

Final Report

Targeted Surveys for Significant Fauna: Bon Thomas Reserve, 57A Quinn Street, Deer Park, Victoria

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GLOSSARY

Acronym	Description
AVW	Atlas of Victorian Wildlife
CMA	Catchment Management Authority
DEPI	Victorian Department of Environment and Primary Industries
DoE	Federal Department of Environment (former Department of Sustainability, Environment, Water, Population and Communities)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVC	Ecological Vegetation Class
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
NES	National Environmental Significance
NVIM Tool	Native Vegetation Information Management Tool (DEPI)
PMST	Protected Matters Search Tool (DoE)
VBA	Victorian Biodiversity Atlas (DEPI)

SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd (Ecology and Heritage Partners) was commissioned by Brimbank City Council to conduct targeted surveys for Striped Legless Lizard *Delma impar* and Golden Sun Moth *Synemon plana* at 57A Quinn Street, Deer Park, Victoria, also known as Bon Thomas Reserve (the study area). The surveys supplement a Biodiversity Assessment and associated targeted surveys for significant flora which have recently been completed for the project (Ecology and Heritage Partners 2016b).

Methods

An overall site assessment was undertaken on the 22nd August 2016 to obtain information on fauna values within the study area. Potential habitat for significant fauna species was identified based on the vegetation mapping and condition assessments undertaken as part of previous studies (Ecology and Heritage Partners 2015; 2016a; 2016b), with a particular emphasis on native Plains Grassland habitats that may provide shelter, food or other resources for the Striped Legless Lizard and Golden Sun Moth. Patches of Plains Grassland within the study area were assessed as providing suitable habitat for these species. Exotic Chilean Needle-grass and Serrated Tussock grass was present throughout these patches and the remainder of the site and is also known to provide suitable habitat for Striped Legless Lizard and Golden Sun Moth.

To survey Striped Legless Lizard two rectangular grids of terracotta roof tiles, 5 x 10 tiles (25 metres x 50 metres), were established within the two larger patches of Plains Grassland present on site. Surveys were undertaken in accordance with the Survey Guidelines for Australia's Threatened Reptiles (SEWPaC 2011). The grid of roof tiles acts as artificial refuge under which small ground-dwelling fauna seek shelter during cooler times of the day and cooler months of the year. Tile grids were checked on six occasions at approximately weekly intervals between October and November 2016.

Targeted surveys for Golden Sun Moth were undertaken by qualified zoologists on four separate occasions between December 2016 and January 2017 consistent with the *Significant impact guidelines for the critically endangered golden sun moth* (DEWHA 2009). Surveys focussed on areas supporting Wallaby-grass *Rytidosperma* spp. which is a known food source for the Golden Sun Moth, and undertaken at a time suitable for detecting the species (i.e. when adult males are flying). Prior to undertaking each survey event, the species was confirmed to be flying at nearby reference locations. The Golden Sun Moth flight season for 2016 was delayed, not commencing until December, probably due to continued rainfall and cooler temperatures.

Results

The Striped Legless Lizard was not detected within the study area, despite the installation of tile grids and six weekly grid checks through the October to December period. Plains Grassland patches within the study area support a high cover of weeds (between 30% to 60%), primarily due to the dominance of introduced annual grasses (Ecology and Heritage Partners 2016b). No surface rocks, or other cover such as logs, that provide shelter are present. Small patches of remnant Plains Grassland also occur within surrounding roadsides and

rail reserves; however, they are generally highly fragmented consisting predominantly of introduced vegetation, which lacks the suitable habitat variables for Striped Legless Lizard.

Given the recent survey results, study area habitat variables, and the nature and extent of surrounding habitat, the Striped Legless Lizard is considered to have a low likelihood of occurring within the study area.

Targeted surveys did not detect Golden Sun Moth within the study area, despite surveys being undertaken over four separate days at times when the species was known to be flying in comparable areas. Based on the results of targeted surveys, landscape context and the proximity of previous records, the Golden Sun Moth is considered to have a low likelihood of occurring within the study area.

Legislative and Policy Implications

No evidence of Golden Sun Moth or Striped Legless Lizard, nor any other significant fauna species, was detected during the surveys and these species are considered to have a low likelihood of occurring within the study area. However, the nationally-significant vegetation community Natural Temperate Grassland of the Victorian Volcanic Plain (Critically Endangered), nationally-significant Spiny Rice-flower (Critically Endangered), and state-significant flora species and ecological communities have been previously recorded within the study area (Ecology and Heritage Partners 2016b). Legislative and Policy implications are detailed in Ecology and Heritage Partners (2016b).

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1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd (Ecology and Heritage Partners) was commissioned by Brimbank City Council to conduct targeted surveys for Striped Legless Lizard *Delma impar* and Golden Sun Moth *Synemon plana* at 57A Quinn Street, Deer Park, Victoria, also known as Bon Thomas Reserve (the study area). The subject site is being investigated for the proposed development of various sports and recreation facilities. The purpose of the surveys is to inform ecological implications and relevant planning approvals at the Commonwealth and State level associated with the proposed action.

Vegetation within the study area was originally assessed by Ecology and Heritage Partners as part of the Native Vegetation Extent Mapping Project conducted on behalf of Brimbank City Council in 2013/2014 (Ecology and Heritage Partners 2015). More recently, a Due Diligence Assessment (Ecology and Heritage Partners 2016a) was completed that identified the presence of Heavier Soils Plains Grassland (Ecological Vegetation Class [EVC] 132_61) within the study area, along with the nationally-significant ecological community Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

This report details the results of targeted Striped Legless Lizard and Golden Sun Moth surveys, which compliment a Biodiversity Assessment and associated targeted surveys for significant flora species recently completed for the project (Ecology and Heritage Partners 2016b).

1.2 Scope and Objectives

The objectives of the targeted surveys were to:

- Complete a desktop review and field survey to confirm the likelihood of the target fauna species occurring within the study area and surrounding landscape;
- Identify known and potential impacts on the target species associated with the proposed activity;
- Provide information in relation to any implications of Commonwealth and State environmental legislation and policy associated with the proposed activity; and,
- Provide advice on mitigation measures that may be undertaken to avoid and/or mitigate potential adverse impacts on significant ecological values.

1.3 Study Area

The study area is located at 57A Quinn Street, Deer Park, Victoria, approximately 16 kilometres west of Melbourne's CBD (Figure 1). The site covers approximately 11.1 hectares and is bound by the Ballarat to Melbourne railway line in the south, private property to the north and east, and the remainder of Bon Thomas Reserve to the west.

The topography is flat with no hills or waterways within the study area. Two recreational playing fields (ovals) are present in the study area, along with a playground and shelters associated with the recreational use of the site. The study area is regularly mown for maintenance purposes; however, slashing was suspended over the duration of the surveys. Heavier Soils Plains Grassland (EVC 132_61) has been mapped over the study area, some of which corresponds with the nationally-significant ecological community NTGVVP (Ecology and Heritage Partners 2016b) (Figure 2).

