

Fauna Inventory Report: Western Grassland Reserve – Mount Cottrell NCR

Melbourne Strategic Assessment



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Front cover photo

Common Blue-tongued Lizard (*Tiliqua scinoides*) from roof tile survey.

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Terms and abbreviations

BCS	Biodiversity Conservation Strategy for Melbourne's Growth Areas (DEPI, 2013)
CaLP Act	The Victorian Catchment and Land Protection Act 1994
DEPI	The former Victorian Department of Environment and Primary Industries (now DELWP)
DELWP	The Victorian Department of Environment, Land, Water and the Environment
DSE	The former Victorian Department of Sustainability and Environment (now DELWP)
EPBC Act	The Federal Environment Protection and Biodiversity Conservation Act 1999
EVC	Ecological Vegetation Class, the units used to describe vegetation type in Victoria
FFG Act	The Victorian Flora and Fauna Guarantee Act 1988
MNES	Matters of National Environmental Significance, as listed under the EPBC-Act.
NCR	Nature Conservation Reserve
WGR	Western Grassland Reserve

Introduction

The Western Grassland Reserve

The Victorian Government has committed to establish a series of Conservation Areas on the periphery of Melbourne for the conservation of threatened plants, animals and ecological communities (DEPI, 2013). They include a network of small areas within Melbourne's Urban Growth Boundary, as well as the larger Western Grassland Reserve (WGR, 15,000 ha) and the Grassy Eucalypt Woodland Reserve (approximately 1,200 ha).

The establishment of the reserves is the result of the Melbourne Strategic Assessment (MSA), which aims to mitigate environmental losses caused by the expansion of Melbourne's Urban Growth Boundary. This expansion will impact on 'Matters of National Environmental Significance (MNES)' listed under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A 'Strategic Impact Assessment' conducted by the Victorian Government recommended ways of mitigating environmental impacts. The mitigation measures agreed to by the Victorian and Australian governments are outlined in the 'Program Report' and the 'Biodiversity Conservation Strategy (DSE, 2009; DEPI, 2013). The commitments include regular reporting on ecological outcomes. A Monitoring and Reporting Framework (MRF) provides the logic and basis for monitoring target species and communities (DELWP, 2015a). The MRF gives specific Key Performance Indicators (KPIs) for each listed species and vegetation community.

All Conservation Areas will be managed to achieve these management targets. The precise management strategy required to achieve the targets will, however, vary from place to place. Each area is different, and each supports a wide range of plant and animal species, has different vegetation patterns, management issues, and other features. Detailed information about the type and distribution of assets and threats is required for each property that is protected. Much of that information will be contained in Fauna Inventory and Vegetation Inventory documents for each property.

Purpose and scope

This Fauna Inventory Report forms part of the basic information required to start managing protected land. It should serve as a useful reference for managers, and also the logical basis of management actions. The specific purpose of this document is to:

- Identify any EPBC-listed animal species that are the targets of conservation measures under the MSA
- Provide enough information about the distribution of animals on the land to allow management planning to proceed.
- Fulfil (for the survey area) DELWP's commitment to produce a detailed inventory of the fauna values within the WGR (DSE, 2011, p38)
- Provide a qualitative baseline describing the fauna when the survey area is brought into the WGR

This document does not:

- constitute a management plan,
- describe the vegetation of the survey area (available in DELWP (2015b)),
- make any claims about the likely presence or absence of values not recorded.

The Survey Area

This report covers the Western Grassland Reserve - Mount Cottrell Nature Conservation Reserve (NCR), a rectangular block of land on the west of Troups Rd South, Mount Cottrell (44.3 ha). The survey area is shown in Figure 1.

