveridge Pastoral Company (and potentially regulators) with a clear understanding of the extent of native vegetation and potential flora and fauna habitats.

#### *Remnant Vegetation Assessment*

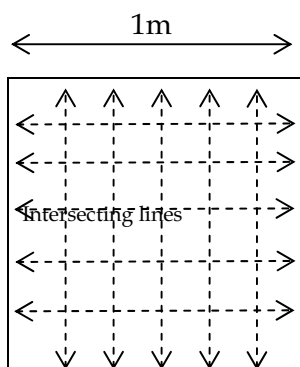
Patches of vegetation characteristic of listed EVCs were studied in further detail to determine the quality of indigenous vegetation on site in accordance with Victoria's *Native Vegetation Management Framework* (DNRE 2002a; Parkes *et al.* 2003). Determining cover abundance of areas of native grassland over the entire site was difficult given the size of the site (and the inherently subjective nature of estimating cover over a large area). Accordingly, a more objective measure of the projected foliage cover was undertaken.

A "cover by point intercept" assessment was undertaken in areas where cover abundance of indigenous vegetation was difficult to discern. A 1 metre x 1

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<sup>3</sup>A scattered tree assessment is required in accordance with the Framework, when a site contains indigenous trees over a predominantly non-indigenous understorey (less than 25% indigenous understorey vegetation cover).

metre quadrat was randomly thrown in areas of remnant vegetation. Each quadrat contained 25 intersecting points, as shown in the diagram below (Figure 1).



**Figure 1:** *Diagram showing intercept points of quadrat*

The plant species under each intersecting point was recorded. After analysis of this data, cover abundance was assigned to each species and a native/exotic category to provide more refined cover abundance within the sampled area. Areas of vegetation where at least 25% of the understorey cover was indigenous were mapped accordingly.

#### *Rocky Knoll Assessment*

The site contains a number of rocky knolls with a varying cover of indigenous vegetation. The percentage cover of rock, bare ground and vegetation was estimated for each rocky knoll. The proportion of indigenous/exotic vegetation within areas of vegetation (i.e. not rock or bare ground) was also estimated. The cover of bryophytes and lichens was also estimated within areas of rock within each knoll.

In order to determine which rocky knolls would require a Net Gain assessment in the future, the rocky knolls were classified and mapped in three categories based on the percentage cover of indigenous species, namely:

**Category A** - rocky knolls with  $\geq 25\%$ <sup>4</sup> cover of indigenous plants (excluding bryophytes and lichens); these rocky knolls will require a detailed Net Gain assessment to determine any offset for removal;

**Category B** - rocky knolls with  $\geq 25\%$  cover of indigenous plants (including bryophytes and lichens); and

**Category C** - rocky knolls with less than 25% cover of indigenous plants (including bryophytes and lichens).

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<sup>4</sup>Note that 25% cover was nominated as an appropriate cut-off point as it is consistent with DSE's definition of a remnant patch (namely an area of vegetation where at least 25% of the understorey cover is native (DSE 2007)).

## *Fauna*

The study area was actively searched for fauna. Incidental records of birds, reptiles and amphibians, and the presence of identifiable tracks and traces of fauna were recorded. Possible nest sites, roosting sites and other breeding habitat were also investigated. No targeted fauna trapping, spotlighting or call playback was carried out as part of this field assessment.

### 2.3

#### *SPECIAL CONSIDERATIONS/LIMITATIONS*

As with most biological assessments, the presence or absence of particular species of flora over time cannot be definitively determined by a single site assessment. However, Spring is considered to be the optimal time of year to gain a comprehensive understanding of the flora species likely to occur within most vegetation types.

The report is limited to those fauna species that can be identified at the time of the survey. It does not provide an exhaustive list of the wildlife on the site, particularly those that may be nocturnal, or use the site on a seasonal or opportunistic basis.

The field methodology outlined in this report aims to target the habitat of significant species likely to occur in the area. A judgement is then made about the presence of those significant species on the subject site based on the available literature, the assessor's knowledge and the relative quality and abundance of the habitat present. This is only a preliminary assessment of the fauna are likely to occur on the site. Additional targeted fauna surveys are recommended to confirm presence or absence of each threatened fauna species, in areas of suitable habitat.

### 3.1 FLORA

#### 3.1.1 Flora Species

##### Threatened Species (FIS and EPBC)

*Annex B* contains the results of the EPBC Protected Matter Search (30 October 2007) for threatened flora species previously recorded or likely to occur within the vicinity of the site. *Annex C* provides a consolidated list of nationally and state threatened flora species previously recorded or likely to occur within the vicinity of the site (Flora Information System, 2007; EPBC Protected Matter Search 2007), and the habitat requirements of each species. The conservation status of each species is also included.

Nine species of nationally threatened plants were recorded as potentially present within five kilometres of the study site. Similarly, 13 species listed as threatened under the Victorian *FFG Act* and seven species listed on the *Advisory List of Rare or Threatened Plants in Victoria* (DSE 2005) have previously been recorded from within a five kilometre radius centred on the site.

The reason for inclusion of this extended area in the assessment is to take into consideration the diversity of habitats at a landscape scale and the fact that fauna move between these habitats via wildlife corridors (such as areas of linear vegetation such as roadside vegetation, creek lines etc) and seed dispersal (via water (such as Merri Creek), birds and other fauna). These databases can only record sightings for one location at one moment in time, even though their presence is likely to have since altered. Consideration of the flora and fauna in the surrounding landscape is standard best practice for determining likelihood of the presence of different species within the assessment site and assists in determining the requirement for targeted surveys.

None of the species listed as occurring within a 5km radius were observed within the study site during the current field investigation. However, five threatened plant species have previously been recorded on the site, namely Swamp Everlasting (*Xerochrysum palustre*), Wetland Blown-grass (*Lachnagrostis filiformis* var. 2), Small Scurf-pea (*Cullen parvum*), Pale Swamp Everlasting (*Helichrysum* aff. *rutidolepis* (Lowland Swamps) and Swamp Fireweed (*Senecio psilocarpus*). Based on the database information the status of these species at the site are :

**Swamp everlasting:** Recorded within the western section of the site in 1990(Flora Information System, 2007). Swamp everlasting is considered

Vulnerable<sup>5</sup> at both National and State level and FFG listed (Flora Information System, 2007)(Annex C).

**Wetland Blown-grass:** Recorded within the western section of the site in 1990 (Flora Information System, 2007). Species considered Poorly Known<sup>6</sup> within Victoria (Flora Information System, 2007)(Annex C).

**Small Scurf-pea:** Recorded within the western section of the site in 2000. Small Scurf-pea is considered Endangered<sup>7</sup> at a National level, and State level and is FFG listed (Flora Information System, 2007)(Annex C).

**Pale Swamp Everlasting:** The species was recorded within the western section of the site in 2000. This species is considered Vulnerable within Victoria (Flora Information System, 2007)(Annex C).

**Swamp Fireweed:** The species was recorded within the western section of the site in 2000. This species is considered Vulnerable at a national level and state level (Flora Information System, 2007)(Annex C).

### Species Recorded During Assessment

#### *Native Plant Species*

A total of 19 indigenous vascular plant species was recorded within the study site (Annex D).

Patches of native grasses such as Short Wallaby-grass (*Austrodanthonia carphoides* var. *carphoides*), Lobed Wallaby-grass (*A. auriculata*), Velvet Wallaby-grass (*A. pilosa*), Striped Wallaby-grass (*A. racemosa*), Shiny Wallaby-grass (*A. induta*), Kangaroo Grass (*Themeda triandra*), Weeping Grass (*Microlaena stipoides*), Common Wheat-grass (*Elymus scabrus*) and Spear-grass (*Austrostipa* sp.) were present throughout the site, generally in association with more elevated parts of the site (such as areas adjacent to rocky knolls). Lower-lying areas within the site contained patches of Tussock Grass (*Poa labillardieri*) and Rush (*Juncus* sp.).

Nine isolated indigenous trees, namely two River Red Gums (*Eucalyptus camaldulensis*) and seven Swamp Gums (*E. ovata*) are located on the site (Annex A).

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<sup>5</sup> *Vulnerable:* not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.

<sup>6</sup> *Poorly Known:* poorly known and suspected, but not definitely known, to belong to another Conservation Status within Victoria. At present, accurate distribution information is inadequate.

<sup>7</sup> *Endangered:* at risk of disappearing from the wild state if present land use and other causal factors continue to operate.

### *Rocky knolls*

Rock knolls at the site contained a mixture of native grasses and herbaceous species such as Pink Bindweed (*Convolvulus erubescens*), Wattle Mat-rush (*Lomandra filiformis*), Tall Bluebell (*Wahlenbergia stricta*) and Bidgee-widgee (*Acaena novae-zelandiae*). Several rocky knolls contained Hedge Wattle (*Acacia paradoxa*). All rocky knolls contained a high cover of lichen and mosses (on rock surfaces).

*Category A* rocky knolls contained indigenous cover greater than or equal to 25% foliage projective cover of indigenous grasses and herbs. *Category B* rocky knolls were generally dominated by exotic species such as Variegated Thistle (*Silybum marianum*) and Ribwort (*Plantago lanceolata*), with less than 25% indigenous cover. *Category C* rocky knolls had no indigenous vegetation cover except for mosses and lichens on basalt surfaces.

The conservation status of each rocky knoll was not considered at this stage of the assessment.

### *Introduced Plant Species*

A total of 38 weed species were recorded at the site (*Annex E*), generally within lower lying parts of the site. Dominant species included a mixture of exotic and pasture grass species such as Chilean Needle-grass (*Nasella neesiana*), Perennial Rye-grass (*Lolium perenne*), Annual Veldt Grass (*Ehrharta longiflora*), Soft Brome (*Bromus hordeaceus*), Ribwort (*Plantago lanceolata*), Yorkshire Fog (*Holcus lanatus*), Prairie Grass (*B. catharticus*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Sterile Brome (*B. sterilis*) and Wild Oat (*Avena fatua*).

Dominant herbaceous species were located amongst the pasture grass as well as on the *Category B* and *C* rocky knolls. These species included Paterson's Curse (*Echium plantagineum*), Cape Weed (*Arctotheca calendula*), Variegated Thistle (*Silybum marianum*) and Cat's Ear (*Hypochoeris radicata*).

Infestations of woody species such as Sweet Briar (*Rosa rubiginosa*) and Gorse (*Ulex europaeus*) were also recorded across the site, particularly adjacent to Merri Creek.

Planted exotic trees including Monterey Cypress (*Cupressus macrocarpa*) and Radiata Pine (*Pinus radiata*) occur adjacent to farm buildings.

Nine of the species recorded within the study site are proclaimed noxious weeds in Victoria under the CALP Act 1994 (*Table 3.1*).



**Table 3.1** *Noxious Weeds Observed at Beveridge Road, Beveridge (November - December 2007).*

Common Name	Species Name	CALP (1994) Classification <sup>1</sup>
African Boxthorn	<i>Lycium ferocissimum</i>	Regionally Controlled
Blackberry	<i>Rubus fruticosus</i> spp. agg.	Regionally Controlled
Chilean Needle-grass	<i>Nassella neesiana</i>	Restricted Weed
Gorse	<i>Ulex europaeus</i>	Regionally Controlled
Horehound	<i>Marrubium vulgare</i>	Regionally Prohibited
Paterson's Curse	<i>Echium plantagineum</i>	Regionally Controlled
Spear Thistle	<i>Cirsium vulgare</i>	Regionally Controlled
Sweet Briar	<i>Rosa rubiginosa</i>	Regionally Controlled
Variegated Thistle	<i>Silybum marianum</i>	Regionally Controlled
1. Faithfull (2006). Lists weed species that have been proclaimed under CALP Act.		