1.4 Targeted Species

1.5 Striped Legless Lizard

The Striped Legless Lizard is listed as Endangered in Victoria and Vulnerable nationally under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DSE 2007). The species is also listed as a threatened taxon under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act). An FFG Act Action Statement (Webster *et al.* 2003) and a National Recovery Plan 1999-2003 (Smith and Robertson 1999) have been developed for the species. A National Recovery Team also exists for this species. Overall the species is of national conservation significance, and is also protected under the Victorian *Wildlife Act 1975*.



Plate 1. Striped Legless Lizard (Ecology and Heritage Partners Pty Ltd)

The Striped Legless Lizard is restricted to the lowland tussock grassland habitats (Coulson 1990) in temperate south-eastern Australia where the species has a limited and patchy distribution. Since European settlement the distribution of Striped Legless Lizard is believed to have declined and the species is known to have disappeared from many sites. It has been estimated that 95% of Victoria's native lowland grasslands have been grossly altered since European settlement. The major type of grassland known to support Striped Legless Lizard is the Western (Basalt) Plains Grassland community, and the majority of sites in Victoria occur on cracking clay soils with at least some surface rock which provides shelter (Cogger *et al.* 1996; Coulson 1995).

A very small percentage of the original habitat for Striped Legless Lizard now exists, and therefore this species is thought to probably occur in small, isolated populations because remaining habitat is very limited in area and severely fragmented (Webster *et al.* 2003).

1.5.1 Golden Sun Moth

Golden Sun Moth is listed as Critically Endangered under the EPBC Act, Threatened under the FFG Act and Critically Endangered on the Advisory List for Threatened Invertebrate Fauna in Victoria (DSE 2009).

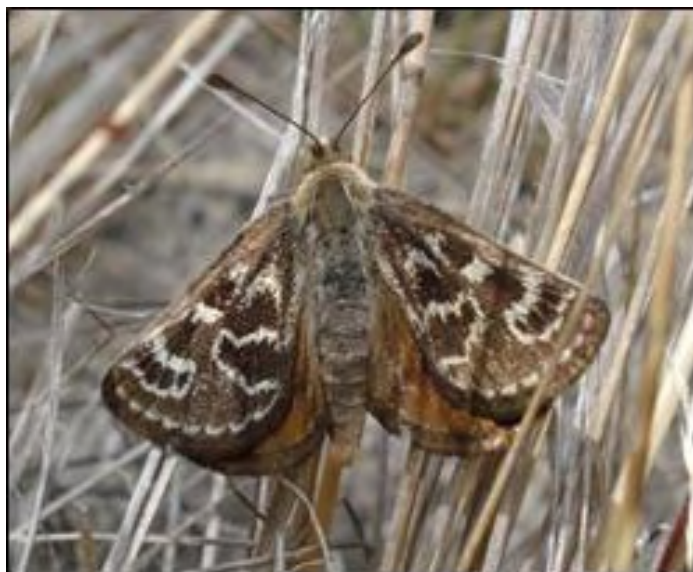


Plate 2. Golden Sun Moth (Ecology and Heritage Partners Pty Ltd)

The Golden Sun Moth typically occurs in native grassland and grassy woodland habitats dominated by greater than 40% cover of Wallaby-grass, in particular *Rytidosperma* spp. (DSE 2004), but may also inhabit areas dominated by Kangaroo Grass *Themeda triandra* (Endersby and Koehler 2006) and introduced grassland dominated by Chilean Needle-grass *Nassella neesiana* and other introduced species (A. Organ pers. obs.). Male flight is typically low, to about one metre above the ground, fast and can be prolonged, but they are generally not recorded flying more than 100 metres from suitable habitat (Clarke and O'Dwyer 1999). The male of this species generally flies between 11am and 3pm on calm, warm (over 20°C), sunny days.

Prior to European settlement, the Golden Sun Moth was widespread and relatively continuous throughout its range, inhabiting grassy open woodlands and grassland, although it now mainly inhabits small isolated sites (DSE 2004). The species is threatened by habitat loss, disturbance and fragmentation due to agricultural expansion and urbanisation. Many populations are isolated and fragmented, impeding the ability of the relatively immobile females to recolonise areas, thereby reducing the likelihood of genetic exchange (DSE 2004). Such populations are therefore vulnerable as there is little likelihood of recolonisation in the event of a local extinction.

2 METHODS

2.1 Nomenclature

The names of vertebrate fauna follow the Victorian Biodiversity Atlas (VBA) (DELWP 2016d). Common and scientific names of vascular plants follow both the VBA (DELWP 2016d) as well as the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007). Vegetation community names follow DELWP's EVC benchmarks (DELWP 2016b).

2.2 Desktop Assessment

Relevant literature, online-resources and numerous databases were reviewed to determine the likelihood of each target species occurring within the study area. The following information sources were reviewed:

- The VBA (DELWP 2016d) for previously documented fauna records within the project locality;
- The Atlas of Victorian Wildlife (AVW) (Viridans 2014b) for species descriptions and distribution;
- The Federal Department of Environment and Energy (DoEE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoEE 2016a);
- Information pertaining to the Striped Legless Lizard and Golden Sun Moth, including but not limited to the Species Profile and Threats Database (SPRAT; DoEE 2016b), relevant Significant Impact Guidelines under the EPBC Act (DEWHA 2009; DoE 2013), National Recovery Plans (Carter and Walsh 2006) and Action Statements under the Victorian FFG Act (DSE 2008);
- Aerial photography of the study area;
- Relevant environmental legislation and policies; and,
- Any previous ecological assessments within the study area.

2.3 Targeted Surveys

An overall site assessment was undertaken on the 22nd August 2016 to obtain information on fauna values within the study area. The study area was visually assessed with active searching under and around ground debris for reptiles, frogs and small mammals undertaken. The area was also scanned for birds, and observers listened for calls and searched for other signs of fauna such as nests, remains of dead animals, droppings and footprints.

Potential habitat for significant fauna species was identified based on the vegetation mapping and condition assessments undertaken as part of previous studies (Ecology and Heritage Partners 2015;2016a;2016b), with a particular emphasis on native Plains Grassland habitats that may provide shelter, food or other resources for the Striped Legless Lizard and Golden Sun Moth. Patches of Plains Grassland within the study area were assessed as providing suitable habitat for these species.

2.3.1 Striped Legless Lizard

The use of terracotta roof tile grids to survey for the Striped Legless Lizard has been demonstrated to be effective in detecting this species, and is a widely accepted method by regulatory authorities including DoEE (SEWPaC 2011; DSE 2010b). The grid of roof tiles acts as artificial refuge under which small ground-dwelling fauna seek shelter during cooler times of the day and cooler months of the year.

Two rectangular grids of terracotta roof tiles, 5 x 10 tiles (25 metres x 50 metres), were established within the two larger patches of Plains Grassland over the study area (Figure 3). Surveys were undertaken in accordance with the *Survey Guidelines for Australia's Threatened Reptiles* (SEWPaC 2011) and included:

- 100 (a total of two 5 x 10 grids) grooved terracotta roof tiles placed in areas of suitable Plains Grassland habitat within the study area. Tiles were laid in areas that have the highest likelihood of supporting Striped Legless Lizard (i.e. areas with connectivity to adjacent potential habitat along the railway reserve and with a higher cover of native grasses);
- Tile grids were laid on 22nd August 2016, with the first check commencing on 11th October 2016;
- Tiles were checked during cool weather conditions (i.e. less than 20 degrees Celsius) between 7.00am and 10.00am; and,
- Grids were checked on six occasions at approximately weekly intervals between October and November 2016 (on 11th, 19th, 25th October; and 3rd, 7th, 15th November).