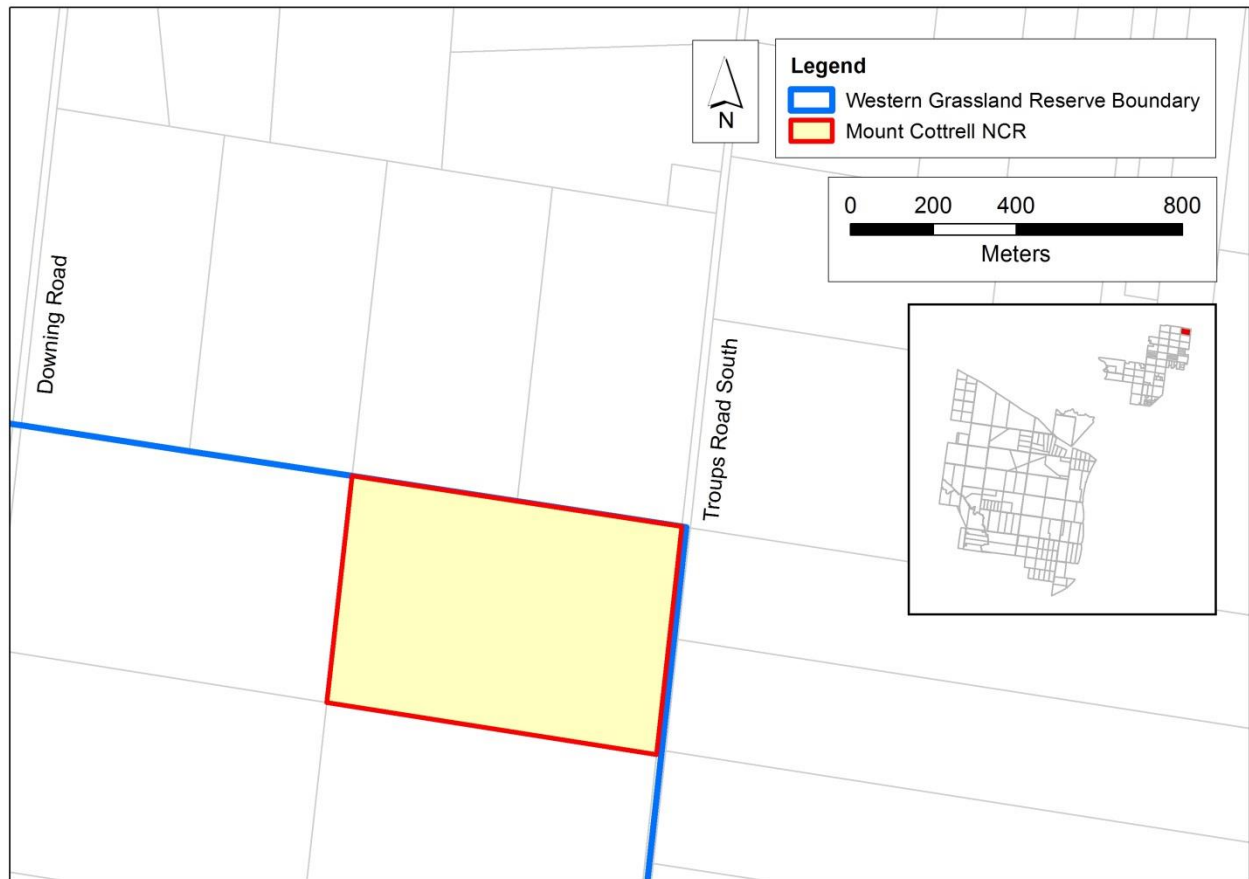


Figure 1. The location of Mount Cottrell NCR. Insert shows the location of Mount Cottrell NCR (red) within the Western Grassland Reserve.

Previous survey information

This area has not been the subject of any previous fauna surveys.

Methods

The site was surveyed using the methods described in DELWP (2015c). As this is a small property dominated by grassland not all survey techniques described in DELWP (2015c) were conducted. Figure 2 shows the survey locations.