### 3.1.2 *Ecological Vegetation Classes*

The study site falls within the Victorian Volcanic Plain bioregion of Victoria. A review of the Ecological Vegetation Class (EVC) maps of the area confirmed that the historic vegetation at the site consisted of three EVC's, all of which are now considered to be Endangered within the Bioregion:

- EVC 132: Plains Grassland (southern section of site);
- EVC 56: Floodplain Riparian Woodland (adjacent to Merri Creek);  
and
- EVC 126: Swampy Riparian Complex (remainder of site).

The current EVC maps indicate there are no clearly defined patches of native vegetation (EVCs) within the site. However, the field investigation revealed that the site contains modified examples of two EVC's, EVC 132\_62: *Lighter Soils* Plains Grassland and EVC 649: Stony Knoll Shrubland<sup>8</sup>. Both EVCs are considered 'Endangered' within the Victorian Volcanic Plains bioregion. These EVCs are described in more detail in Annex F.

#### **Habitat Zones**

The majority of the site contains modified grassland considered representative of EVC 132\_62: *Lighter Soils* Plains Grassland (approximately 380 hectares (or 42%), although the quality and density of areas of grassland varies.

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<sup>8</sup>It should be noted that EVC mapping is at a scale of 1:100,000. Accordingly, smaller areas of vegetation may not appear in the EVC mapping.

The point quadrat method was used to determine which areas of grassland within the site were considered remnant vegetation<sup>9</sup>. This area, referred to as 'Remnant Patch 1' (RP1), is generally located in the western section of the site (Annex A).

### Scattered Trees

A scattered tree assessment is required in accordance with the Framework when a site contains indigenous trees over a predominantly non-indigenous understorey (less than 25% indigenous understorey vegetation cover).

Nine scattered indigenous tree, seven Swamp Gums (*Tree 1, Trees 4 - 9*) and two River Red Gums (*Tree 2 and 3*), were recorded within the study site (Annex A). *Trees 1 to 9* are classified as a Scattered Tree Zone<sup>10</sup> (STZ1) (DNRE 2002a).

The EVC map of the site indicates that scattered indigenous trees 4 to 8 are remnants of the historic EVC 56: Floodplain Riparian Woodland, and trees 1, 2, 3 and 9 are remnants of the historic EVC 126: Swampy Riparian Complex. The benchmark<sup>11</sup> Diameter at Breast Height for overstorey trees within the historic EVCs is 80 centimetres and 70 centimetres respectively.

The species type, Diameter at Breast Height (DBH) and size of each tree is shown below (Table 3.2). This data is required to calculate offsets for scattered trees in the recommended detailed Net Gain Assessment.

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<sup>9</sup>A remnant patch of vegetation is defined as "An area of vegetation, with or without trees, where less than 75% of the total understorey plant cover is weeds or non-native plants (bare ground is not included). That is, at least 25% of the understorey cover is native"; or "An area of treed vegetation where the density of the trees is such that tree canopy cover is at least at benchmark canopy cover" (DSE 2006a).

<sup>10</sup>A Scattered Tree Zone (STZ) is defined as an area where tree densities are not greatly reduced from benchmark densities, but the indigenous understorey is less than 25% of the total cover specified for the EVC benchmark.

<sup>11</sup>An EVC benchmark is standard vegetation-quality reference point relevant to the vegetation type that is applied in assessments. EVC benchmarks represent the average characteristics of a mature and apparently long-undisturbed state of the same vegetation type.

**Table 3.2** *Diameter at Breast Height (DBH) and Size of Indigenous Trees within Study Site, Beveridge Road, Beveridge (November - December 2007).*

Tree Number	Common Name	DBH (cm) <sup>1</sup>	Size <sup>2</sup>
1	Swamp Gum	95	Large
2	River Red Gum	115	Large
3	River Red Gum	100	Large
4	Swamp Gum	207	Very Large
5	Swamp Gum	66	Medium
6	Swamp Gum	165	Very Large
7	Swamp Gum	14	Small
8	Swamp Gum	102	Large
9	Swamp Gum	81	Large
<sup>1</sup> Benchmark DBH - 70 cm for Swamp Gum and 80 cm for River Red Gum. <sup>2</sup> Very Large Old Trees = $\leq 1.5$ times the trunk diameter of a large old tree as defined by the relevant EVC benchmark. Large Old Trees = $\leq 1.0$ to $< 1.5$ times the trunk diameter of a large old tree as defined by the relevant EVC benchmark. Medium Old Trees = $\leq 0.75$ to $< 1.0$ times the trunk diameter of a large old tree as defined by the relevant EVC benchmark. Small Old Trees = $< 0.75$ times the trunk diameter of a large old tree as defined by the relevant EVC benchmark.			

## 3.2 FAUNA

### 3.2.1 Fauna species

#### Threatened Species (Atlas of Victorian Fauna/ EPBC)

*Annex B* contains the results of the EPBC Protected Matter Search (30 October 2007) for threatened fauna species previously recorded or likely to occur within the vicinity of the site. *Annex D* provides a consolidated list of nationally and state threatened fauna species previously recorded or likely to occur within the vicinity of the site (Atlas of Victorian Fauna 2007; EPBC Protected Matter Search 2007), and the habitat requirements of each species. The conservation status of each species is also included.

Twenty two species of nationally threatened fauna could potentially be present within five kilometres of the study site. In addition, 18 fauna species listed as threatened under the Victorian *FFG Act* have previously been recorded from within a five kilometre radius centred on the study site. Interrogation of the Atlas of Victorian Wildlife revealed that a further 27 species of fauna threatened in Victoria have previously been recorded within the same radius (Atlas of Victorian Fauna 2007). None of the species listed in *Annex D* were recorded during the field assessment.

Merri Creek may provide a suitable environment for some waterbirds listed as migratory under the EPBC Act. However, the habitat present within the creek is degraded; few large trees remain and riparian habitat is dominated by exotic species. The general study area provides some feeding habitat

however, is not considered an important breeding site for any of the threatened migratory species (*Annex D*).

Three threatened fauna species recorded as potentially present within five kilometres of the study site, namely Striped Legless Lizard (*Delmar impar*), Growling Grass Frog (*Litoria raniformis*) and Golden Sun Moth (*Synemon plana*), are considered likely to occur within or adjacent to the study site. Two threatened fauna species, namely Brown Toadlet (*Pseudophryne bibronii*) and Fat-tailed Dunnart (*Sminthopsis crassicaudata*), have previously been recorded on the site. Each species is discussed in more detail below:

**Striped Legless Lizard:** Recorded approximately 500 metres from the western boundary of the site. The species is considered nationally Vulnerable<sup>12</sup>, Endangered within Victoria<sup>13</sup> and is FFG listed (*Annex D*).

**Growling Grass Frog:** Not recorded on site, however moderate likelihood of population in Merri Creek due to potential presence of suitable habitat (*Annex B*). The species is considered nationally Vulnerable, Endangered within Victoria and is FFG listed (*Annex D*).

**Golden Sun Moth:** Not recorded on site, however moderate likelihood of population in Remnant Patch 1 (*Annex A*) due to potential presence of suitable habitat (*Annex B*). The species is considered Critically Endangered at a national level<sup>14</sup>, Endangered within Victoria and is FFG listed.

**Fat-tailed Dunnart :** Recorded within the western section of the Site in 1991. (*Atlas of Victorian Fauna, 2007*). The species is considered Near Threatened<sup>15</sup> within Victoria.

**Brown Toadlet:** Recorded within the western section of the site in 1991 (*Atlas of Victoria Fauna, 2007*). The species is considered Endangered within Victoria.

### Species Recorded During Assessment

A total of 36 fauna species were recorded at the site (*Annex E*). The majority of fauna recorded within the study site consisted of common native bird species, including Australian Magpie (*Gymnorhina tibicen*), Magpie-lark (*Grallina*

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<sup>12</sup> *nationally Vulnerable:* not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.

<sup>13</sup> *Endangered within Victoria:* considered to be facing a very high risk of extinction in the wild.

<sup>14</sup> *nationally Critically Endangered:* facing an extremely high risk of extinction in the wild in the immediate future.

<sup>15</sup> *Near Threatened:* does not currently qualify for Critically Endangered, Endangered or Vulnerable when assessed against the criteria, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

*cyanoleuca*), Galah (*Cacatua roseicapilla*), Black-faced Cuckoo-shrike (*Coracina novaehollandiae*), Nankeen Kestrel (*Falco cenchroides*), Long-billed Corella (*C. tenuirostris*), Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*), Red Wattlebird (*Anthochaera carunculata*), White-fronted Chat (*Epthianura albifrons*) and Sulphur-crested Cockatoo (*C. galerita*). Native waterbird species recorded in association with farm dams and Merri Creek included Australian Shelduck (*Tadorna tadornoides*), Australian Wood Duck (*Chenonetta jubata*), White-faced Heron (*Egretta novaehollandiae*) and Masked Lapwing (*Vanellus miles*).

Four frog species, Common Froglet (*Crinia signifera*), Eastern Banjo Frog (*Limnodynastes dumerilii*), Peron's Tree Frog (*Litoria peronii*) and Striped Marsh Frog (*L. peronii*) were heard calling from Merri Creek. Several large mobs of Eastern Grey Kangaroo (*Macropus giganteus*) were observed within the site. One native reptile, White's Skink (*Egernia whitii*) was recorded on rocky knolls at the site.

Introduced bird species observed at the site included Common Blackbird (*Turdus merula*), Common Starling (*Sturnus vulgaris*), European Goldfinch (*Carduelis carduelis*), Spotted Turtle-Dove (*Streptopelia chinensis*), Skylark (*Aluada arvensis*) and House Sparrow (*Passer domesticus*). Introduced mammals such as European Rabbit (*Oryctolagus cuniculus*), Brown Hare (*Lepus capensis*) and Red Fox (*Canis vulpes*) were also observed at the site.

### **Habitat Value**

Habitat features were limited in areas of the study site that have been highly modified by clearing and invasion of exotic species. Five main areas were identified that may provide habitat opportunities for flora and fauna at the site.

#### *Open Grassland Areas*

Open grassland areas (areas where weeds dominated the understorey vegetation) were limited in the diversity of fauna habitats they provide and were considered largely unsuitable for occupation by native ground dwelling mammals. However, these areas may provide foraging opportunities for ground foraging species including meadow birds such as the Australian Magpie. Aerial birds that hunt ground-dwelling prey would also forage over open grassland areas. Large tracts of the southern and western sections of the site contained good quality indigenous grassland, and there are large areas of mature grasslands that would provide habitat for insects, small reptiles and small exotic mammals. These small fauna are an essential food resource to meadow birds and birds of prey.

#### *Native Grassland*

The areas on the site that contain native tussock grasses may provide habitat for small native fauna, reptiles, frogs and invertebrates. Grassland-dwelling birds may also use the site.

Modified areas of grassland may provide dispersal linkages within the site to areas of higher quality grassland.

#### *Rocky Knolls*

A specific feature of the higher quality areas of grassland within the site is probably due to the presence of embedded and surface basalt rock which has precluded cultivation of these areas.

Rocky knolls may provide shelter and basking sites for a range of reptiles and habitat for native herpetofauna, particularly frogs, skinks and snakes and small ground mammals. The rocky knolls on this site are likely to provide such habitat, as lizards were observed on rocky knolls during current field visits.

#### *Mature Scattered Trees*

The site contains three isolated mature indigenous Eucalypts. Indigenous tree 1 is ecologically part of the Rail reserve corridor. Trees 2 and 3 provide the only link on site between the Rail reserve and the Merri Creek corridor. Trees 4 to 9 provide linkages in the Merri Creek corridor. These scattered indigenous trees act as 'stepping stones' to larger, more intact areas of vegetation, and may provide roosting and resting sites for mobile species (such as birds) moving across the site to areas containing more appropriate foraging and nesting resources. No hollows were observed, and therefore these trees do not contain suitable habitat for hollow-dwelling species such as bats, some birds and small arboreal mammals.