Plate 1. Location of tile grid 1 (Ecology and Heritage Partners Pty Ltd 24/10/2016).



Plate 2. Location of tile grid 2 (Ecology and Heritage Partners Pty Ltd 24/10/2016).

2.3.2 Golden Sun Moth

Areas of suitable habitat were walked by qualified zoologists over four separate days during the known flight season (i.e. November to early January). In particular surveys focussed on areas supporting Wallaby-grass *Rytidosperma* spp. which is a known food source for the species. Surveys were undertaken at a time which is considered suitable for detecting the Golden Sun Moth (i.e. when adult males are flying), and when the species was observed flying at nearby locations.

Targeted surveys for Golden Sun Moth were undertaken over the study area on four separate occasions on 13 December and 20 December 2016, and 4, 9 January 2017. The Golden Sun Moth flight season for 2016 was delayed, not commencing until December, probably due to continued rainfall and cooler temperatures (Fabian Douglas, *pers comm*). However, survey procedures followed those outlined in the *Significant impact guidelines for the critically endangered golden sun moth* (DEWHA 2009), with the following undertaken:

- A habitat assessment was completed detailing information on habitat quality, biomass levels, presence of weeds and floristic diversity (Ecology and Heritage Partners 2016b);
- Surveys were conducted by ecologists experienced in the detection and identification of Golden Sun Moth;
- The study area was surveyed on four separate occasions, with at least one week between surveys;
- Surveys took place during the species' flight season (generally described as late October to early January). Moths were confirmed flying at known reference sites prior to undertaking each survey;
- Surveys were undertaken during weather conditions suitable for detecting the species (i.e. between 10am and 3pm on warm (over 20°C by 10am) days with minimal cloud cover and still conditions); and,
- Surveys were conducted by two qualified overservers walking 25 metre wide parallel transects across all areas of suitable habitat.

2.4 Assessment Qualifications and Limitations

Field assessments were undertaken during optimal seasons for the identification of the targeted fauna species with all mowing and slashing of the study area ceasing at least four weeks prior to surveys, allowing native vegetation to recover. While the southern tile grid remained intact for the duration of the survey period, the northern grid was affected by constant disturbance including tile theft, damage from slashing and public access. Nevertheless the disturbances to one tile grid are not expected to adversely affect the results of the targeted survey, with the tiles replaced immediately following the theft and damage.

Based on available information the Golden Sun Moth flight season (2016/17) commenced at a majority of sites in early-mid December. Striped Legless Lizard survey tile grids were inspected weekly over six weeks during appropriate conditions and during the appropriate season.

Fauna surveys were conducted under the Ecology and Heritage Partners Pty Ltd research and animal ethics permits.

It is therefore considered that appropriate survey effort has been employed to determine the status of each species within the study area.

3 RESULTS

3.1 Fauna Habitat

Patches of native Plains Grassland (EVC 132_61) have been mapped across the study area around the existing disturbed oval of introduced grasses and interface with residential areas (Ecology and Heritage Partners 2016b) (Figure 2). The Plains Grasslands patches varied in quality and species composition with dominant native grass species including Kangaroo Grass *Themeda triandra*, as well as various species of Wallaby-grasses *Rytidosperma* spp. and Spear-grasses *Austrostipa* spp. Not all Plains Grassland patches met the condition thresholds to be defined as the nationally significant ecological community NTGVVP, primarily because they were too small in size. Weed cover was also high in all Plains Grassland patches; ranging from approximately 30% to 60% (Ecology and Heritage Partners 2016b). Weed cover is particularly high due to the dominance of introduced annual grasses, particularly Oat *Avena* spp. and Soft Brome *Bromus hordeaceus* subsp. *hordeaceus*.

Two large patches of remnant grassland mapped over the study area were assessed as being more likely to provide habitat for the target fauna species. Although small patches of remnant Plains Grassland may occur within surrounding roadside and rail reserves, or private properties, adjoining areas are generally highly fragmented and predominantly consist of introduced vegetation, which lacks suitable habitat for either Striped Legless Lizard or Golden Sun Moth.

3.2 Striped Legless Lizard

The VBA identifies over 420 records of the Striped Legless Lizard within 10 kilometres of the study area (2016d), with the most recent from 2014 (Appendix 2.1). The closest records to the study area are from 0.5 kilometres to the east in grassland surrounding Deer Park Rail Station (from 2004), and to the west in grassland surrounding Robinson Rail Station (from 2003) (Figure 4). Several records are also included along the Western Freeway, 1.5 kilometres to the west of the study area (from 2007) (Figure 4).

The Striped Legless Lizard was not detected within the study area, despite the installation of tile grids and six weekly grid checks through the October to December period (Table 3). However; during the initial survey in October, approximately 50% of the tiles within tile grid No. 2 were missing. All tiles were replaced in time for the following survey on 19th October. Given the nature of the habitat, and the short duration that tiles were missing, it is unlikely that this irregularity significantly affected the survey findings.

Table 1. Striped Legless Lizard survey results

Date	Survey time	Temp. (°C)	Humidity (%)	Cloud cover (%)	No. SLL
11/10/2016	08:30	8 °C	77 %	12.5 %	0
19/10/2016	10:00	12 °C	58 %	0 %	0
25/10/2016	10:00	18 °C	50 %	30 %	0
03/11/2016	08:30	14 °C	74 %	12.5 %	0
07/11/2016	09:15	18 °C	51 %	50 %	0
15/11/2016	09:30	15 °C	70 %	60 %	0

Plains Grassland patches over the study area support a high cover of weeds (between 30% to 60%), primarily due to the dominance of introduced annual grasses (Ecology and Heritage Partners 2016b). No surface rocks, or other cover such as logs, that provide shelter are present. Small patches of remnant Plains Grassland also occur within surrounding roadsides and rail reserves; however, they are generally highly fragmented consisting predominantly of introduced vegetation, which lacks the suitable habitat variables for Striped Legless Lizard. Given the recent survey results, lack of preferred habitat variables, and the nature and extent of surrounding habitat, it is considered unlikely that the species is present.

3.3 Golden Sun Moth

One hundred records of the Golden Sun Moth within 10 kilometres of the study area are included within the VBA database (DELWP 2016d), with the most recent record sourced from 2010 (Appendix 2.1). The closest record to the study area is from three kilometres to the south-east (Figure 4).

Targeted surveys did not detect Golden Sun Moth within the study area, despite surveys being undertaken over four separate days at times when the species was known to be flying in comparable areas. The survey results and weather conditions are provided below (Table).