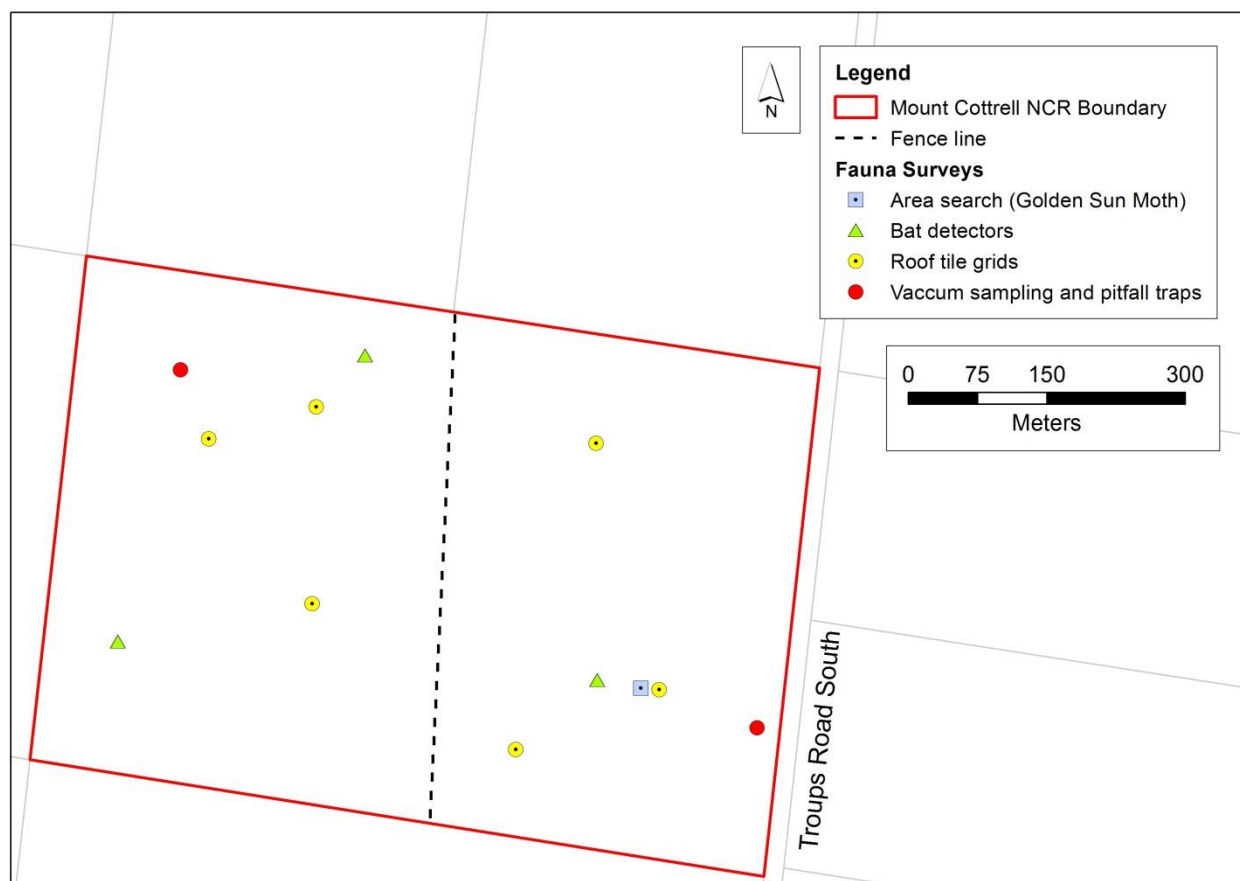


Figure 2. Survey locations at Mount Cottrell NCR by survey type.

Roof tile grids (general)

One relatively economical and effective technique for surveying terrestrial vertebrates, especially small reptiles and mammals, is artificial cover such as roof tiles. Studies that use such artificial cover have been employed across different habitats in Victoria (e.g. south-western Victoria, north-central Victoria, alpine region) (e.g. Schulz et al., 1995; Thompson, 2006; Homan, 2012; Michael et al., 2012; O'Shea, 2013). Terracotta roof tiles are commonly used; they can be checked quickly and can remain in situ for medium or long-term investigations.

At this site, three roof tile grids were installed during September 2014 to supplement three existing grids installed in 2005 (Brett Lane & Associates, 2006) (Figure 2). Each grid of 50 roof tiles was configured as ten lines of five tiles, each five metres apart. These grids, principally targeting reptiles, were checked six times in spring 2014 and autumn 2015.

Table 1. Details of roof tile grids (GDA 94, z55).