#### *Aquatic Habitat*

Remnant pools currently present in the Merri Creek may provide habitat for native fish and frogs that may use the site as refuge during times of low flow or drought. However, no assessments were made of the fauna of the creek, therefore the presence of fish or frogs can not be confirmed at this time. The presence of snags and in-stream vegetation suggests that the creek has potential habitat for instream fauna.

A number of water birds would also be expected to periodically or seasonally use the creek as habitat and as a food source, given the likelihood of the presence of fish, frogs and macroinvertebrates.

#### *Other*

Areas of the site have been highly modified by the invasion of exotic species. Flora and fauna habitat is limited in these areas. However, exotic trees and shrubs on the site probably provide some, albeit low quality, habitat for small bird and mammal species. For example, small insectivorous bird species such as Superb Fairy-wren (*Malurus cyaneus*) may use dense shrubby species such as Gorse for shelter and foraging.

#### 4.1 HABITAT ZONES

The conservation significance of remnant vegetation is determined by considering the following factors:

- The Habitat Score produced from a Habitat Hectare Assessment;
- The bioregional conservation status of the vegetation type (EVC);
- The presence of any rare or threatened species on the site, or the extent to which the vegetation present provides suitable and appropriate habitat for particular rare or threatened species within, or in close proximity to the site; and
- The presence on or near the site of 'other attributes' (DNRE 2002a)<sup>16</sup>.

In accordance with the criteria set out in the Framework, the "minimum" conservation significance of an area of remnant vegetation representative of EVC 132\_62: *Lighter Soils Plains Grassland* (Endangered) is High<sup>17</sup> (this significance level is given because the site generally contains areas of poor quality remnant vegetation). The conservation significance would be Very High if the site contained areas of higher quality grassland (determined by a Habitat Hectare Assessment) or given the presence of threatened species and nearby sites of biological significance.

Accordingly, the conservation significance of vegetation within *Remnant Patch 1* varies from High to Very High. The proportion of High and Very High conservation significance vegetation will need to be determined as part of the recommended detailed Habitat Hectare Assessment.

#### 4.2 SCATTERED TREES

Scattered trees are assigned the lowest conservation significance category appropriate to the conservation status of the EVC to which they originally belonged (in this case, EVC 175: *Grassy Woodland* and EVC 55: *Plains Grassy Woodland*, both considered Endangered), unless there are threatened species or other attributes that increase their rating (DSE 2006a). Accordingly, the conservation significance of *Trees 1* to *9* is High. The offsets required for the removal of any of the nine indigenous trees on site will need to be incorporated in the recommended detailed Net Gain assessment.

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<sup>16</sup>This includes Ramsar sites (wetlands of international importance), sites with National Estate values, other significant wetlands or areas identified as providing refuge for significant species  
<sup>17</sup>The significance rating is based on a scale of Very High, High, Medium and Low (DNRE 2002a).

The “overall” conservation significance of the site is determined by considering the bioregional conservation status of any EVCs present on the site and several other biodiversity attributes such as the presence of threatened species and nearby sites of biological significance. The significance of the site is based on the results of the desktop assessment, the experience of the assessors (ERM) and the extent and condition of native vegetation and specific habitat features present on the site and in the locality (Table 4.1).

The site contains two BioSites<sup>18</sup>: BioSite 4854: Hernes Swamp, located in the north-west corner of the site, and BioSite 5130: Beveridge Rail Reserve - Camoola Swamp, located along the western site boundary.

BioSite 4854: Hernes Swamp is approximately 300 hectares in area. Approximately 75 hectares of the BioSite is located within the site. Hernes Swamp is drained and carries little water.

Threatened flora species observed within the BioSite include Swamp Fireweed (*Senecio psilocarpus*), Swamp Everlasting (*Xerochrysum palustre*), Swamp Billy-buttons (*Craspedia paludicola*), and Pale Swamp Everlasting (*Helichrysum aff. rutidolepis* (Lowland Swamps)). Threatened fauna species observed within the BioSite include Striped Legless Lizard (amongst Kangaroo Grass grassland in 1991), Black Falcon (*Falco subniger*) (sighted hunting over the Swamp in 1990), and Brown Quail (*Coturnix ypsilophora*) (found on mudflats along a drainage channel to the west of the railway at the north end of the Swamp).

BioSite 5130: Beveridge Rail Reserve - Camoola Swamp is approximately 200 hectares in area. Approximately 120 hectares of BioSite 4854 is located within the site. Beveridge Rail Reserve - Camoola Swamp includes grassland along the railway line from Beveridge railway station to Hernes Swamp and areas of stony rises and swampland to the east of Camoola. This BioSite contains the last relatively extensive and intact area of native grassland remaining along the north-eastern (Melbourne to Sydney) railway, north-east of Melbourne (Beardsell, 1997).

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<sup>18</sup>A BioSite is an area of land or water containing biological assets with particular attributes, such as the presence of rare or threatened flora, fauna or habitat required for their survival and/or rare or threatened vegetation communities.



Threatened flora species observed within the BioSite include Variable Glycine (*Glycine tabacina*) and *Pimelea glauca*. Threatened fauna species observed within the BioSite include Fat-tailed Dunnart (*Sminthopsis crassicaudata*) (nest recorded at Camoola Swamp in 1991), Latham's Snipe (*Gallinago hardwickii*) (flushed from Camoola Swamp in 1991), Swamp Harrier (*Circus approximans*) and Plains Froglet (*Crinia parinsignifera*). The BioSite is also considered likely to support Striped Legless Lizard and Growling Grass Frog.

**Table 4.1 Summary: Overall Conservation Significance of Study Site, Beveridge Road, Beveridge (November - December 2007).**

Flora and Fauna Species and Habitat	Threatened Flora and Fauna Species	Presence On or Near the Site of Other Attributes <sup>1</sup>	Overall Conservation Significance of Site
<ul style="list-style-type: none"> <li>Majority of grassland within the study site is modified from original state. Approximately 40% of site contains modified native grassland considered representative of EVC 132_62: <i>Lighter Soils Plains Grassland</i>.</li> <li>High abundance of exotic plant species, particularly within eastern section of site.</li> <li>Two Large River Red Gums, two Very Large and three Large Swamp Gums present within site.</li> <li>The conservation significance of indigenous vegetation within the site (in accordance with the Framework) is <b>High to Very High</b>.</li> <li>Moderate habitat potential for fauna given presence of indigenous vegetation and other habitat features (rocky knolls, Merri Creek) and connectivity with other areas of indigenous vegetation.</li> <li>Merri Creek may form a dispersal link for common species. Similarly, the Rail Reserve adjacent to the western boundary of the site may provide a link between the site and nearby areas of high quality grassland and swamp.</li> </ul>	<ul style="list-style-type: none"> <li>Five threatened plant species previously recorded on site (<b>Swamp Everlasting, Wetland Blown-grass, Small Scurf-pea, Pale Swamp Everlasting and Swamp Fireweed</b>).</li> <li>Two threatened fauna species previously recorded on site (<b>Brown Toadlet and Fat-tailed Dunnart</b>).</li> <li>Three threatened fauna species (<b>Growling Grass Frog, Striped Legless Lizard and Golden Sun Moth</b>) considered likely to occur within the study site.</li> </ul>	<ul style="list-style-type: none"> <li>Site contains two BioSites: BioSite 4854 (Hernes Swamp) located in the north-west corner of the site and BioSite 5130 (Beveridge Rail Reserve - Camoola Swamp) located along the western site boundary.</li> <li>Seven additional BioSites of regional and state significance occur within a five kilometre radius of the subject site: Upper Plenty, Eden Hills, Beveridge Rail Reserve (Grassland), Wallan East Rail Reserve (Grassland), Sydenham Radio Transmission Site (Grassland), Hernes Swamp (Grassland), Merri Creek - Kalkallo and Spring Street Swamp, Beveridge.</li> <li>Merri Creek flows through the study site.</li> </ul>	<p><b>Moderate.</b></p> <p>Note: that the conservation significance rating may increase if threatened flora and fauna are detected within the study site.</p>

<sup>1</sup> DNRE (2002b). *Ecological Vegetation Classes (EVCs) and Sites of Biodiversity Significance (BioSites): Port Phillip and Westernport Region*

## IMPLICATIONS FOR DEVELOPMENT

Disturbance of the site as part of any proposed development, particularly through native vegetation clearance, has the potential to reduce the biodiversity of the site and surrounds. However, if current land use was to continue, the biodiversity values of the site will continue to decline due to the further increase in the density of existing weeds.

An EPBC Referral to the Federal Environment Minister under the EPBC Act is not considered necessary unless nationally threatened species are observed during subsequent targeted flora and fauna surveys recommended at the study site.

The presence of numerous rocky knolls may impact on the potential for development in some areas of the site. Therefore, priority is placed on:

- clusters of *Category A & B* rocky knolls located within BioSites;
- the large cluster of *Category A* rocky knolls in the southern section of the Site, to the south of the existing homestead (shaded purple, *Annex A*).

Alteration to natural drainage patterns of the site may lead to indirect habitat degradation in areas such as Merri Creek. In particular, increases in the area of hard surfacing (for example, non-porous surfaces such as asphalt that don't provide absorption) within the proposed development area may result in increased runoff, nutrient levels and sediment movement into Merri Creek, particularly during the construction phase.

Retention of some trees would be required (Trees 1 to 9) and the Beveridge Pastoral Company would be required to offset vegetation losses as determined by a Net Gain and Habitat Hectare Assessment if vegetation removal can not be avoided or minimised.

It is anticipated that some of these impacts can be minimised through innovative development plan design prior to development.

The development of the site may also provide some positive outcomes which could include:

- Weed management within higher quality areas of remnant vegetation at the site, adjacent to Merri Creek and the study site in general.
- Opportunities for additional indigenous revegetation exist adjacent to Merri Creek (particularly if the creek is revegetated to provide structural diversity and cover for wildlife). The focus of revegetation activities should aim to improve connectivity within the site (for example, the formation of links between areas of remnant grassland, the Rail Reserve and Merri Creek).

The management requirements and recommendations for the property under the relevant biodiversity legislation and policy include:

### 6.1.1 *Vegetation Surveys and Offsets*

- It is recommended that a comprehensive flora and Net Gain assessment be undertaken in areas identified as remnant grassland. The assessment should be undertaken during Spring/ Summer. The assessment will allow the proponent to identify areas of higher quality remnant grassland within the site (i.e. those areas of grassland that should be retained).
- It is recommended that *Category A* rocky knolls be retained, and that *Category B* rocky knolls be retained where possible. Further, we recommend that clusters of either *Category A* or *B* rocky knolls are retained, in preference to isolated *Category A* rocky knolls. It is recognised that this presents a significant obstacle to development of the site. Therefore, priority is placed on: clusters of *category A & B* rocky knolls located within BioSites; and the large cluster of *category A* rocky knolls in the southern section of the Site, to the south of the existing homestead (shaded purple, *Annex A*).
- It is recommended that *Trees 1* to *9* be retained. This is due to the paucity of large trees on the site. This will also avoid the need for vegetation offsets for the removal of *Trees 1* to *9*. The retention of *Trees 2* and *3* would also be consistent with Council's *River Red Gum Protection Policy*
- It is recommended that native vegetation clearance primarily be limited to the removal of *Category C* rocky knolls, with some vegetation removal within *Category B* where necessary and unavoidable.
- It is also recommended that the proponent incorporate a riparian buffer along Merri Creek, in line with the Whittlesea Planning Scheme ESO3. This will minimise indirect impacts of the development of riparian and emergent vegetation, provide an opportunity for on site offsets and provide the opportunity to enhance the ecological values of the reach of Merri Creek that flows through the site.