Table 4. Golden Sun Moth survey results

Date	Survey times	Reference Site	Temperature (°C) (9am and 3pm)		Wind (km/hr)	Cloud cover (%)	No. of days since rain	No. GSM
13/12/2016	1100 – 1200	Avalon	20.6	27.2	33	92	>2	0
20/12/2016	1130 – 1230	Avalon	14.6	25.2	22	80	>2	0
3/01/2017	1430 – 1530	Avalon	15.5	29.8	20	5	>2	0
9/01/2017	1210 – 1310	Avalon	17.4	21.2	<5	98	>2	0

Based on the results of targeted surveys, landscape context and the proximity of previous records, the Golden Sun Moth is considered to have a low likelihood of occurring within the study area (Appendix 3.2).

4 SIGNIFICANCE, IMPACTS AND MITIGATION MEASURES

The criteria adopted for assessing the ecological significance of the study area is presented in Appendix 1.3. No evidence of Golden Sun Moth or Striped Legless Lizard was detected during the surveys and these species are considered to have a low likelihood of occurring within the study area (Appendix 3.2). The proposed action is therefore unlikely to directly or indirectly impact significant fauna species.

However, the nationally-significant vegetation community NTGVVP (Critically Endangered), nationally-significant Spiny Rice-flower (Critically Endangered), and state-significant flora species and ecological communities have been previously recorded within the study area (Ecology and Heritage Partners 2016b). Based on these results the study area is considered to be of Moderate to High ecological significance (Ecology and Heritage Partners 2016b). Recommended measures to mitigate impacts associated with the proposed activity on known terrestrial ecological values are detailed in the Biodiversity Assessment report (Ecology and Heritage Partners 2016b).

5 LEGISLATIVE AND POLICY IMPLICATIONS

Given the low likelihood of Striped Legless Lizard and Golden Sun Moth occurring within the study area, there are no legislative implications relating to these species. Legislative and policy implications relating to other significant ecological values recorded within the study area are detailed in the Biodiversity Assessment report (Ecology and Heritage Partners 2016b).

REFERENCES

- Biosis Research Pty. Ltd. 2008. Targeted Survey of Golden Sun Moth in the Melbourne Area. Unpublished report prepared for FKP Property Group.
- Carter, O. & Walsh, N. 2006. National Recovery Plan for the Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*, Department of Sustainability and Environment, East Melbourne, Victoria.
- Christidis, L. & Boles, W.E. 2008. Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Collingwood, Victoria.
- Clarke, G.M. & C. O'Dwyer 1999. Further survey in southeastern New South Wales for the endangered golden sun moth, *Synemon plana*. Pg 77. CSIRO Entomology, Canberra.
- Cogger, H. G (Ed). 1996. Reptiles and Amphibians of Australia. 5th Edition. Reed Books Australia, Victoria.
- Cogger, H.G., Cameron, E.E., Sadler, R.A. & Egglar, P. 1993. The Action Plan for Australian Reptiles. Australia Nature Conservation Age.
- Cogger, H.G., Cameron, E.E., Sadler, R.A. and Egglar P., 1993. The Action Plan for Australian Reptiles. Australian Nature conservation Agency, Canberra, ACT.
- Coulson, G. 1990. Conservation Biology of the Striped Legless Lizard (*Delma impar*): an initial investigation. Arthur Rylah Institute for Environmental Research Technical Report Series No. 106, Department of Conservation and Environment, Melbourne.
- Coulson, G. 1995. Management directions for the Striped Legless Lizard (*Delma impar*) in the Australian Capital Territory. Technical Report 12. Wildlife Research Unit, ACT Parks & Conservation Service.
- Dear, C. 1996. Distribution of *Synemon plana*: a new encounter. Victorian Entomologist 26: 26-28.
- Dear, C. 1996. Distribution of *Synemon plana*: a new encounter. Victorian Entomologist 26: 26-28.
- Ecology and Heritage Partners Pty Ltd. 2015. Brimbank Native Vegetation Mapping Project Report. Prepared for Brimbank City Council. July 2015
- Ecology and Heritage Partners 2016a. Ecological Due Diligence Assessment: 57A Quinn Street, Deer Park, Victoria. Report for Brimbank City Council.
- Ecology and Heritage Partners 2016b. Biodiversity Assessment, 57A Quinn Street, Deer Park, Victoria. Report for Brimbank City Council.
- DELWP 2015. Biodiversity assessment handbook, Permitted clearing of native vegetation – Version 1.0. Victoria Department of Environment, Land, Water and Planning.
- DELWP 2016a. Native Vegetation Information Management Tool [WWW Document] URL <http://nvim.depi.vic.gov.au/>. Victorian Department of Environment, Land, Water and Planning.
- DELWP 2016b. Ecological Vegetation Class (EVC) Benchmarks for each Bioregion [WWW Document]. URL <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/evc-benchmarks#bioregionname>. Victorian Department of Environment, Land, Water and Planning.

- DELWP 2016c. Biodiversity Interactive Map [WWW Document]. URL <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/biodiversity-interactive-map>. Victorian Department of Environment, Land, Water and Planning.
- DELWP 2016d. Victorian Biodiversity Atlas. Sourced from: “VBA_FLORA25”, “VBA_FLORA100”, “VBA_FAUNA25”, “VBA_FAUNA100”, January 2016. Victorian Department of Environment, Land, Water and Planning.
- DELWP 2016e. Planning Maps Online [www Document]. URL <http://services.land.vic.gov.au/landchannel/jsp/map/PlanningMapsIntro.jsp>. Victoria Department of Environment, Land, Water and Planning.
- DELWP 2016f. Planning Schemes Online (www Document). URL <http://planningschemes.dpcd.vic.gov.au/> Victoria Department of Environment, Land, Water and Planning.
- DEPI 2013a. Permitted clearing of native vegetation - Biodiversity assessment guidelines (the Guidelines). Victorian Department of Environment and Primary Industries.
- DEPI 2014a. Advisory List of Threatened Vertebrate Fauna in Victoria - 2014. Department of Sustainability & Environment, Victoria.
- DEPI 2014b. Advisory List of Rare or Threatened Plants in Victoria. Victorian Department of Sustainability and Environment.
- DEWHA 2009. EPBC Act Policy Statement 3.11 - Significant Impact Guidelines for the Critically Endangered Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*). [Online]. Available from: <http://www.environment.gov.au/epbc/publications/pubs/spiny-rice-flower.pdf>.
- DoE 2013. Significant Impact Guidelines 1.1. Matters of National Environmental Significance. Federal Department of the Environment and Energy, Canberra.
- DoEE 2016a. Protected Matters Search Tool: Interactive Map [WWW Document]. URL <http://www.environment.gov.au/epbc/pmst/>. Federal Department of Environment, Canberra.
- DoEE 2016b. Species Profile and Threats Database: *Pimelea spinescens* subsp. *spinescens* — Spiny Rice-flower. Department of the Environment and Energy, Canberra.
- Dorrough, J. 1995. Past and present habitat of the Striped Legless Lizard, *Delma impar* (Pygopodidae), in the Australian Capital Territory. Unpublished report to the Australian Capital Territory Parks and Conservation Science, Australian Capital Territory.
- DSE 2004. Flora and Fauna Guarantee Act Action Statement: Five threatened Victoria Sun Moths. Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE 2004. Vegetation quality assessment manual: Guidelines for applying the habitat hectares scoring
- DSE 2008. Action Statement No. 132: Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*. Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE 2009. Advisory list of Threatened Invertebrate Fauna in Victoria – 2009. Victorian Department of Sustainability and Environment.