Grid No.	Easting	Northing	First survey date	Final survey date
East 1	294053	5818041	29/08/2014	22/04/2015
East 2	294207	5818109	29/08/2014	22/04/2015
East 3	294133	5818374	29/08/2014	22/04/2015
West 1	293829	5818194	15/10/2014	24/06/2015
West 2	293713	5818370	15/10/2014	24/06/2015
West 3	293829	5818407	15/10/2014	24/06/2015

Roof tile grids (Striped Legless Lizard)

Targeted roof tile grids were set up at one location on the parcel. Each grid was a rectangle of 10 x 5 ceramic roof tiles spaced 5 m apart, 50 tiles per grid in total (Table 2). The tile grids were established two months prior to commencing the survey. In line with the optional conditions for detecting the Striped Legless Lizard, surveys were conducted between 10am and 4pm, when the tile temperature was 18-40°C and the ambient air temperature was between 15-30°C. At each tile grid the sheltered area underneath the tiles was inspected for evidence of lizard presence, including sloughed skins. Six repeat tile checks of each grid were conducted at least one week apart. Tile checks occurred at different times of the day on each occasion for any given tile grid during the survey period (i.e. randomly allocate daily site check order).

Table 2. Details of targeted Striped Legless Lizard roof tile grids (GDA 94, z55).

Grid No.	Easting	Northing	First survey date	Final survey date
1	293941	5818280	10/09/2015	5/11/2015

Diurnal survey (birds)

Surveys for diurnal birds were conducted across two paddocks (east and west of the fence; Figure 2) by one experienced observer on 25th September 2014 between 16:15-17:50. Each paddock was walked in transects ~50 m apart. All birds seen or heard were identified and the number of individuals counted.

Spotlighting (Plains-wanderer)

A spotlighting survey, targeting the threatened Plains-wanderer, was conducted on 18th November 2014, between 20:30 and 23:30. One experienced observer walked each transect, using powerful LED torches to scan the area for three hours. All birds detected were counted and recorded. During the day preceding the spotlighting surveys, survey transects (~20 m apart) were established using a GPS. Poles with reflective tape were placed at the end of each transect.

Bat detectors

Computerised bat echolocation call detector units (AnaBatTM SD2, Titley Scientific) were installed at three locations in Mount Cottrell NCR (Figure 3). The units were employed during fine weather for 14-16 consecutive nights and programmed to record bat calls between dusk and dawn. Ultrasonic bat calls were subsequently downloaded to a computer and species (or species complexes where individual species could not reliably be distinguished) subsequently identified electronically using *AnaScheme*, call recognition software that recognises individual bat calls by their sonic characteristics. *AnaScheme* reads sound files

recorded by Anabat detectors and models individual bat search-phase pulses using regression analysis (Adams et al., 2010). Pulses are identified using a regional identification key. This is followed by visual inspection of uncertain calls.

Area search (Golden Sun Moth)

A survey for the Golden Sun Moth was conducted according to the protocol described in the MRF (DELWP, 2015a). One 400 x 400 m plot, comprising 20 transects (oriented north-south) 20 m apart, was established in the eastern paddock (Table 3; Figure 2). The plot was searched for flying male moths under suitable environmental conditions. Under the protocol searching continued until an individual was detected or the whole plot searched. The time to first detection or the total time taken to survey the plot (in the absence of detection) was recorded. Surveys for Golden Sun Moth were conducted in 2014 and 2015.

Table 3. 2014 Golden Sun Moth plot location (GDA 94, z55).

Plot	Easting	Northing	Survey date
MC1 (2014)	294187	5818110	04/12/2014
MC1 (2015)	284731	5799362	9/11/2015

Vacuum sampling and pitfall traps

Terrestrial arachnids were surveyed using pitfall traps and vacuum transects, at two locations, a sub-set of those locations selected for grassland monitoring (DEWLP, 2015b) (Table 4, Figure 2).

Pitfall traps

At each location 30 traps were established in two lines of five (traps 4 m apart) and two lines of ten (traps 2 m apart), one metre outside of the plot (Figure 3). Traps comprised two disposable plastic drinking cups (one placed inside the other, 200 ml volume, 65 mm diameter, and 90 mm deep). The preservative propylene glycol was added to the cups to a depth of approximately 10 mm. Traps were left in place for four nights, after which the contents of each trap were collected and placed in a separate vial.

Vacuum sampling

Within each of the plots, five 20 m transects were established, running north-south, 4 m apart and 2 m from the edge of the plot (Figure 3). Specimens were collected using a hand-held vacuum sampler (Doxon et al., 2011), the opening covered by a mesh bag that retained the sample. Each transect was walked at a slow pace and samples were taken to ~50 cm either side of the transect. Samples from each transect were placed in a separate bag.