### 6.1.2 *Targeted threatened species surveys*

- It is recommended that the following targeted flora and fauna surveys be undertaken to determine the presence of these species within the site:
  - Pale Swamp Everlasting (Spring/Summer);
  - Small Scurf-pea (Spring/ Summer);
  - Swamp Everlasting (Spring/ Summer);

- Swamp Fireweed (Spring/Summer);
  - Wetland Blown-grass (Summer);
  - Striped Legless Lizard (Spring/ Summer);
  - Growling Grass Frog (Spring);
  - Golden Sun Moth (late Spring/ Summer);
  - Brown Toadlet (late Summer/ Autumn); and
  - Fat-tailed Dunnart (Spring/ Summer).
- An EPBC Referral to the Federal Environment Minister under the EPBC Act may be necessary if Swamp Everlasting, Swamp Fireweed, Small Scurf-pea, Growling Grass Frog, Striped Legless Lizard or Golden Sun Moth are recorded at the site.

### 6.1.3 *Weed Management*

- Under the CALP Act, landholders are required to manage noxious weeds. African Box-thorn, Blackberry, Gorse, Spear Thistle, Variegated Thistle, Paterson's Curse and Sweet Briar infestations within the study site should be actively managed prior to development of the site and as necessary thereafter. In particular, these species will need to be controlled to prevent their spread within their property and the adjoining half width of the roadside (Faithfull, 2006). Horehound infestations within the study site should be eradicated prior to development of the site and as necessary thereafter.

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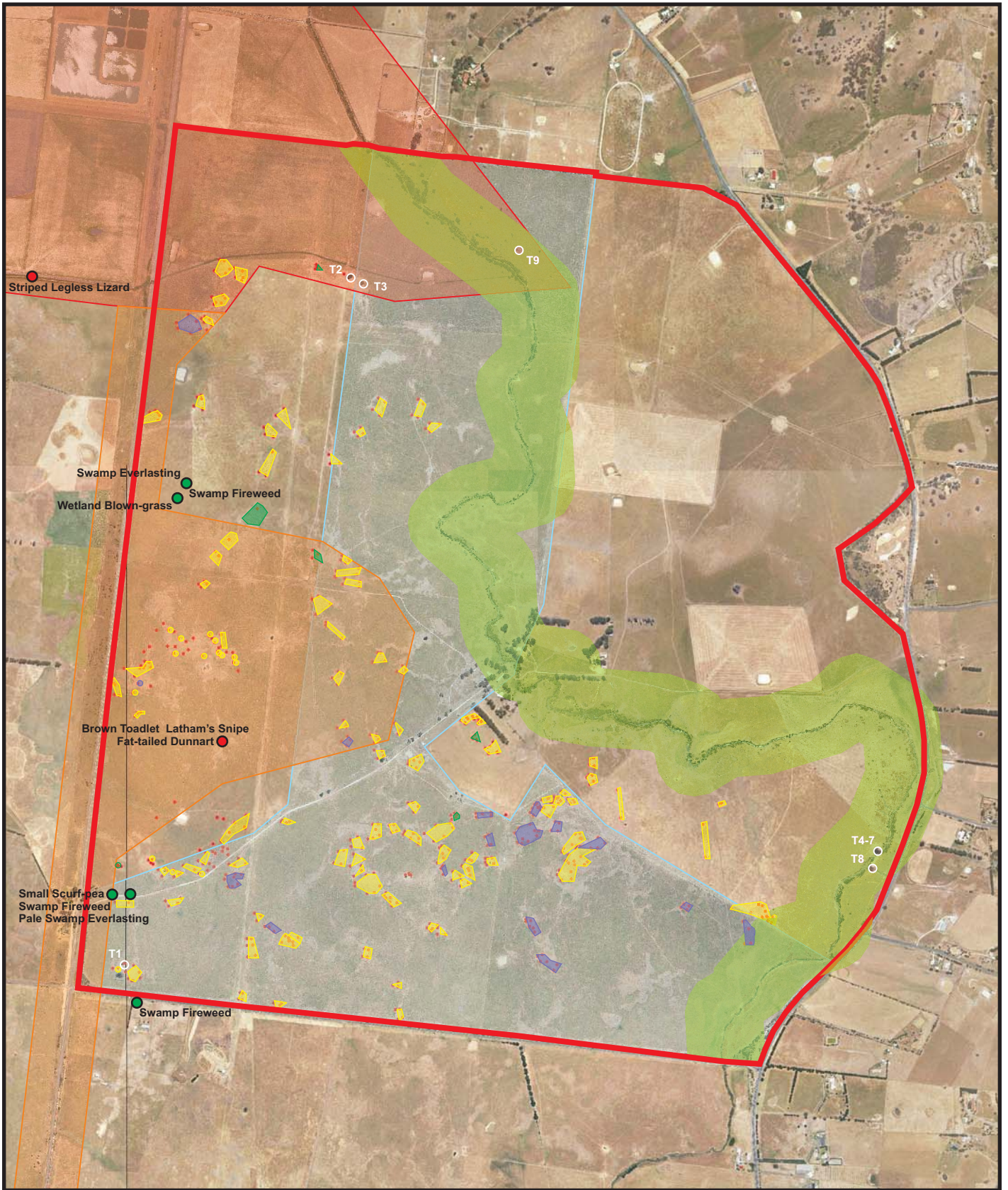
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Annex A

## Map of Study Area



**Legend**

- Indigenous Trees (shown white on map)
- Site Boundary
- Category A Rocky Knoll
- Category B Rocky Knoll
- Category C Rocky Knoll
- BioSite 4854 - Hernes Swamp
- BioSite 5130 - Beveridge Rail Reserve - Camoola Swamp
- >25% Indigenous Grass Coverage
- Whittlesea Environmental Significance Overlay - Schedule 3

Client:	Adams Corporation		
Project:	Beveridge Road, Beveridge, Victoria		
Drawing No:	0074621_01	Suffix No:	R0
Date:	14/12/2007	Drawing size:	A4
Drawn by:	SG	Reviewed by:	FD
Source:	QASCO		
Scale:	1 : 20 000		



**Figure 1**

**Beveridge Road  
Beveridge  
Victoria**

Environmental Resources Management Australia Pty Ltd  
Level 3, Yarra Tower, 18-38 Siddeley St, Docklands  
Melbourne, Victoria, Australia 3005  
TEL: +61 (0)3 9696 8011 | FAX: +61 (0)3 9696 8022



Annex B

## EPBC Protected Matters Search



## Protected Matters Search Tool

You are here: [Environment Home](#) > [EPBC Act](#) > [Search](#)

30 October 2007 10:12

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the [caveat](#) at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

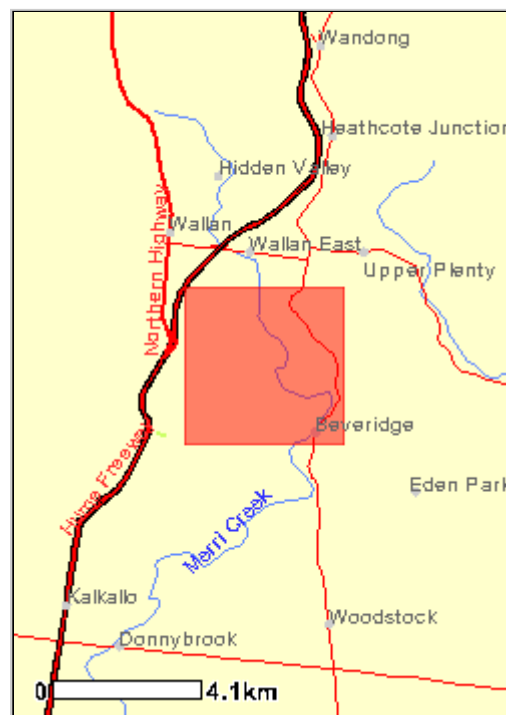
The Australian Natural Resources Atlas at <http://www.environment.gov.au/atlas> may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

**Search Type:** Area  
**Buffer:** 5 km  
**Coordinates:** -37.43050,144.98444, -  
37.47957,144.98444, -  
37.47957,145.03386, -  
37.4305,145.03386



**Report Contents:** [Summary](#)  
[Details](#)

- [Matters of NES](#)
- [Other matters protected by the EPBC Act](#)
- [Extra Information](#)
- [Caveat](#)
- [Acknowledgments](#)



This map may contain data which are  
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(Geoscience Australia)  
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## Summary

### Matters of National Environmental Significance



This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see

<http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

<b>World Heritage Properties:</b>	None
<b>National Heritage Places:</b>	None
<b>Wetlands of International Significance: (Ramsar Sites)</b>	None
<b>Commonwealth Marine Areas:</b>	None
<b><u>Threatened Ecological Communities:</u></b>	1
<b><u>Threatened Species:</u></b>	20
<b><u>Migratory Species:</u></b>	13

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

<b>Commonwealth Lands:</b>	None
<b>Commonwealth Heritage Places:</b>	None
<b><u>Places on the RNE:</u></b>	3
<b><u>Listed Marine Species:</u></b>	11
<b>Whales and Other Cetaceans:</b>	None
<b>Critical Habitats:</b>	None
<b>Commonwealth Reserves:</b>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

<b>State and Territory Reserves:</b>	None
<b>Other Commonwealth Reserves:</b>	None
<b><u>Regional Forest Agreements:</u></b>	2

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## Details

### Matters of National Environmental Significance

Threatened Ecological Communities [ [Dataset Information](#) ]

[White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland](#)

Status	Type of Presence
Critically Endangered	Community may occur within area

Threatened Species [ [Dataset Information](#) ]

#### Birds

[Lathamus discolor](#) \*  
Swift Parrot

Endangered Species or species habitat may occur within area

[Rostratula australis](#) \*  
Australian Painted Snipe

Vulnerable Species or species habitat may occur within area

[Xanthomyza phrygia](#) \*  
Regent Honeyeater

Endangered Species or species habitat may occur within area

#### Frogs

[Litoria raniformis](#) \*  
Growling Grass Frog, Southern Bell Frog,  
Warty Bell Frog, Green and Golden Frog

Vulnerable Species or species habitat may occur within area

#### Insects

[Synemon plana](#) \*  
Golden Sun Moth

Critically Endangered Species or species habitat may occur within area

#### Mammals

[Dasyurus maculatus maculatus \(SE mainland population\)](#) \*  
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)

Endangered Species or species habitat may occur within area

[Pseudomys fumeus](#) \*  
Konoom, Smoky Mouse

Endangered Species or species habitat likely to occur within area

[Pteropus poliocephalus](#) \*  
Grey-headed Flying-fox

Vulnerable Species or species habitat may occur within area

#### Ray-finned fishes

[Galaxiella pusilla](#) \*  
Dwarf Galaxias

Vulnerable Species or species habitat likely to occur within area

<a href="#">Maccullochella peelii peelii</a> * Murray Cod, Cod, Goodoo	Vulnerable	Species or species habitat may occur within area
<a href="#">Macquaria australasica</a> * Macquarie Perch	Endangered	Species or species habitat may occur within area
<a href="#">Prototroctes maraena</a> * Australian Grayling	Vulnerable	Species or species habitat likely to occur within area
<b>Reptiles</b>		
<a href="#">Delma impar</a> * Striped Legless Lizard	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Tymanocryptis pinguicollis</a> * Grassland Earless Dragon	Endangered	Species or species habitat may occur within area
<b>Plants</b>		
<a href="#">Carex tasmanica</a> * Curly Sedge	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Dianella amoena</a> * Matted Flax-lily	Endangered	Species or species habitat likely to occur within area
<a href="#">Glycine latrobeana</a> * Purple Clover, Clover Glycine	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lepidium hyssopifolium</a> * Basalt Pepper-cress	Endangered	Species or species habitat likely to occur within area
<a href="#">Pimelea spinescens subsp. spinescens</a> * Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Prasophyllum frenchii</a> * Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid	Endangered	Species or species habitat likely to occur within area
Migratory Species [ <a href="#">Dataset Information</a> ]	Status	Type of Presence
<b>Migratory Terrestrial Species</b>		
<b>Birds</b>		
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail	Migratory	Species or species habitat may occur within area
<a href="#">Merops ornatus</a> * Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher	Migratory	Breeding likely to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail	Migratory	Breeding may occur within area
<a href="#">Xanthomyza phrygia</a> Regent Honeyeater	Migratory	Species or species habitat may occur within area
<b>Migratory Wetland Species</b>		
<b>Birds</b>		
<a href="#">Ardea alba</a> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<a href="#">Ardea ibis</a>	Migratory	Species or species habitat may occur within area