- DSE 2013. Advisory List of Rare or Threatened Fauna in Victoria. Victorian Department of Sustainability and Environment.
- Duncan, A., Baker, G.B. and Montgomery, N. (Eds) 1999. The Action Plan for Australian Bats. Environment Australia. Canberra, ACT.
- Ecology and Heritage Partners 2015 Brimbank Native Vegetation Mapping Project. Report for Brimbank City Council. July 2015.
- Ecology and Heritage Partners 2016a. Ecological Due Diligence Assessment: 57A Quinn Street, Deer Park, Victoria. Report for Brimbank City Council. July 2016.
- Ecology and Heritage Partners 2016b. Biodiversity Assessment: 57A Quinn Street, Deer Park, Victoria. Report for Brimbank City Council. November 2016.
- Endersby, I & Koehler, S. 2006. Golden Sun Moth *Synemon plana*: discovery of new populations around Melbourne. *The Victorian Naturalist* 123, 362-365.
- EPA 1991. Construction Techniques for Sediment Pollution Control. Published document prepared by the Victorian Environment Protection Authority, Victoria.
- EPA 1996. Environmental Guidelines for Major Construction Sites. Published document prepared by the Victorian Environmental Protection Authority (EPA).
- Garnett, S., J. Szabo and G. Dutson 2011. The action plan for Australian Birds 2010. Collingwood, Victoria: CSIRO Publishing.
- Gilmore, D., Koehler, S. O'Dwyer, C. & Moore, W. 2008. Golden Sun Moth *Synemon plana* (Lepidoptera: Castniidae): results of a broad survey of populations around Melbourne. *Victorian Naturalist* Vol. 125 (2).
- Menkhorst, P. and Knight, F. 2004. A Field Guide to the Mammals of Australia . 2nd Edition. Oxford University Press, Victoria.
- Mueck, S. 2000. Translocation of Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*) Laverton, Victoria. Technical report, Ecological Management and Restoration 1: 111–116.
- Nelson, J. S. 1994. *Fishes of the World*, 3rd Edition. John Wiley & Sons, New York.
- NRE 2002. Native Vegetation Management: A Framework for Action. Department of Natural Resources and Environment, Victoria.
- Sands, D.P.A. and New, T.R. 2002. The Action Plan for Australian Butterflies, Environment Australia, Canberra.
- Smith, W.J.S. & Robertson, P. 1999. National recovery plan for the Striped Legless Lizard (*Delma impar*) 1999-2003. Unpublished report to Environment Australia, Canberra.
- Strahan, R. (Ed) 1995. *The Mammals of Australia*. Reed Books, Sydney.
- Tyler, M.J. 1997. *The Action Plan for Australian Frogs*. Wildlife Australia: Canberra.
- Victorian Urban Stormwater Committee 1999. *Urban Stormwater: Best Practice Environmental Management Guidelines*. CSIRO.

Viridans 2014a. Flora Information System. Viridans Biological Databases.

Viridans 2014b. Victorian Fauna Database. Viridans Biological Databases.

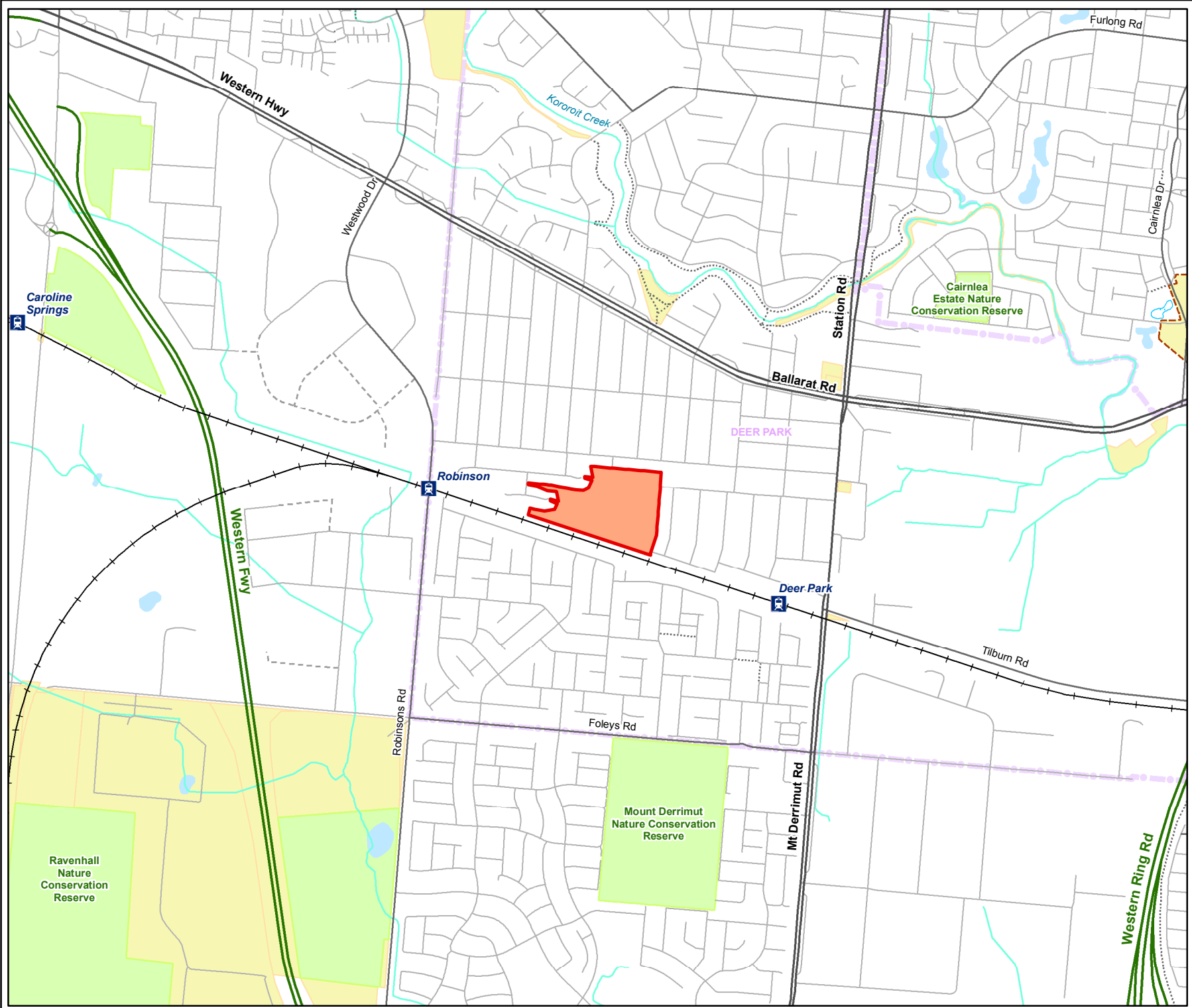
Walsh, N.G., Stajsic, V. 2007. A census of the vascular plants of Victoria, 8th ed. ed. Royal Botanic Gardens Melbourne.

Walsh, N.G., Stajsic, V. 2007. A census of the vascular plants of Victoria, 8th ed. ed. Royal Botanic Gardens Melbourne.