Sample identification

Arachnid samples were sorted from other material and preserved in vials containing 70% ethanol. Any vertebrates captured were also recorded and retained. For this report spiders were identified to family according to the taxonomy in Davies (1986) and Raven et al. (2002). Common names of spider families follow Framenau et al. (2014). Specimens that were difficult to identify were identified by taxon experts at Museum Victoria.

Table 4. Details and location (GDA 94, z55) of Arachnid sampling sites. Site numbers correspond to the vegetation monitoring plots for this property (DELWP, 2015b).

Site	NTG State	Easting	Northing	Pitfall start	Pitfall end	Vacuum
1	HNG	294314	5818070	14/11/2014	18/11/2014	18/11/2014
7	HNG	293681	5818444	14/11/2014	18/11/2014	18/11/2014

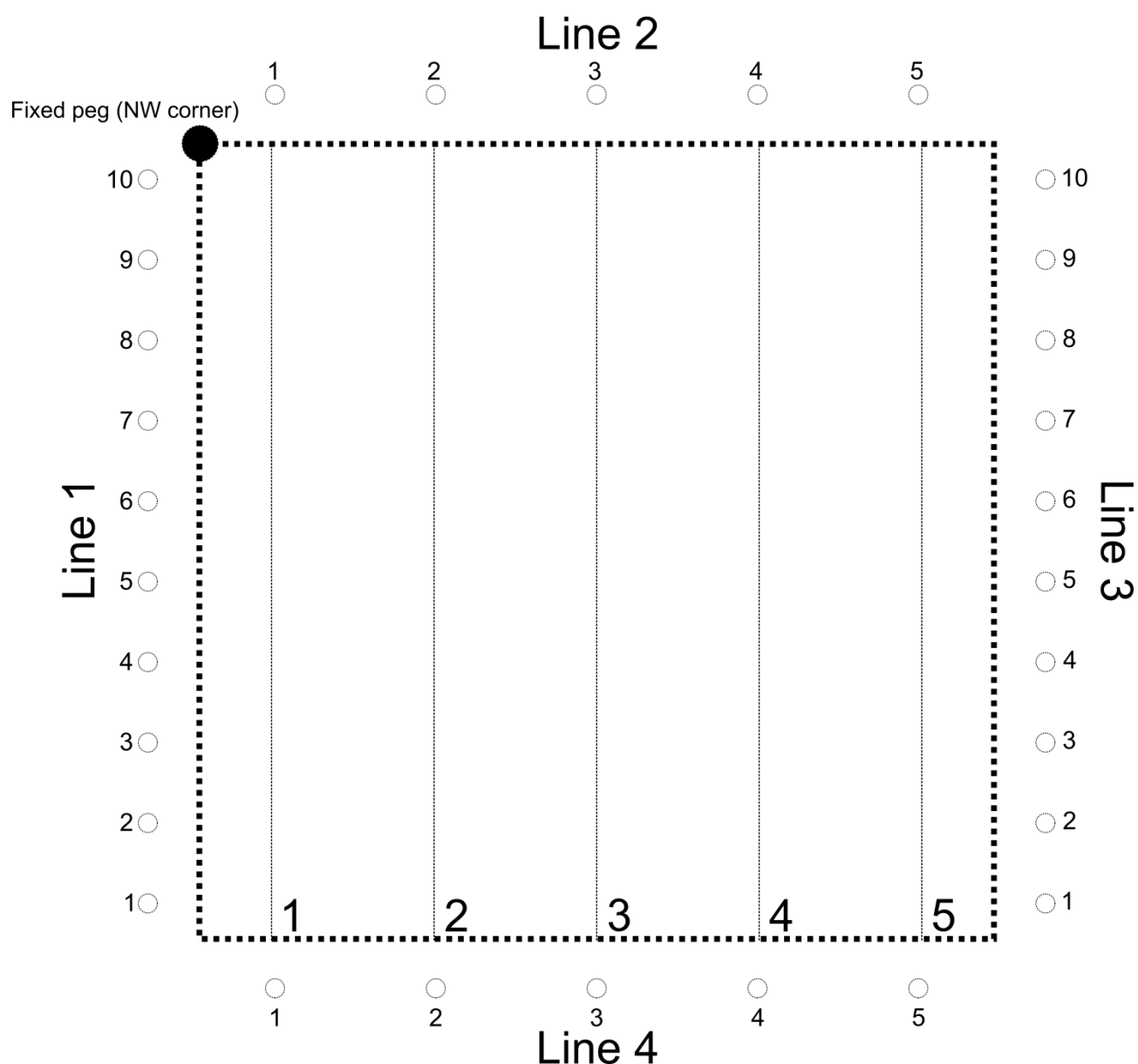


Figure 3. Arrangement of arachnid pitfall traps and vacuum sampling transects. Arrangement of arachnid pitfall traps and vacuum sampling transects. Lines (1 to 4) indicate lines of pitfall traps (open circles), the solid lines (1 to 5) are the vacuum transects and the dashed lines are the 20 m x 20 m perimeter of the vegetation monitoring plot.

Incidental records

Incidental records of vertebrates were collected from Mount Cottrell NCR during the survey season, usually while staff were in transit or outside of the times dedicated to standardised surveys.

Results

Roof tile grids

Four vertebrate species were recorded during the roof tile grid survey, one introduced (*) mammal, two native reptile and one native amphibian species (Table 5). All species recorded are considered common in grassland habitats of the Keilor plains.

Table 5. Vertebrate records from roof tile grids.

Common name	Scientific name	No. of records
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>	4
House Mouse*	<i>Mus musculus</i>	4
Tiger snake	<i>Notechis scutatus</i>	1
Common Blue-tongue	<i>Tiliqua scincoides</i>	15

Roof tile grids (Striped Legless Lizard)

No Striped Legless Lizards were found during the targeted Striped Legless Lizard roof tile grid survey.