Cattle Egret		occur within area
<a href="#">Gallinago hardwickii</a> *	Migratory	Species or species habitat may occur within area
Latham's Snipe, Japanese Snipe		
<a href="#">Rostratula benghalensis s. lat.</a>	Migratory	Species or species habitat may occur within area
Painted Snipe		
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a>	Migratory	Species or species habitat may occur within area
Fork-tailed Swift		
<a href="#">Ardea alba</a>	Migratory	Species or species habitat may occur within area
Great Egret, White Egret		
<a href="#">Ardea ibis</a>	Migratory	Species or species habitat may occur within area
Cattle Egret		

## Other Matters Protected by the EPBC Act

Listed Marine Species [ [Dataset Information](#) ]

	Status	Type of Presence
<b>Birds</b>		
<a href="#">Apus pacificus</a>	Listed - overfly marine area	Species or species habitat may occur within area
Fork-tailed Swift		
<a href="#">Ardea alba</a>	Listed - overfly marine area	Species or species habitat may occur within area
Great Egret, White Egret		
<a href="#">Ardea ibis</a>	Listed - overfly marine area	Species or species habitat may occur within area
Cattle Egret		
<a href="#">Gallinago hardwickii</a> *	Listed - overfly marine area	Species or species habitat may occur within area
Latham's Snipe, Japanese Snipe		
<a href="#">Haliaeetus leucogaster</a>	Listed	Species or species habitat likely to occur within area
White-bellied Sea-Eagle		
<a href="#">Hirundapus caudacutus</a>	Listed - overfly marine area	Species or species habitat may occur within area
White-throated Needletail		
<a href="#">Lathamus discolor</a> *	Listed - overfly marine area	Species or species habitat may occur within area
Swift Parrot		
<a href="#">Merops ornatus</a> *	Listed - overfly marine area	Species or species habitat may occur within area
Rainbow Bee-eater		
<a href="#">Myiagra cyanoleuca</a>	Listed - overfly marine area	Breeding likely to occur within area
Satin Flycatcher		



[Rhipidura rufifrons](#)

Rufous Fantail

Listed - Breeding may occur within area  
overfly  
marine  
area[Rostratula benghalensis s. lat.](#)

Painted Snipe

Listed - Species or species habitat may occur  
overfly within area  
marine  
area

Places on the RNE [ [Dataset Information](#) ]  
Note that not all Indigenous sites may be listed.

**Historic**[Braemore VIC](#)[Catholic Church \(former\) VIC](#)[John Kelly House \(former\) VIC](#)**Extra Information**Regional Forest Agreements [ [Dataset Information](#) ]

Note that all RFA areas including those still under consideration have been included.

Central Highlands RFA, Victoria

West Victoria RFA, Victoria

**Caveat**

The information presented in this report has been provided by a range of data sources as [acknowledged](#) at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the [migratory](#) and [marine](#) provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as [extinct or considered as vagrants](#)
- some species and ecological communities that have only recently been listed
- [some terrestrial species](#) that overfly the Commonwealth marine area
- migratory species that are very [widespread, vagrant, or only occur in small numbers](#).

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

## Acknowledgments

This database has been compiled from a range of data sources. The Department acknowledges the following custodians who have contributed valuable data and advice:

- [New South Wales National Parks and Wildlife Service](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Water and Environment, Tasmania](#)
- [Department of Environment and Heritage, South Australia Planning SA](#)
- [Parks and Wildlife Commission of the Northern Territory](#)
- [Environmental Protection Agency, Queensland](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- Other groups and individuals

[ANUcliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University](#) was used extensively for the production of draft maps of species distribution.

Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Last updated:

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Annex C

## Likelihood of Threatened Species at Site -Flora

*Likelihood of Threatened Flora Species, Beveridge Road, Beveridge, November - December 2007.*

Common Name	Species Name	Conservation Status		Habitat Preferences (Sources: Coates, 2003; Gray and Knight 2001; Walsh and Entwisle 1999, 1996; 1994)	Habitat Present on Site?	Likelihood of Occurrence
		National	Victorian			
Basalt Peppergrass	<i>Lepidium hyssopifolium</i>	Endangered	Endangered, FFG Listed	Basalt plains. The species occurs in woodland with a grassy understorey and grassland.	No.	Unlikely. No suitable habitat.
Curly Sedge	<i>Carex tasmanica</i>	Vulnerable	Vulnerable, FFG Listed	Seasonally wet, heavy clayey soils north of Melbourne and further to the west.	No.	Unlikely. No suitable habitat.
Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	Endangered	Endangered, FFG Listed	Tea-tree heath; valley sclerophyll forest.	No.	Unlikely. No suitable habitat.
Matted Flax-lily	<i>Dianella amoena</i>	Endangered	Endangered	Grassy wetland; Red Gum woodland; plains grassland and grassy woodlands.	Yes.	Unlikely given past habitat modification and disturbance.
Pale Swamp Everlasting	<i>Helichrysum aff. rutidolepis</i> (Lowland Swamps)		Vulnerable	Widespread and sometimes locally common, but absent from the far north-west. Usually found in moist sites in open forest and woodland.	Yes.	Moderately likely. Previously recorded in western section of site.
Plains Rice-flower	<i>Pimelea spinescens subsp. spinescens</i>	Critically Endangered	Vulnerable, FFG Listed	Grows in grassland or open shrubland on basalt-derived soils west of Melbourne.	Yes.	Unlikely given past habitat modification and disturbance.
Purple Clover	<i>Glycine latrobeana</i>	Vulnerable	Vulnerable, FFG Listed	Grassland and grassy woodland.	Yes.	Unlikely given past habitat modification and disturbance.
Slender Tick-trefoil	<i>Desmodium varians</i>		Poorly Known	An uncommon species mostly from inland parts of eastern Victoria where found mainly in woodland and open forest.	No.	Unlikely. No suitable habitat.
Small Scurf-pea	<i>Cullen parvum</i>	Endangered	Endangered, FFG Listed	Known from a few localities in north-central and south-central areas where it grows mainly in grassland or grassy woodland.	Yes.	Moderately likely. Previously recorded in western section of site.

Common Name	Species Name	Conservation Status		Habitat Preferences (Sources: Coates, 2003; Gray and Knight 2001; Walsh and Entwisle 1999; 1996; 1994)	Habitat Present on Site?	Likelihood of Occurrence
		National	Victorian			
Smooth Groundsel	<i>Senecio glabrescens</i>		Rare.	Grassland.	Yes.	Unlikely given past habitat modification and disturbance.
Swamp Everlasting	<i>Xerochrysium palustre</i>	Vulnerable	Vulnerable, FFG Listed	Swamp scrub, winter wet grasslands, riparian scrub, lowland swamps. Requires moist to wet clay soils.	Yes.	Moderately likely. Previously recorded in western section of site.
Swamp Fireweed	<i>Senecio psilocarpus</i>	Vulnerable	Vulnerable	Herb-rich winter-wet swamps south and west from Ballarat, growing on volcanic clays or peaty soils.	Yes.	Moderately likely. Previously recorded in western section of site.
Wetland Blown-grass	<i>Lachnagrostis filiformis</i> var. 2		Poorly Known	Specimens recorded in Victoria from near the Yarra River, from Wando Vale near Casterton and from Snowy Creek, a tributary of the upper Overns River, near Freeburgh. Often grows on heavy soils or in moist areas.	Yes.	Moderately likely. Previously recorded in western section of site.

*Table notes:*

National Conservation Status = listed on the EPBC Act 1999, Victorian Conservation Status = listed on the DSE's Advisory List of Rare or Threatened Plants in Victoria; FFG Listed = listed on the Victorian FFG Act 1988.

*Likelihood of Occurrence:*

1. Unlikely = No preferred habitat on the site and/or outside the species' known distribution.
2. Low = Some preferred habitat present on the site, but species is either not known from the area or has not been recorded in previous surveys in area.
3. Moderate = Site contains some of the preferred habitat to support a population of the species.
4. High = Site contains the preferred habitat which is likely to support a population of the species.
5. Present = Species directly observed on the site or recently recorded at the site. Preferred habitat is present on the site.

Annex D

## Likelihood of Threatened Species at Site - Fauna

*Likelihood of Threatened Fauna Species, Beveridge Road, Beveridge, November - December 2007.*

Species Name	Common Name	Conservation Status		Habitat Preferences	Habitat Present on Site?	Likelihood of Occurrence
		National	Victorian			
<b>Birds</b>						
Australasian Bittern	<i>Botaurus poiciloptilus</i>		Endangered, FFG Listed	In, or over, water in tall reed beds, sedges, rushes, cumbungi and lignum. Also in drains in tussocky paddocks, occasionally salt marshes and brackish wetlands.	No.	Unlikely. No suitable habitat.
Australian Painted Snipe	<i>Rostratula australis</i>	Vulnerable	Critically Endangered, FFG Listed	Uncommon summer visitors to Victoria. Lowlands on shallow freshwater swamps with emergent vegetation, and flooded saltmarshes.	No.	Unlikely. No suitable habitat.
Black Falcon	<i>Falco subniger</i>		Vulnerable	Woodland, scrub, shrubland and grassland types in arid and semi-arid zones.	No.	Unlikely. No suitable habitat.
Brown Quail	<i>Coturnix ypsilophora</i>		Near threatened.	Widespread in grass and sedge flats, often adjacent to rivers and swamps.	No.	Unlikely. No suitable habitat.
Diamond Firetail	<i>Stagonopleura guttata</i>		Vulnerable, FFG Listed	Diamond Firetails are found in open grassy woodland, heath and farmland or grassland with scattered trees.	No.	Unlikely. No suitable habitat.
Great Egret	<i>Ardea alba</i>	Migratory	Vulnerable, FFG Listed	Floodwaters, rivers, shallow of wetlands, intertidal mud flats.	No.	Unlikely. No suitable habitat.
Hardhead	<i>Aythya australis</i>		Vulnerable	Deep, permanent freshwater wetlands with dense fringing vegetation.	No.	Unlikely. No suitable habitat.
Latham's Snipe	<i>Gallinago hardwickii</i>	Migratory	Near Threatened	Prefers wet grasslands, open and wooded swamps.	No.	Unlikely. No suitable habitat.



Species Name	Common Name	Conservation Status		Habitat Preferences Sources: Birds Australia 2003a & 2003b; Emison <i>et al</i> 1987; Simpson & Day, 1989; Strahan 1995; Hero <i>et al</i> 1991; Inland Fisheries Service 2000; Menkhorst & Knight 2001; Swift Parrot Recovery Team 2000; Webster <i>et al</i> 1992; Wilson & Swan 2004.	Habitat Present on Site?	Likelihood of Occurrence
		National	Victorian			
Musk Duck	<i>Biziura lobata</i>		Vulnerable	Permanent swamps with dense vegetation, more open waters in non-breeding season.	No.	Unlikely. No suitable habitat.
Painted Snipe	<i>Rostratula benghalensis s. lat.</i>	Vulnerable, Migratory	Critically Endangered, FFG Listed	Well vegetated shallows on margins of wetlands, dams, sewage ponds; wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, open timber.	No.	Unlikely. No suitable habitat.
Rainbow Bee-eater	<i>Merops ornatus</i>	Migratory.		Summer migrants to Victoria where they occur in many wooded habitats with an annual rainfall of less than 800mm, especially north of the Great Divide.	No.	Unlikely. No suitable habitat.
Regent Honeyeater	<i>Xanthomyza phrygia</i>	Endangered, Migratory.	Critically Endangered, FFG Listed.	Depends on nectar and insects from Box-Ironbark Eucalypt forests. Only breeding habitat lies in Northeast Victoria and central coast of NSW.	No.	Unlikely. No suitable habitat.
Royal Spoonbill	<i>Platalea regia</i>		Vulnerable	Larger shallow waters (inland and coastal), well-vegetated shallow freshwater wetlands, floodplains, billabongs, sewage ponds, irrigation storages, tidal mudflats, estuaries, salt marshes, salt fields, mangroves, islands.	No.	Unlikely. No suitable habitat.
Rufous Fantail	<i>Rhipidura rufifrons</i>	Migratory		Wet forested regions, particularly gullies and rainforests, occasionally more open forests. Require dense shrubs for nesting, usually along watercourses.	No.	Unlikely. No suitable habitat.
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	Migratory		Tall and medium open forests.	No.	Unlikely. No suitable habitat.