Webster, A., Fallu, R. & Preece, K. 2003. Flora and Fauna Guarantee Action Statement No. 17. Striped Legless Lizard *Delma impar* (updated website edition). Department of Conservation & Environment, Victoria.

Woinarski J. C. Z., Burbidge A. A. & Harrison P. 2014. The action plan for Australian mammals 2012. CSIRO Publishing, Melbourne.

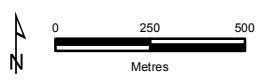
FIGURES



- Legend**
- Study Area
 - Railway
 - Freeway
 - Major Road
 - Collector Road
 - Minor Road
 - Proposed Road
 - Walking Track
 - Minor Watercourse
 - Permanent Waterbody
 - Wetland/Swamp
 - Parks and Reserves
 - Crown Land
 - Localities



Figure 1
Location of the study area
Targeted Surveys for Significant Fauna: Bon Thomas Reserve, Deer Park



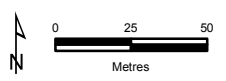
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

8521 Fig01_StudyArea 18/01/2017 melslv



- Legend**
- Study Area
 - Proposed pavilion footprint
 - Existing car park (recent construction)
 - Impact Area
- EPBC Act listed flora**
- ✱ Spiny Rice-flower
- Ecological Vegetation Classes**
- Plains Grassland
 - Plains Grassy Wetland
- EPBC Act listed vegetation community**
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Weeds**
- + Noxious weed
 - Serrated Tussock patch

Figure 2
Ecological features
Targeted Surveys for Significant Fauna: Bon Thomas Reserve, Deer Park



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

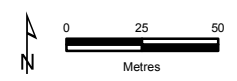
8521_Fig02_EcoFeat_18/01/2017_melsley



- Legend**
- Study Area
 - Tile grid locations
 - Proposed pavilion footprint
 - Existing car park (recent construction)
- Ecological Vegetation Classes**
- Plains Grassland
 - Plains Grassy Wetland

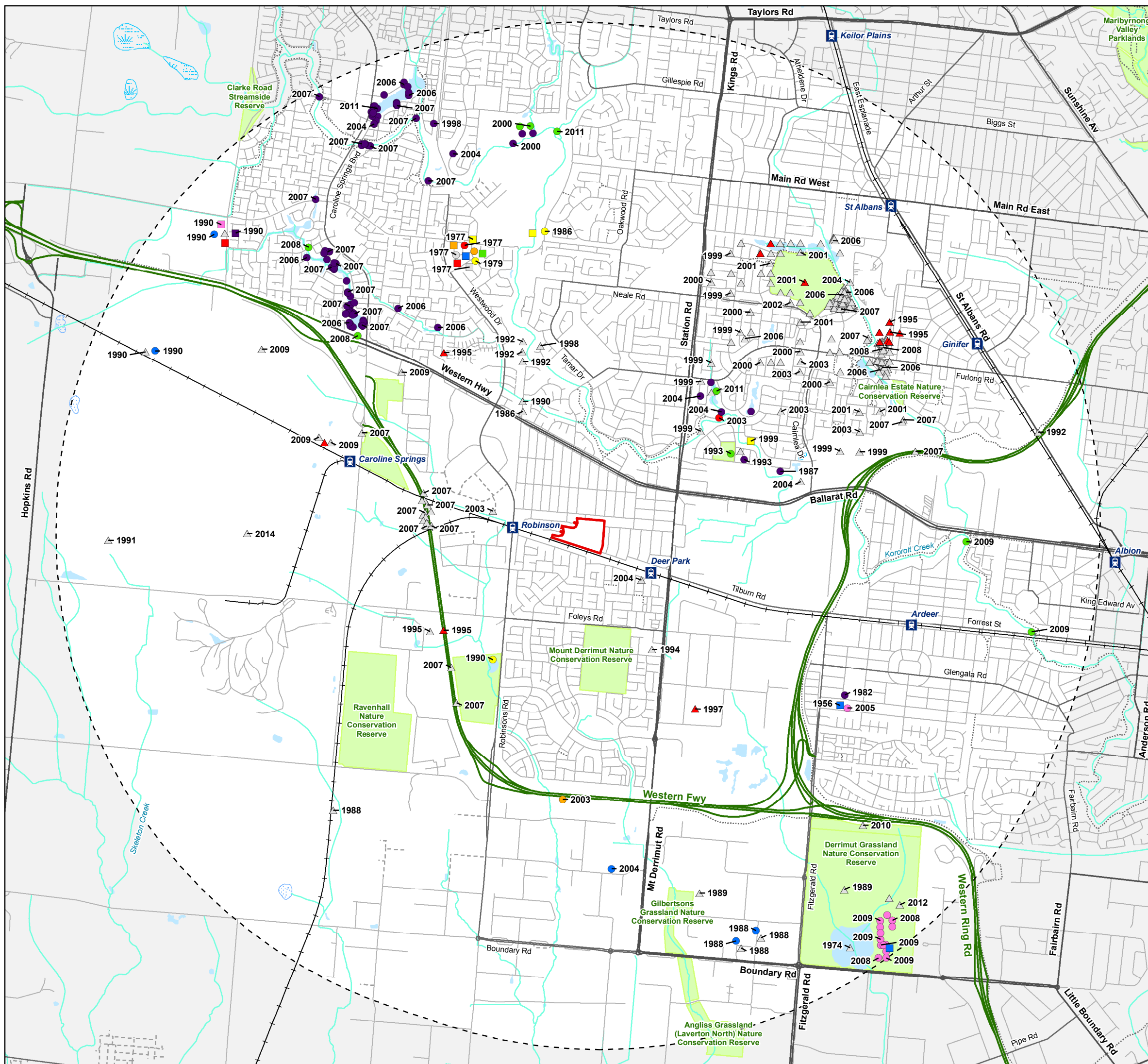


Figure 3
Tile grid locations
Targeted Surveys for Significant Fauna: Bon Thomas Reserve, Deer Park



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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- Legend**
- Study Area
 - Significant fauna**
 - Australian Painted Snipe
 - Baillon's Crake
 - Black Falcon
 - Eastern Great Egret
 - Eastern Snake-necked Turtle
 - Fat-tailed Dunnart
 - Golden Sun Moth
 - Growing Grass Frog
 - Hardhead
 - Latham's Snipe
 - Musk Duck
 - Nankeen Night Heron
 - Orange-bellied Parrot
 - Plains-wanderer
 - Red-chested Button-quail
 - Spotted Harrier
 - ▲ Striped Legless Lizard
 - ▲ Tussock Skink

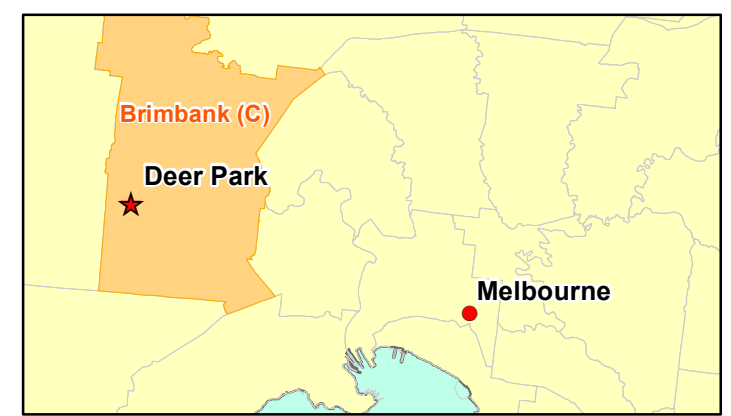


Figure 4
Previously documented significant fauna within 5km of the study area
Targeted Surveys for Significant Fauna: Bon Thomas Reserve, Deer Park