Diurnal survey (birds)

Fourteen bird species, including three introduced species (*), were detected during diurnal bird surveys, the most common being the Little Raven (39% total records) (Table 6).

Table 6. Bird species detected during the diurnal survey of Mount Cottrell NCR on 25th September, 2014.

Common name	Scientific name	No. of records
Common Skylark*	<i>Alauda arvensis</i>	9
Red Wattlebird	<i>Anthochaera carunculata</i>	4
Richard's Pipit	<i>Anthus richardi</i>	3
European Goldfinch*	<i>Carduelis carduelis</i>	4
Australian Wood Duck	<i>Chenonetta jubata</i>	2
European Greenfinch*	<i>Chloris chloris</i>	1
Little Raven	<i>Corvus mellori</i>	23
Stubble Quail	<i>Coturnix pectoralis</i>	2
Brown Falcon	<i>Falco berigora</i>	1
Magpie Lark	<i>Grallina cyanoleuca</i>	4
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	2
Crested Pigeon	<i>Ocyphaps lophotes</i>	1
Willie Wagtail	<i>Rhipidura leucophrys</i>	2
Masked Lapwing	<i>Vanellus miles</i>	1

Spotlighting (Plains-wanderer)

Four bird species were detected during nocturnal bird surveys, including one introduced species (*) and the Brown Songlark which was not detected during diurnal surveys (Table 7). The target species, Plains-wanderer, was not detected.

Table 7. Nocturnal birds recorded from Mount Cottrell NCR on November 28th, 2014.

Common name	Scientific name	No. of records
Common Skylark*	<i>Alauda arvensis</i>	2
Stubble Quail	<i>Coturnix pectoralis</i>	3
Brown Songlark	<i>Megalurus cruralis</i>	2
Singing Bushlark	<i>Miafra javanica</i>	4

Bat detectors

AnaBat detectors recorded at least seven insectivorous bat species, all of which are common and widespread species in south-eastern Australia (Table 8).

Table 8. Occurrence of insectivorous bats derived from the AnaBat detectors for Mount Cottrell NCR. The habitat at each detector location was; MC1: grassland, W2: grassland near dam and W3: grassland near trees. ^The calls of three species of Long-eared Bat (*Nyctophilus*) cannot be distinguished from each other.