Species Name	Common Name	Conservation Status		Habitat Preferences Sources: Birds Australia 2003a & 2003b; Emison <i>et al</i> 1987; Simpson & Day, 1989; Strahan 1995; Hero <i>et al</i> 1991; Inland Fisheries Service 2000; Menkhorst & Knight 2001; Swift Parrot Recovery Team 2000; Webster <i>et al</i> 1992; Wilson & Swan 2004.	Habitat Present on Site?	Likelihood of Occurrence
		National	Victorian			
Spotted Harrier	<i>Circus assimilis</i>		Near Threatened	Low over open grassland, crops and windbreaks.	Yes.	May fly over.
Swift Parrot	<i>Lathamus discolor</i>	Endangered.	Endangered, FFG Listed	Winter migrator from Tasmania. Generally prefers Box-Ironbark forests and woodlands inland of the Great Dividing Range during winter (Swift Parrot Recovery Team 2000).	No.	Unlikely. No suitable habitat.
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Migratory	Vulnerable, FFG Listed	Coastal islands, coastal lakes and along some inland rivers and lakes.	No.	Unlikely. No suitable habitat.
White-throated Needletail	<i>Hirundapus caudacutus</i>	Migratory		Aerial, mainly eastern Australia often associated with coastal and mountain regions.	No.	May fly over.
<b>Mammals</b>						
Common Dunnart	<i>Sminthopsis murina</i>		Vulnerable	Heath and forest.	No.	Unlikely. No suitable habitat.
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>		Near Threatened	Prefers logs, rocks or in deep cracks in the soil.	Yes.	Moderately likely. Previously recorded in western section of site
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable, FFG Listed.	Roost sites commonly occur in gullies, in vegetation with dense canopy cover and close to water.	No.	Unlikely. No suitable habitat.
Smoky Mouse	<i>Pseudomys fumeus</i>	Endangered	FFG Listed.	Dry sclerophyll forest on ridges with heath and tussock-grass understorey, coastal heath.	No.	Unlikely. No suitable habitat.
Spotted-tail Quoll	<i>Dasyurus maculatus</i> (SE mainland population)	Endangered.	Endangered, FFG Listed.	Generally a forest-dependent species requiring large intact areas of vegetation for foraging (NSW Parks and Wildlife Service 1999).	No.	Unlikely. No suitable habitat.

Species Name	Common Name	Conservation Status		Habitat Preferences Sources: Birds Australia 2003a & 2003b; Emison <i>et al</i> 1987; Simpson & Day, 1989; Strahan 1995; Hero <i>et al</i> 1991; Inland Fisheries Service 2000; Menkhorst & Knight 2001; Swift Parrot Recovery Team 2000; Webster <i>et al</i> 1992; Wilson & Swan 2004.	Habitat Present on Site?	Likelihood of Occurrence
		National	Victorian			
<b>Reptiles</b>						
Grassland Earless Dragon.	<i>Tympanocryptis lineata pinguicollis</i>	Vulnerable		Confines to scattered remnants of treeless native grassland on the plains west of Melbourne. Shelters in invertebrate holes and cracks.	Yes.	Low likelihood.
Striped Legless Lizard	<i>Delmar impar</i>	Vulnerable	Endangered, FFG Listed	Native grasslands and grassy woodland, within grass tussocks, cracks in the ground or under rocks. Has been recorded in exotic pasture.	Yes.	Moderate likelihood.
<b>Frogs</b>						
Brown Toadlet	<i>Pseudophryne bibronii</i>		Endangered	Forests, woodlands, shrublands, grassland and heaths, sheltering under moist leaf litter and other debris in boggy soaks and depressions.	Yes.	Moderately likely. Previously recorded in western section of site
Growling Grass Frog	<i>Litoria raniformis</i>	Vulnerable	Endangered, FFG Listed	Prefers permanent lakes, swamps, dams and lagoons; very wet areas in woodland and shrubland.	Yes.	Moderate likelihood.
Southern Toadlet	<i>Pseudophryne semimarmorata</i>		Vulnerable	Dry forest, woodland, grassland and heath in moist soaks and depressions; uses leaf litter for shelter.	Yes.	Unlikely given past habitat modification and disturbance.
<b>Fish</b>						
Australian Grayling	<i>Prototroctes maraena</i>	Vulnerable	Vulnerable, FFG Listed.	Clear gravelly streams; deep slow flowing pools.	No.	Unlikely. No suitable habitat.
Dwarf Galaxias	<i>Galaxiella pusilla</i>	Vulnerable	Vulnerable, FFG Listed.	Still or slow moving waters.	No.	Unlikely. No suitable habitat.

Species Name	Common Name	Conservation Status		Habitat Preferences	Habitat Present on Site?	Likelihood of Occurrence
		National	Victorian			
Macquarie Perch	<i>Macquaria australasica</i>	Endangered	Endangered, FFG Listed	Sources: Birds Australia 2003a & 2003b; Emison <i>et al</i> 1987; Simpson & Day, 1989; Strahan 1995; Hero <i>et al</i> 1991; Inland Fisheries Service 2000; Menkhorst & Knight 2001; Swift Parrot Recovery Team 2000; Webster <i>et al</i> 1992; Wilson & Swan 2004. Deep, rocky holes with considerable cover and flowing water over unsilted cobble and gravel substrate.	No.	Unlikely. No suitable habitat.
Murray Cod	<i>Maccullochella peelii peelii</i>	Vulnerable	Endangered, FFG Listed	Small clear, rocky, upland streams with riffle and pool structure on the upper western slopes of the Great Dividing Range to large, meandering, slow-flowing, often silty rivers in the alluvial lowland reaches of the Murray-Darling Basin.	No.	Unlikely. No suitable habitat.
<b>Insects</b>						
Golden Sun Moth	<i>Synemona plana</i>	Critically Endangered.	Endangered, FFG Listed	Prefers native grassland and grassy woodland areas containing Wallaby Grasses and with an open tussock structure. Also observed in association with stone rises and in areas dominated by Kangaroo Grass.	Yes.	Moderate likelihood.
<p><i>Table notes:</i></p> <p>National Conservation Status = listed on the EPBC Act 1999, Victorian Conservation Status = listed on the DSE's Advisory List of Rare or Threatened Plants in Victoria; FFG Listed = listed on the Victorian FFG Act 1988.</p> <p><i>Likelihood of Occurrence:</i></p> <ol style="list-style-type: none"> <li>1. Unlikely = No preferred habitat on the site and/or outside the species' known distribution.</li> <li>2. Low = Some preferred habitat present on the site, but species is either not known from the area or has not been recorded in previous surveys in area.</li> <li>3. Moderate = Site contains some of the preferred habitat to support a population of the species.</li> <li>4. High = Site contains the preferred habitat which is likely to support a population of the species.</li> <li>5. Present = Species directly observed on the site or recently recorded at the site. Preferred habitat is present on the site.</li> </ol>						

Annex E

## Flora and Fauna Species List

*List of Flora Species Recorded at the Study Site, Beveridge Road, Beveridge, November - December 2007.*

Family	Common Name	Species Name	AROT	VROT	FFG	Origin
Asteraceae						
	Cape Weed	<i>Arctotheca calendula</i>				*
	Cat's Ear	<i>Hypochoeris radicata</i>				*
	Scotch Thistle	<i>Cirsium vulgare</i>				*
	Sow-thistle	<i>Sonchus oleraceus</i>				*
	Variegated Thistle	<i>Silybum marianum</i>				*
Boraginaceae						
	Paterson's Curse	<i>Echium plantagineum</i>				*
Brassicaceae						
	Hedge Mustard	<i>Sisymbrium officinale</i>				*
Campanulaceae						
	Tall Bluebell	<i>Wahlenbergia stricta</i>				
Commelinaceae						
	Wandering Jew	<i>Tradescantia albiflora</i>				*
Convolvulaceae						
	Pink Bindweed	<i>Convolvulus erubescens</i>				
Cupressaceae						
	Monterey Cypress	<i>Cupressus macrocarpa</i>				*
Fabaceae						
	Gorse	<i>Ulex europaeus</i>				*
	White Clover	<i>Trifolium repens</i>				*
Iridaceae						
	Common Onion-grass	<i>Romulea rosea</i>				*
Juncaceae						
	Rush	<i>Juncus sp.</i>				
Juncaginaceae						
	Water-ribbons	<i>Triglochin procerum s.s.</i>				
Lamiaceae						
	Horehound	<i>Marrubium vulgare</i>				*
Mimosaceae						
	Hedge Wattle	<i>Acacia paradoxa</i>				
Myrtaceae						
	River Red Gum	<i>Eucalyptus camaldulensis</i>				
	Swamp Gum	<i>Eucalyptus ovata</i>				
Pinaceae						
	Radiata Pine	<i>Pinus radiata</i>				*
Plantaginaceae						
	Ribwort	<i>Plantago lanceolata</i>				*
Poaceae						
	Annual Veldt Grass	<i>Ehrharta longiflora</i>				*
	Barley Grass	<i>Hordeum vulgare</i>				*

Family	Common Name	Species Name	AROT	VROT	FFG	Origin
	Buffalo Grass	<i>Stenotaphrum secundatum</i>				*
	Chilean Needle-grass	<i>Austrostipa neesiana</i>				*
	Cocksfoot	<i>Dactylis glomerata</i>				*
	Common Tussock-grass	<i>Poa labillardieri</i>				
	Common Wheat-grass	<i>Elymus scabrus</i>				
	Great Brome	<i>Bromus diandrus</i>				*
	Kangaroo Grass	<i>Themeda triandra</i>				
	Large Quaking-grass	<i>Briza maxima</i>				*
	Lobed Wallaby-grass	<i>Austrodanthonia auriculata</i>				
	Panic Veldt Grass	<i>Ehrharta erecta</i>				*
	Perennial Rye-grass	<i>Lolium perenne</i>				*
	Prairie Grass	<i>Bromus catharticus</i>				*
	Rat-tail Grass	<i>Sporobolus sp.</i>				
	Red Brome	<i>Bromus rubens</i>				*
	Shiny Wallaby-grass	<i>Austrodanthonia induta</i>				
	Short Wallaby-grass	<i>Austrodanthonia carphoides</i> <i>var. carphoides</i>				
	Soft Brome	<i>Bromus hordeaceus</i>				*
	Sterile Brome	<i>Bromus sterilis</i>				*
	Striped Wallaby-grass	<i>Austrodanthonia racemosa</i>				
	Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>				*
	Toowoomba Canary-grass	<i>Phalaris aquatica</i>				*
	Velvet Wallaby-grass	<i>Austrodanthonia pilosa</i>				
	Water Couch	<i>Paspalum distichum</i>				
	Weeping Grass	<i>Microlaena stipoides</i>				
	Wild Oat	<i>Avena fatua</i>				*
	Yorkshire Fog	<i>Holcus lanatus</i>				*
Polygonaceae						
	Dock	<i>Rumex sp.</i>				*
	Persicaria	<i>Persicaria maculosa</i>				*
Rosaceae						
	Bidgee-widgee	<i>Acaena novae-zelandiae</i>				
	Blackberry	<i>Rubus fruticosus spp. agg.</i>				*
	Sweet Briar	<i>Rosa rubiginosa</i>				*
Solanaceae						
	African Box-thorn	<i>Lycium ferocissimum</i>				*
Xanthorrhoeaceae						
	Mat-rush	<i>Lomandra sp.</i>				