0 0.75 1.5
 Kilometres

VBA 2016. Victorian Biodiversity Atlas. // Sourced from: 'VBA_FLORA25' and 'VBA_FLORA100', January 2016 © The State of Victoria, Department of Environment, Land, Water and Planning. Records prior to 1949 not shown. Ecology and Heritage Partners recorded species have been submitted to but are not yet included in the VBA as at October 2014. VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

APPENDICES

APPENDIX 1

Appendix 1.1 – Rare or Threatened Categories for Listed Victorian Taxa

Table A1.1. Rare or Threatened categories for listed Victorian taxa.

Rare or Threatened Categories
Conservation Status in Australia (Based on the EPBC Act 1999)
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
Conservation Status in Victoria (Based on DSE 2005, DSE 2009, DSE 2013)
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: 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 total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

Appendix 1.2 – Defining Ecological Significance

Table A1.2a. Criteria for defining Ecological Significance ratings for significant flora, fauna and communities.

National Significance
<p>Flora: National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).</p>
<p>Fauna: National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. Extinct, Critically Endangered, Endangered, Vulnerable). Fauna listed as Extinct, Critically Endangered, Endangered, Vulnerable, or Rare under National Action Plans for terrestrial taxon prepared for DoE: threatened marsupials and monotremes (Maxwell et al. 1996), rodents (Lee 1995), bats (Duncan et al. 1999), birds (Garnett and Crowley 2000), reptiles (Cogger et al. 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).</p>
<p>Communities: Vegetation communities considered critically endangered, endangered or vulnerable under the EPBC Act and considering vegetation condition.</p>
State Significance
<p>Flora: Threatened taxa listed under the provisions of the FFG Act. Flora listed in the State Government’s Advisory List of Rare or Threatened Plants in Victoria (DSE 2005).</p>
<p>Fauna: Threatened taxon listed under Schedule 2 of the FFG Act. Fauna listed as Extinct, Critically Endangered, Endangered and Vulnerable on the State Government’s Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013). Listed as Lower Risk (Near Threatened, Conservation Dependent or Least concern) or Data Deficient under National Action Plans for terrestrial species prepared for the DoE: threatened marsupials and monotremes (Maxwell et al. 1996), rodents (Lee 1995), bats (Duncan et al. 1999), birds (Garnett and Crowley 2000), reptiles (Cogger et al. 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).</p>
<p>Communities: Ecological communities listed as threatened under the FFG Act. EVC listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion (DSE 2013c) and considering vegetation condition.</p>
Regional Significance
<p>Fauna: Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the particular Bioregion in which the study area is located. A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as Lower Risk – Near Threatened, Data Deficient or Insufficiently Known on the State Government’s Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013).</p>
<p>Communities: EVC listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion (DSE 2013c) and considering vegetation condition. EVC considered rare by the author for a particular bioregion.</p>
Local Significance
<p>Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.</p>

Table A1.2b. Criteria for defining Site Significance ratings.

National Significance
<p>A site is of National significance if:</p> <ul style="list-style-type: none"> • It regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as ‘Critically Endangered’ or ‘Endangered’ under the EPBC Act and/or under National Action Plans for terrestrial taxon prepared for the DoE. • It regularly supports, or has a high probability of supporting, an ‘important population’ as defined under the EPBC Act of one or more nationally ‘vulnerable’ flora and fauna taxon. • It is known to support, or has a high probability of supporting taxon listed as ‘Vulnerable’ under National Action Plans. • It is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as ‘Conservation Dependent’ under the EPBC Act and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. • It contains an area, or part thereof designated as ‘critical habitat’ under the EPBC Act, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. • It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
State Significance
<p>A site is of State significance if:</p> <ul style="list-style-type: none"> • It occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as ‘Critically Endangered’ or ‘Endangered’ under the EPBC Act and/or under National Action Plans. • It regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as ‘Vulnerable’, ‘Near threatened’, ‘Data Deficient’ or ‘Insufficiently Known’ in Victoria (DSE 2005, 2013), or species listed as ‘Data Deficient’ or ‘Insufficiently Known’ under National Action Plans. • It contains an area, or part thereof designated as ‘critical habitat’ under the FFG Act. • It supports, or likely to support a high proportion of any Victorian flora and fauna taxa. • It contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular bioregion. • It is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.
Regional Significance
<p>A site is of Regional significance if:</p> <ul style="list-style-type: none"> • It regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. • It contains a large population (i.e. greater than 1% or 5%) of flora considered rare in any regional native vegetation plan for a particular bioregion. • It supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. • It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
Local Significance
<p>Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as:</p> <ul style="list-style-type: none"> • An area which supports indigenous flora species and/or a remnant EVC, and habitats used by locally significant fauna species. • An area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

Appendix 1.3 – Defining Habitat Quality

Table A1.3. Defining Habitat Quality.

Criteria for defining Habitat Quality
<p>High Quality:</p> <ul style="list-style-type: none"> • High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups). • High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity). • High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat. • Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2005; 2009 or 2013.
<p>Moderate Quality:</p> <ul style="list-style-type: none"> • Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups. • Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes. • Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat. • Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2005; 2009 or 2013.
<p>Low Quality:</p> <ul style="list-style-type: none"> • Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups). • Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes. • Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat. • Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DSE 2005; 2009 or 2013.

APPENDIX 2

DRAFT

Appendix 2.1 – Desktop Fauna Results

Table A2.1 Significant fauna recorded within 10 kilometres of the study area.

Likelihood: Habitat characteristics of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings are defined below.

1 - High Likelihood

- Known resident in the study area based on site observations, database records, or expert advice; and/or,
- Recent records (i.e. within five years) of the species in the local area (DELWP 2016d); and/or,
- The study area contains the species' preferred habitat.

2 - Moderate Likelihood

- The species is likely to visit the study area regularly (i.e. at least seasonally); and/or,
- Previous records of the species in the local area (DELWP 2016d); and/or,
- The study area contains some characteristics of the species' preferred habitat.

3 - Low Likelihood

- The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or,
- There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or,
- The study area contains few or no characteristics of the species' preferred habitat.