Common name	Scientific name	MC1	MC2	MC3
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	✓	✓	✓
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	✓	✓	✓
Southern Freetail Bat	<i>Mormopterus planiceps</i> (lp)	✓	✓	✓
Long-eared Bats^	<i>Nyctophilus geoffroyi/gouldi/timoriensis</i>	✓	✓	✓
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>	✓	✓	
White-striped Freetail Bat	<i>Tadarida australis</i>	✓	✓	✓
Little Forest Bat	<i>Vespadelus vulturnus</i>	✓	✓	

Area search (Golden Sun Moth)

Golden Sun Moths were detected at the site in 2015: the time to detection was 19 minutes (Table 9).

Table 9. Results of area searches for Golden Sun Moth at One Tree East (GDA 94, z55).

Plot	Easting	Northing	Moth detected	Time to detection (mins)
MC1 (2014)	294187	5818110	x	n/a
MC1 (2015)	284731	5799362	✓	19

Vacuum sampling and pitfall traps

Spider surveys yielded 373 specimens from six families, 59 (18%) specimens were not identified to family level (Table 10). No spiders could be identified from the vacuum samples. Unidentified spiders were mostly juveniles with features that were not developed enough for identification. Two spider families, Lycosidae (Wolf Spiders) and Miturgidae (Prowling Spiders), were particularly common. Three families Salticidae

(Jumping Spiders), Prodidomidae (Long Spinneret Ground Spiders) and Zodariidae (Ant Spiders) were uncommon represented by four, two and one specimens respectively

Table 10. Spider families recorded from pitfall and vacuum sampling in Mount Cottrell NCR in 2014.

Common name	Scientific name	Pitfall	Vacuum	Total
Ground Spiders	Gnaphosidae	13		13
Wolf Spiders	Lycosidae	297		297
Prowling Spiders	Miturgidae	36		36
Long Spinneret Ground Spiders	Prodidomidae	2		2
Jumping Spiders	Salticidae	4		4
Ant Spiders	Zodariidae	1		1
Unidentified		13	7	20
Total		366	7	373

Incidental observations

Four additional vertebrate species were recorded incidentally during fauna surveys of the Mount Cottrell NCR, comprising generally widespread and common species, one of which is an introduced species (*) (Table 11).

Table 11. Species recorded incidentally from Mount Cottrell NCR during visits September 2014-June 2015.

Common name	Scientific name
Wedge-tailed Eagle	<i>Aquila audax</i>
Redback Spider	<i>Latrodectus hasseltii</i> (Family: Theridiidae)
Eastern Grey Kangaroo	<i>Macropus giganteus</i>
Zebra Finch	<i>Taeniopygia guttata</i>
Red Fox*	<i>Vulpes vulpes</i>

Threatened species

Golden Sun Moth (*Synemon plana*) was the only threatened species recorded from the Mount Cottrell NCR during this study.

Conclusion

Thirty-three terrestrial vertebrate species were recorded during the 2014-2015 survey of Mount Cottrell NCR in the WGR, comprising ten mammal species (including at least seven bat species), 19 bird species, two reptile species, one insect and one frog species. In all, five introduced species were recorded, comprising two mammal species and three bird species. Most of the species identified from the Mount Cottrell NCR during this study are common and widespread and considered habitat generalists.

Seven spider families were recorded. These families are principally hunting spiders (Gnaphosidae, Lycosidae, Miturgidae, Salticidae and Prodidomidae). However, the tangle-web building Redback Spider (*Latrodectus hasseltii*) and the ant and termite specialist family Zodariidae were also found.

A list of all species from Mount Cottrell NCR, recorded during this study, is provided in Appendix 1.

Threatened species

The Golden Sun Moth (*Synemon plana*) is a medium-sized day-flying moth restricted to Victoria, the Australian Capital Territory and adjacent areas of southern New South Wales (Victorian Department of Sustainability and Environment, 2004; Department of the Environment Water Heritage and the Arts, 2009). It inhabits grassy areas, including native grasslands and grassy woodlands as well as areas of introduced (non-native) grasses (pastures) and weeds. It is listed as Critically Endangered under the Commonwealth EPBC Act 1999 and is also listed as a threatened species under the Victorian FFG Act 1988 (Department of Sustainability and Environment 2008). An open tussock structure with sparse inter-tussock spaces and/or much bare ground is presumed to be an important attribute of a site supporting the species (Gilmore et al., 2008; Brown et al., 2012; New, 2012; Richter et al., 2013). The Golden Sun Moth has previously been recorded from the block and the general area during targeted surveys (Biosis Research, 2011).