Family	Common Name	Species Name	AROT	VROT	FFG	Origin
<p><i>Status Notes:</i></p> <p><b>AROT</b> Australian Rare or Threatened Status  <b>VROT</b> Victorian Rare or Threatened Status  <b>E</b> - Endangered in Australia; <b>e</b> - Endangered in Victoria.  <b>V</b> - Vulnerable in Australia; <b>v</b> - Vulnerable in Victoria.  <b>R</b> - Rare in Australia; <b>r</b> - Rare in Victoria.  <b>K</b> - Poorly Known in Australia; <b>k</b> - Poorly Known in Victoria.  * Introduced.  # Dual Origin (Native but assumed cultivated).</p>						



*List of Fauna Species Recorded at the Study Site, Beveridge Road, Beveridge, November - December 2007.*

Family	Common Name	Scientific Name	ESP	CST	FFG	Origin
Alaudidae						
	Skylark	<i>Alauda arvensis</i>				*
Anatidae						
	Australian Shelduck	<i>Tadorna tadornoides</i>				
	Australian Wood Duck	<i>Chenonetta jubata</i>				
Ardeidae						
	White-faced Heron	<i>Egretta novaehollandiae</i>				
Artamidae						
	Australian Magpie	<i>Gymnorhina tibicen</i>				
Cacatuidae						
	Galah	<i>Cacatua roseicapilla</i>				
	Long-billed Corella	<i>Cacatua tenuirostris</i>				
	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>				
Campephagidae						
	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>				
Canidae						
	Red Fox	<i>Canis vulpes</i>				*
Charadriidae						
	Masked Lapwing	<i>Vanellus miles</i>				
Columbidae						
	Spotted Turtle-Dove	<i>Streptopelia chinensis</i>				*
Corvidae						
	Australian Raven	<i>Corvus coronoides</i>				
	Corvid	<i>Corvus sp.</i>				
Dicuridae						
	Magpie-lark	<i>Grallina cyanoleuca</i>				
	Willie Wagtail	<i>Rhipidura leucophrys</i>				
Falconidae						
	Nankeen Kestrel	<i>Falco cenchroides</i>				
Fringillidae						
	European Goldfinch	<i>Carduelis carduelis</i>				*
	European Goldfinch	<i>Carduelis carduelis</i>				*
Hirundinidae						
	Welcome Swallow	<i>Hirundo neoxena</i>				
Hylidae						
	Peron's Tree Frog	<i>Litoria peronii</i>				
Leporidae						
	Brown Hare	<i>Lepus capensis</i>				*
	European Rabbit	<i>Oryctolagus cuniculus</i>				*
Leptodactylidae						
	Striped Marsh Frog	<i>Limnodynastes peronii</i>				

Family	Common Name	Scientific Name	ESP	CST	FFG	Origin
Macropodidae						
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>				
Maluridae						
	Superb Fairy-wren	<i>Malurus cyaneus</i>				
Meliphagidae						
	Red Wattlebird	<i>Anthochaera carunculata</i>				
	White-fronted Chat	<i>Epthianura albifrons</i>				
Muscicapidae						
	Common Blackbird	<i>Turdus merula</i>				*
Myobatrachidae						
	Common Froglet	<i>Crinia signifera</i>				
	Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>				
Pardalotidae						
	Brown Thornbill	<i>Acanthiza pusilla</i>				
Pardalotidae						
	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>				
Passeridae						
	House Sparrow	<i>Passer domesticus</i>				*
Scincidae						
	White's Skink	<i>Egernia whitii</i>				
Sturnidae						
	Common Starling	<i>Sturnus vulgaris</i>				*
<p><i>Status Notes:</i></p> <p><b>ESP</b> Conservation status in Australia.</p> <p><b>CST</b> Conservation status in Victoria.</p> <p><b>FFG</b> Status under the <i>Flora and Fauna Guarantee Act 1988</i>.</p> <p><b>CEnd</b> Critically Endangered</p> <p><b>End</b> Endangered.</p> <p><b>Vul</b> Vulnerable.</p> <p><b>R/R</b> Rare.</p> <p><b>NT</b> Low Risk, Near Threatened.</p> <p>* Introduced.</p>						

Annex F

## EVC Benchmark(S)

# EVC/Bioregion Benchmark for Vegetation Quality Assessment

## Victorian Volcanic Plain bioregion

### EVC 83: Swampy Riparian Woodland

#### Description:

Woodland to 15 m tall generally occupying low energy streams of the foothills and plains. The lower strata are variously locally dominated by a range of large and medium shrub species on the stream levees in combination with large tussock grasses and sedges in the ground layer.

#### Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	70 cm	10 / ha

#### Tree Canopy Cover:

%cover	Character Species	Common Name
20%	<i>Eucalyptus ovata</i>	Swamp Gum

#### Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	2	10%	T
Medium Shrub	2	5%	MS
Large Herb	5	10%	LH
Medium Herb	9	15%	MH
Small or Prostrate Herb	4	5%	SH
Large Tufted Graminoid	5	20%	LTG
Large Non-tufted Graminoid	1	1%	LNG
Medium to Small Tufted Graminoid	8	20%	MTG
Medium to Tiny Non-tufted Graminoid	2	1%	MNG
Ground Fern	1	1%	GF
Scrambler or Climber	2	5%	SC
Bryophytes/Lichens	na	20%	BL

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Acacia melanoxylon</i>	Blackwood
T	<i>Acacia mearnsii</i>	Black Wattle
MS	<i>Olearia glandulosa</i>	Swamp Daisy-bush
MS	<i>Acacia verticillata</i> ssp. <i>verticillata</i>	Prickly Moses
MS	<i>Leptospermum lanigerum</i>	Woolly Tea-tree
MS	<i>Ozothamnus rosmarinifolius</i>	Rosemary Everlasting
LH	<i>Senecio minimus</i>	Shrubby Fireweed
LH	<i>Persicaria praetermissa</i>	Spotted Knotweed
LH	<i>Epilobium billardierianum</i>	Variable Willow-herb
MH	<i>Acaena novae-zelandiae</i>	Bidgee-widgee
MH	<i>Geranium potentilloides</i>	Cinquefoil Cranesbill
MH	<i>Oxalis exilis</i>	Shady Wood-sorrel
MH	<i>Euchiton involucreatus</i> s.l.	Star Cudweed
SH	<i>Leptinella reptans</i> s.l.	Creeping Cotula
SH	<i>Hydrocotyle sibthorpioides</i>	Shining Pennywort
SH	<i>Hydrocotyle hirta</i>	Hairy Pennywort
SH	<i>Dichondra repens</i>	Kidneyweed
LTG	<i>Juncus procerus</i>	Tall Rush
LTG	<i>Cyperus lucidus</i>	Leafy Flat-sedge
LTG	<i>Juncus pallidus</i>	Pale Rush
LTG	<i>Poa labillardierei</i>	Common Tussock-grass
MTG	<i>Juncus planifolius</i>	Broad-leaf Rush
MTG	<i>Juncus pauciflorus</i>	Loose-flower Rush
MTG	<i>Triglochin procerum</i> s.l.	Water Ribbons
MNG	<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass
MNG	<i>Triglochin striatum</i>	Streaked Arrowgrass
GF	<i>Pteridium esculentum</i>	Austral Bracken
SC	<i>Calystegia sepium</i>	Large Bindweed

# EVC 83: Swampy Riparian Woodland - Victorian Volcanic Plain bioregion

**Recruitment:**

Continuous

**Organic Litter:**

20 % cover

**Logs:**

20 m/0.1 ha.

**Weediness:**

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MS	<i>Rubus sp. aff. armeniacus</i>	Blackberry	high	high
LH	<i>Sonchus asper s.l.</i>	Rough Sow-thistle	high	low
LH	<i>Cirsium vulgare</i>	Spear Thistle	high	high
LH	<i>Plantago lanceolata</i>	Ribwort	high	low
LH	<i>Parentucellia viscosa</i>	Yellow Bartsia	high	low
MH	<i>Lotus corniculatus</i>	Bird's-foot Trefoil	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Acetosella vulgaris</i>	Sheep Sorrel	high	low
MH	<i>Leontodon taraxacoides ssp. taraxacoides</i>	Hairy Hawkbit	high	low
MH	<i>Anagallis arvensis</i>	Pimpernel	high	low
SH	<i>Trifolium repens var. repens</i>	White Clover	high	low
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	high	high
MTG	<i>Lolium perenne</i>	Perennial Rye-grass	high	high
MTG	<i>Juncus articulatus</i>	Jointed Rush	high	high
MTG	<i>Bromus hordeaceus ssp. hordeaceus</i>	Soft Brome	high	low
MNG	<i>Vulpia spp.</i>	Fescue	high	low

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# EVC/Bioregion Benchmark for Vegetation Quality Assessment

## Victorian Volcanic Plain bioregion

### EVC 126: Swampy Riparian Complex

#### Description:

Mapping unit that includes a range of EVCs that could not be resolved at the scale of mapping. Structurally variable vegetation typical of swampy to waterlogged, low gradient drainage-lines (or associated hillside soaks). The potential component EVCs include Creepline Herb-rich Woodland, Gully Woodland, Shrubby Gully Forest, Fern Swamp, Swampy Riparian Woodland, Swampy Woodland and Swamp Scrub. Woodlands to 15 m tall or forests to 20 m tall.

+ woodland/forest only components (ignore when assessing treeless areas and standardise final score as appropriate)

#### Large trees<sup>+</sup>:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	70 cm	10 / ha

#### Tree Canopy Cover<sup>+</sup>:

%cover	Character Species	Common Name
20%	<i>Eucalyptus ovata</i>	Swamp Gum

#### Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree <sup>+</sup>		5%	IT
Understorey Tree or Large Shrub <sup>+</sup>	3	10%	T
Medium Shrub	7	30%	MS
Large Herb	4	5%	LH
Medium Herb	14	20%	MH
Small or Prostrate Herb	5	5%	SH
Large Tufted Graminoid	6	15%	LTG
Large Non-tufted Graminoid	2	1%	LNG
Medium to Small Tufted Graminoid	5	10%	MTG
Medium to Tiny Non-tufted Graminoid	5	10%	MNG
Ground Fern	4	15%	GF
Tree Fern	2	5%	TRF
Scrambler or Climber	3	5%	SC
Bryophytes/Lichens	na	10%	BL

#### Recruitment:

Continuous

#### Organic Litter:

40 % cover

#### Logs<sup>+</sup>:

20 m/0.1 ha.