4 - Unlikely

- No previous records of the species in the local area; and/or,
- The species may fly over the study area when moving between areas of more suitable habitat; and/or,
- Out of the species' range; and/or,
- No suitable habitat present.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likely occurrence in study area
NATIONAL SIGNIFICANCE								
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	2010	4	VU	L	VU	VU	4
Greater Glider #	<i>Petauroides volans</i>	-	-	VU	-	VU	-	4
Australasian Bittern	<i>Botaurus poiciloptilus</i>	1976	2	EN	L	EN	VU	4
Plains-wanderer	<i>Pedionomus torquatus</i>	1979	10	CR	L	CR	EN	4
Australian Painted Snipe	<i>Rostratula australis</i>	1977	1	VU	L	CR	VU	4
Swift Parrot	<i>Lathamus discolor</i>	2000	1	EN	L	EN	EN	4
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	1977	1	CR	L	CR	CR	4
Regent Honeyeater	<i>Anthochaera phrygia</i>	1905	1	CR	L	CR	EN	4
Striped Legless Lizard	<i>Delma impar</i>	2014	422	VU	L	EN	VU	3
Grassland Earless Dragon #	<i>Tympanocryptis pinguicollis</i>	-	-	EN	L	CR	VU	4
Growling Grass Frog	<i>Litoria raniformis</i>	2010	221	VU	L	EN	VU	4
Dwarf Galaxias #	<i>Galaxiella pusilla</i>	-	-	VU	L	EN	VU	4
Australian Grayling	<i>Prototroctes maraena</i>	2015	6	VU	L	VU	VU	4
Murray Cod	<i>Maccullochella peelii</i>	1981	2	VU	L	VU	-	4
Macquarie Perch	<i>Macquaria australasica</i>	1970	2	EN	L	EN	DD	4
Eltham Copper	<i>Paralucia pyrodiscus lucida</i>	1920	1	-	L	EN	VU	4
Golden Sun Moth	<i>Synemon plana</i>	2010	100	CR	L	CR	-	3
STATE SIGNIFICANCE								
Yellow-bellied Sheath-tail Bat	<i>Saccolaimus flaviventris</i>	2000	2	-	L	DD	LC	4
Musk Duck	<i>Biziura lobata</i>	2007	7	-	-	VU	-	4
Freckled Duck	<i>Stictonetta naevosa</i>	1990	1	-	L	EN	-	4
Australasian Shoveler	<i>Anas rhynchotis</i>	1997	7	-	-	VU	-	4

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likely occurrence in study area
Hardhead	<i>Aythya australis</i>	2001	8	-	-	VU	-	4
Blue-billed Duck	<i>Oxyura australis</i>	1996	2	-	L	EN	-	4
White-throated Needletail	<i>Hirundapus caudacutus</i>	2005	4	-	-	VU	-	4
Little Bittern	<i>Ixobrychus minutus dubius</i>	1980	1	-	L	EN	-	4
Eastern Great Egret	<i>Ardea modesta</i>	2001	8	-	L	VU	-	4
Little Egret	<i>Egretta garzetta nigripes</i>	1987	4	-	L	EN	-	4
Black Falcon	<i>Falco subniger</i>	2009	5	-	-	VU	-	4
Brolga	<i>Grus rubicunda</i>	2013	2	-	L	VU	-	4
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	1988	3	-	L	VU	NT	4
Baillon's Crake	<i>Porzana pusilla palustris</i>	2003	6	-	L	VU	-	4
Lesser Sand Plover	<i>Charadrius mongolus</i>	1976	1	-	-	CR	-	4
Terek Sandpiper	<i>Xenus cinereus</i>	1986	1	-	L	EN	-	4
Common Sandpiper	<i>Actitis hypoleucos</i>	1980	1	-	-	VU	-	4
Common Greenshank	<i>Tringa nebularia</i>	2008	5	-	-	VU	-	4
Marsh Sandpiper	<i>Tringa stagnatilis</i>	1994	5	-	-	VU	-	4
Great Knot	<i>Calidris tenuirostris</i>	1982	1	-	L	EN	-	4
Red-chested Button-quail	<i>Turnix pyrrhothorax</i>	1990	2	-	L	VU	-	4
Caspian Tern	<i>Hydroprogne caspia</i>	1980	1	-	L	NT	-	4
Brown Treecreeper (south-eastern ssp.)	<i>Climacteris picumnus victoriae</i>	1905	4	-	-	NT	NT	4
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	1902	2	-	L	EN	NT	4
Crested Bellbird	<i>Oreoica gutturalis gutturalis</i>	1800	1	-	L	NT	NT	4
Diamond Firetail	<i>Stagonopleura guttata</i>	1898	2	-	L	NT	NT	4
Murray Short-necked Turtle	<i>Emydura macquarii</i>	2008	1	-	-	VU	-	4

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likely occurrence in study area
Tussock Skink	<i>Pseudemoia pagenstecheri</i>	2008	74	-	-	VU	-	3
Brown Toadlet	<i>Pseudophryne bibronii</i>	2010	2	-	L	EN	DD	4
Freshwater Catfish	<i>Tandanus tandanus</i>	1997	3	-	L	EN	-	4
Southern Pygmy Perch	<i>Nannoperca australis</i>	2000	2	-	-	-	-	4
REGIONAL SIGNIFICANCE								
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>	2005	14	-	-	NT	-	3
Pied Cormorant	<i>Phalacrocorax varius</i>	1995	1	-	-	NT	-	4
Nankeen Night Heron	<i>Nycticorax caledonicus hillii</i>	1999	12	-	-	NT	-	4
Royal Spoonbill	<i>Platalea regia</i>	2001	3	-	-	NT	-	4
Spotted Harrier	<i>Circus assimilis</i>	2007	10	-	-	NT	-	3
Latham's Snipe	<i>Gallinago hardwickii</i>	2004	8	-	-	NT	-	4
Sanderling	<i>Calidris alba</i>	1987	5	-	-	NT	-	4
Long-toed Stint	<i>Calidris subminuta</i>	1984	1	-	-	NT	-	4
Pectoral Sandpiper	<i>Calidris melanotos</i>	1990	1	-	-	NT	-	4
Australian Pratincole	<i>Stiltia isabella</i>	1990	2	-	-	NT	-	4
Whiskered Tern	<i>Chlidonias hybridus javanicus</i>	1990	4	-	-	NT	-	4
White-winged Black Tern	<i>Chlidonias leucopterus</i>	1986	2	-	-	NT	-	4
Pacific Gull	<i>Larus pacificus pacificus</i>	1979	1	-	-	NT	-	4
Black-eared Cuckoo	<i>Chrysococcyx osculans</i>	1987	2	-	-	NT	-	4
Red-backed Kingfisher	<i>Todiramphus pyrropygia pyrropygia</i>	1982	2	-	-	NT	-	4
Long-necked Turtle	<i>Chelodina longicollis</i>	2011	13	-	-	DD	-	4
River Blackfish	<i>Gadopsis marmoratus</i>	1981	2	-	-	-	-	4

Notes: EPBC = *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), FFG = *Flora and Fauna Guarantee Act 1988* (FFG Act), DSE = Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013) , # = Records identified from EPBC Act Protected Matters Search Tool, L = Listed. Data sources: Victorian Biodiversity Atlas (DELWP 2016d); Victorian Fauna Database (Viridans 2014b); Protected Matters Search Tool (DoE 2016). Taxonomic order: Mammals (Strahan 1995 in Menkhorst & Knight 2004); Birds (Christidis & Boles, 2008); Reptiles and Amphibians (Cogger *et al.* 1983 in Cogger 1996); Fish (Nelson 1994); Mussels & Crustaceans (Alphabetical); Invertebrates (Alphabetical).

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