There are no other recent records (within the past five years) of threatened species in the Mount Cottrell NCR. However Striped Legless Lizard (*Delma impar*) and Fat-tailed Dunnart (*Sminthopsis crassicaudata*) were detected in surveys conducted in 2005 (Brett Lane & Associates, 2006). Although not recorded in Mount Cottrell NCR, there are historical records of the following threatened vertebrate species from the surrounding area: Plains-wanderer (*Pedionomus torquatus*), Swift Parrot (*Lathamus discolor*) and Grassland Earless Dragon (*Tympanocryptis pinguicolla*).

Introduced species

One species of introduced predator, Red Fox (*Vulpes vulpes*) was detected during this study. It is also possible that cats (*Felis catus*) visit the site. A further four introduced vertebrates were also detected including House Mouse (*Mus musculus*) and three bird species.

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Appendix 1: List of taxa recorded by different survey methods

The list below presents all species of terrestrial vertebrates, ordered alphabetically by genus then species within each vertebrate group, recorded during surveys of Mount Cottrell NCR. Introduced species are indicated with an asterisk (*).

Common name	Scientific name	Roof tile grids	Diurnal survey (birds)	Spotlighting – Plains Wanderer	Bat detectors	Area search - GSM	Spider surveys – pitfall and/or vacuum	Additional species from Incidental Records
Mammals								
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>				✓			
Chocolate Wattled Bat	<i>Chalinolobus morio</i>				✓			
Eastern Grey Kangaroo	<i>Macropus giganteus</i>							✓
Southern Freetail Bat	<i>Mormopterus planiceps</i> (lp)				✓			
House Mouse*	<i>Mus musculus</i>	✓						
Long-eared Bats	<i>Nyctophilus geoffroyi/gouldi/timoriensis</i>				✓			
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>				✓			
White-striped Freetail Bat	<i>Tadarida australis</i>				✓			
Large Forest Bat	<i>Vespadelus darlingtoni</i>				✓			
Red Fox*	<i>Vulpes vulpes</i>							✓
Birds								
Common Skylark*	<i>Alauda arvensis</i>		✓	✓				
Red Wattlebird	<i>Anthochaera carunculata</i>		✓					
Richard's pipit	<i>Anthus richardi</i>		✓					
Wedge-tailed Eagle	<i>Aquila audax</i>							✓
European Goldfinch*	<i>Carduelis carduelis</i>		✓					
Australian Wood Duck	<i>Chenonetta jubata</i>		✓					
European Greenfinch*	<i>Chloris chloris</i>		✓					
Brown Songlark	<i>Cincloramphus cruralis</i>			✓				
Little Raven	<i>Corvus mellori</i>		✓					
Stubble Quail	<i>Coturnix pectoralis</i>		✓	✓				
White-fronted Chat	<i>Epthianura albifrons</i>		✓					
Brown Falcon	<i>Falco berigora</i>		✓					
Magpie-lark	<i>Grallina cyanoleuca</i>		✓					
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>		✓					
Singing Bushlark	<i>Mirafrja javanica</i>			✓				

Common name	Scientific name	Roof tile grids	Diurnal survey (birds)	Spotlighting – Plains Wanderer	Bat detectors	Area search - GSM	Spider surveys – pitfall and/or vacuum	Additional species from Incidental Records
Crested Pigeon	<i>Ocyphaps lophotes</i>		✓					
Willie Wagtail	<i>Rhipidura leucophrys</i>		✓					
Zebra Finch	<i>Taeniopygia guttata</i>							✓
Masked Lapwing	<i>Vanellus miles</i>		✓					
Reptiles								
Tiger Snake	<i>Notechis scutatus</i>	✓						
Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>	✓						
Frogs								
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>	✓						
Insects								
Golden Sun Moth	<i>Synemon plana</i>					✓		
Spiders								
Ground Spiders	Gnaphosidae						✓	
Wolf Spiders	Lycosidae						✓	
Prowling Spiders	Miturgidae						✓	
Long Spinneret Ground Spiders	Prodidomidae						✓	
Jumping Spiders	Salticidae						✓	
Redback Spider	Theridiidae (<i>Latrodectus hasseltii</i>)							✓
Ant Spiders	Zodariidae						✓	

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