# EVC 126: Swampy Riparian Complex

## - Victorian Volcanic Plain bioregion

LF Code	Species typical of at least part of EVC range	Common Name
T+	<i>Acacia dealbata</i>	Silver Wattle
T+	<i>Rapanea howittiana</i>	Mutton-wood
MS	<i>Melaleuca ericifolia</i>	Swamp Paperbark
MS	<i>Melaleuca squarrosa</i>	Scented Paperbark
MS	<i>Coprosma quadrifida</i>	Prickly Currant-bush
MS	<i>Olearia lirata</i>	Snowy Daisy-bush
LH	<i>Senecio minimus</i>	Shrubby Fireweed
MH	<i>Hydrocotyle hirta</i>	Hairy Pennywort
MH	<i>Lobelia anceps</i>	Angled Lobelia
MH	<i>Viola hederacea sensu Willis (1972)</i>	Ivy-leaf Violet
SH	<i>Oxalis exilis</i>	Shady Wood-sorrel
SH	<i>Dichondra repens</i>	Kidney-weed
SH	<i>Hydrocotyle tripartita</i>	Slender Pennywort
SH	<i>Hydrocotyle sibthorpioides</i>	Shining Pennywort
LTG	<i>Lepidosperma elatius</i>	Tall Sword-sedge
LTG	<i>Carex appressa</i>	Tall Sedge
LTG	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
LTG	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge
LNG	<i>Phragmites australis</i>	Common Reed
MTG	<i>Isolepis inundata</i>	Swamp Club-sedge
MTG	<i>Poa ensiformis</i>	Sword Tussock-grass
MTG	<i>Juncus pauciflorus</i>	Loose-flower Rush
MTG	<i>Carex gaudichaudiana</i>	Fen Sedge
MNG	<i>Microlaena stipoides var. stipoides</i>	Weeping Grass
MNG	<i>Poa tenera</i>	Slender Tussock-grass
MNG	<i>Echinopogon ovatus</i>	Common Hedgehog-grass
MNG	<i>Triglochin striatum</i>	Streaked Arrowgrass
GF	<i>Blechnum minus</i>	Soft Water-fern
GF	<i>Polystichum proliferum</i>	Mother Shield-fern
GF	<i>Pteridium esculentum</i>	Austral Bracken
GF	<i>Gleichenia microphylla</i>	Scrambling Coral-fern
TRF	<i>Dicksonia antarctica</i>	Soft Tree-fern
TRF	<i>Todea barbara</i>	Austral King-fern
TRF	<i>Cyathea australis</i>	Rough Tree-fern
EP	<i>Amyema pendula</i>	Drooping Mistletoe
SC	<i>Galium australe</i>	Tangled Bedstraw
SC	<i>Clematis aristata</i>	Mountain Clematis

### Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MS	<i>Rubus fruticosus spp. agg.</i>	Blackberry	high	high
LH	<i>Sonchus oleraceus</i>	Common Sow-thistle	high	low
LH	<i>Senecio jacobaea</i>	Ragwort	high	high
LH	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	high	low
LH	<i>Solanum nigrum sensu Willis (1972)</i>	Black Nightshade	high	low
LH	<i>Cirsium vulgare</i>	Spear Thistle	high	high
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Centaureum erythraea</i>	Common Centaury	high	low
MH	<i>Gamochaeta purpurea s.s.</i>	Spiked Cudweed	high	low
MH	<i>Allium triquetrum</i>	Three-corner Garlic	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	high	high
SC	<i>Galium aparine</i>	Cleavers	high	low

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# EVC/Bioregion Benchmark for Vegetation Quality Assessment

## Victorian Volcanic Plain bioregion

### EVC 132\_62: *Lighter-soils* Plains Grassland

#### Description:

Treeless vegetation < 1 m tall dominated by largely graminoid and herb life forms but may have originally contained scattered woody plants. Occupies more freely draining red loamy basalt-derived soils and occasionally lighter sedimentary soils in areas receiving at least 500 mm annual rainfall.

#### Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	2	5%	LH
Medium Herb	10	20%	MH
Small or Prostrate Herb	4	5%	SH
Medium to Small Tufted Graminoid	13	40%	MTG
Medium to Tiny Non-tufted Graminoid	4	5%	MNG
Bryophytes/Lichens and Soil Crust*	na	20%	BL

\* Note: treat as one life form in this EVC

LF Code	Species typical of at least part of EVC range	Common Name
LH	<i>Senecio quadridentatus</i>	Cottony Fireweed
LH	<i>Ptilotus macrocephalus</i>	Feather-heads
MH	<i>Calocephalus citreus</i>	Lemon Beauty-heads
MH	<i>Acaena echinata</i>	Sheep's Burr
MH	<i>Leptorhynchus squamatus</i>	Scaly Buttons
MH	<i>Gonocarpus tetragynus</i>	Rough Raspwort
SH	<i>Solenogyne dominii</i>	Smooth Solenogyne
SH	<i>Lobelia pratioides</i>	Poison Lobelia
SH	<i>Drosera whittakeri</i> ssp. <i>aberrans</i>	Scented Sundew
MTG	<i>Themeda triandra</i>	Kangaroo Grass
MTG	<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass
MTG	<i>Elymus scaber</i> var. <i>scaber</i>	Common Wheat-grass
MTG	<i>Schoenus apogon</i>	Common Bog-sedge
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
MNG	<i>Microtis unifolia</i>	Common Onion-orchid
TTG	<i>Centrolepis aristata</i>	Pointed Centrolepis
TTG	<i>Centrolepis strigosa</i> ssp. <i>strigosa</i>	Hairy Centrolepis
SC	<i>Convolvulus erubescens</i>	Pink Bindweed

#### Recruitment:

Episodic/Fire or Grazing. Desirable period between disturbances is 5 years.

#### Organic Litter:

10% cover



# EVC 132\_62: *Lighter-soils* Plains Grassland - Victorian Volcanic Plain bioregion

## Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Plantago lanceolata</i>	Ribwort	high	low
LH	<i>Cirsium vulgare</i>	Spear Thistle	high	high
LH	<i>Sonchus oleraceus</i>	Common Sow-thistle	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Leontodon taraxacoides</i> ssp. <i>taraxacoides</i>	Hairy Hawkbit	high	low
MH	<i>Trifolium subterraneum</i>	Subterranean Clover	high	low
MH	<i>Plantago coronopus</i>	Buck's-horn Plantain	high	low
MH	<i>Trifolium striatum</i>	Knotted Clover	high	low
MH	<i>Trifolium dubium</i>	Suckling Clover	high	low
LTG	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Romulea rosea</i>	Onion Grass	high	low
MTG	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	high	low
MTG	<i>Briza minor</i>	Lesser Quaking-grass	high	low
MTG	<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	Soft Brome	high	low
MTG	<i>Briza maxima</i>	Large Quaking-grass	high	low
MTG	<i>Lolium rigidum</i>	Wimmera Rye-grass	high	low
MTG	<i>Lolium perenne</i>	Perennial Rye-grass	high	low
MTG	<i>Nassella neesiana</i>	Chilean Needle-grass	high	high
MNG	<i>Cynosurus echinatus</i>	Rough Dog's-tail	high	low
MNG	<i>Juncus capitatus</i>	Capitate Rush	high	low

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# EVC/Bioregion Benchmark for Vegetation Quality Assessment

## Victorian Volcanic Plain bioregion

### EVC 649: Stony Knoll Shrubland

#### Description:

Stony Knoll Shrubland is a shrubland to 3 m tall or low non-eucalypt woodland to 8 m tall with a grassy understorey. It occurs on low stony rises on basalt flows. The soils are fertile and well drained but shallow with out cropping rock, causing severe summer dryness.

+ woodland only components (ignore when assessing treeless areas and standardise final score as appropriate)

#### Canopy Cover<sup>+</sup>:

%cover	Character Species	Common Name
15%	<i>Allocasuarina verticillata</i> <i>Bursaria spinosa</i>	Drooping Sheoak Sweet Bursaria

#### Understorey:

Life form	#Spp	%Cover	LF code
Medium Shrub	3	10%	MS
Prostrate Shrub	1	1%	PS
Large Herb	2	1%	LH
Medium Herb	11	10%	MH
Small or Prostrate Herb	4	5%	SH
Medium to Small Tufted Graminoid	10	25%	MTG
Tiny Tufted Graminoid	2	5%	TTG
Medium to Tiny Non-tufted Graminoid	2	5%	MNG
Ground Fern	2	5%	GF
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	10%	S/C
<b>Total understorey projective foliage cover</b>		<b>85%</b>	

LF Code	Species typical of at least part of EVC range	Common Name
MS	<i>Hymenanthera dentata</i> s.l.	Tree Violet
MS	<i>Acacia paradoxa</i>	Hedge Wattle
PS	<i>Kennedia prostrata</i>	Running Postman
LH	<i>Senecio quadridentatus</i>	Cotton Fireweed
LH	<i>Senecio glomeratus</i>	Annual Fireweed
MH	<i>Oxalis perennans</i>	Grassland Wood-sorrel
MH	<i>Rumex brownii</i>	Slender Dock
MH	<i>Hypericum gramineum</i>	Small St John's Wort
MH	<i>Acaena ovina</i>	Australian Sheep's Burr
SH	<i>Dichondra repens</i>	Kidneyweed
SH	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
SH	<i>Crassula sieberiana</i>	Sieber Crassula
MTG	<i>Themeda triandra</i>	Kangaroo Grass
MTG	<i>Poa sieberiana</i>	Grey Tussock-grass
MTG	<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass
MTG	<i>Austrodanthonia setacea</i>	Bristly Wallaby-grass
TTG	<i>Carex breviculmis</i>	Short-stem Sedge
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
GF	<i>Pteridium esculentum</i>	Austral Bracken
GF	<i>Adiantum aethiopicum</i>	Common Maidenhair
SC	<i>Convolvulus erubescens</i> spp. agg.	Pink Bindweed

#### Recruitment:

Continuous

#### Organic Litter:

20 % cover

# EVC 649: Stony Knoll Shrubland - Victorian Volcanic Plain bioregion

## Logs<sup>+</sup>:

5 m/0.1 ha. (note: large log class does not apply)

## Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
T	<i>Schinus molle</i>	Pepper Tree	high	high
MS	<i>Lycium ferocissimum</i>	African Box-thorn	high	high
MS	<i>Genista monspessulana</i>	Montpellier Broom	high	high
SS	<i>Marrubium vulgare</i>	Horehound	high	high
LH	<i>Sonchus oleraceus</i>	Common Sow-thistle	high	low
LH	<i>Helminthotheca echioides</i>	Ox-tongue	high	low
LH	<i>Lactuca serriola</i>	Prickly Lettuce	high	low
LH	<i>Sisymbrium officinale</i>	Hedge Mustard	high	low
LH	<i>Sonchus asper</i> s.l.	Rough Sow-thistle	high	low
LH	<i>Verbascum thapsus</i> ssp. <i>thapsus</i>	Great Mullein	high	high
LH	<i>Echium plantagineum</i>	Paterson's Curse	high	high
LH	<i>Centaurium tenuiflorum</i>	Slender Centaury	high	low
LH	<i>Foeniculum vulgare</i>	Fennel	high	high
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover	high	low
MH	<i>Trifolium subterraneum</i>	Subterranean Clover	high	low
MH	<i>Trifolium campestre</i> var. <i>campestre</i>	Hop Clover	high	low
MH	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover	high	low
MH	<i>Lotus suaveolens</i>	Hairy Bird's-foot Trefoil	high	low
MH	<i>Cerastium glomeratum</i> s.l.	Common Mouse-ear Chickweed	high	low
SH	<i>Medicago polymorpha</i>	Burr Medic	high	low
SH	<i>Trifolium glomeratum</i>	Cluster Clover	high	low
SH	<i>Modiola caroliniana</i>	Red-flower Mallow	high	low
SH	<i>Aptenia cordifolia</i>	Heart-leaf Ice-plant	high	high
LTG	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
LNG	<i>Avena fatua</i>	Wild Oat	high	low
MTG	<i>Nassella trichotoma</i>	Serrated Tussock	high	high
MTG	<i>Ehrharta longiflora</i>	Annual Veldt-grass	high	low
MTG	<i>Briza maxima</i>	Large Quaking-grass	high	low
MTG	<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	Soft Brome	high	low
MTG	<i>Sporobolus africanus</i>	Rat-tail Grass	high	high
MTG	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	high	low
MTG	<i>Romulea rosea</i>	Onion Grass	high	low
MTG	<i>Pentstemonis airoides</i> ssp. <i>airoides</i>	False Hair-grass	high	low
MTG	<i>Lolium perenne</i>	Perennial Rye-grass	high	low
MTG	<i>Dactylis glomerata</i>	Cocksfoot	high	high
MTG	<i>Vulpia myuros</i>	Rat's-tail Fescue	high	low
MTG	<i>Bromus rubens</i>	Red Brome	high	low
MTG	<i>Avena barbata</i>	Bearded Oat	high	low
MTG	<i>Aira caryophylla</i>	Silvery Hair-grass	high	low
SC	<i>Vicia sativa</i> ssp. <i>sativa</i>	Common Vetch	low	low

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