# *FLORA AND FAUNA ASSESSMENT*

## *PROPOSED ADDITIONAL WIND TURBINES*
## *WOODLAWN WIND FARM*
## *GOULBURN MULWAREE COUNCIL*

*prepared by*

***KEVIN MILLS & ASSOCIATES***
*ECOLOGICAL AND ENVIRONMENTAL CONSULTANTS*
*114 NORTH CURRAMORE ROAD*
*JAMBEROO NSW 2533*
*ABN 346 816 238 93*

*for*

***INFIGEN ENERGY***
LEVEL 22, 56 PITT STREET
*SYDNEY NSW 2000*

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*Kevin Mills & Associates Pty Limited ACN 003 441 610*
*as trustee for Kevin Mills & Associates Trust*

## Document Reference

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**Kevin Mills & Associates**
Ecological and Environmental Consultants
114 North Curramore Road
Jamberoo NSW 2533
ABN 346 816 238 93

Ph: (02) 4236 0620
Mob.: 0419248094
Email: k.mills@bigpond.net.au

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## 1. Introduction

Infigen Energy is preparing a development application under the *Environment Protection & Assessment Act 1979* for the construction of three additional wind turbines on their Woodlawn Wind Farm Project. The existing wind farm, yet to be constructed, has been previously approved by the Minister.

The purpose of the Flora and Fauna Assessment report is to describe the biota associated with the study area and assess the potential impact of the three new turbine sites and the associated developments. The study area was inspected by Kevin Mills & Associates on 30 April 2010, prior to the preparation of this report.

The report contains:

1. a description of the vegetation and fauna habitat in the study area;
2. lists of the flora and fauna species observed;
3. an assessment of the potential impact of the developments on flora and fauna, including:
   - species, populations and communities listed under the New South Wales *Threatened Species Conservation Act 1995;*
   - matters of national environmental significance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; and
4. a discussion of what measures could be taken to reduce the impact of the developments on flora and fauna.

## 2. The Study Area

The study area encompasses the three new wind turbine sites, the proposed track and cable routes linking the turbines and the immediately adjacent areas. These areas are shown on **Figure 1**; turbines WTG 21, WTG 22 and WTG 23 are contiguous with the approved turbine site WTG 20. The proposed turbines are about 260 metres from each other, and are linked by about 1,100 metres of track and cable route, extending from WTG20 to WTG23.

The land is located on the Great Dividing Range at an altitude of around 850 metres. The area is typically undulating to steep with numerous ridges and valleys. The underlying geology is composed of old metamorphosed sediments. Most of the land has been cleared of its original woodland vegetation for many years and is used for the grazing flocks of sheep. Woodland remnants do occur in the vicinity of the development; see **Figure 1**.

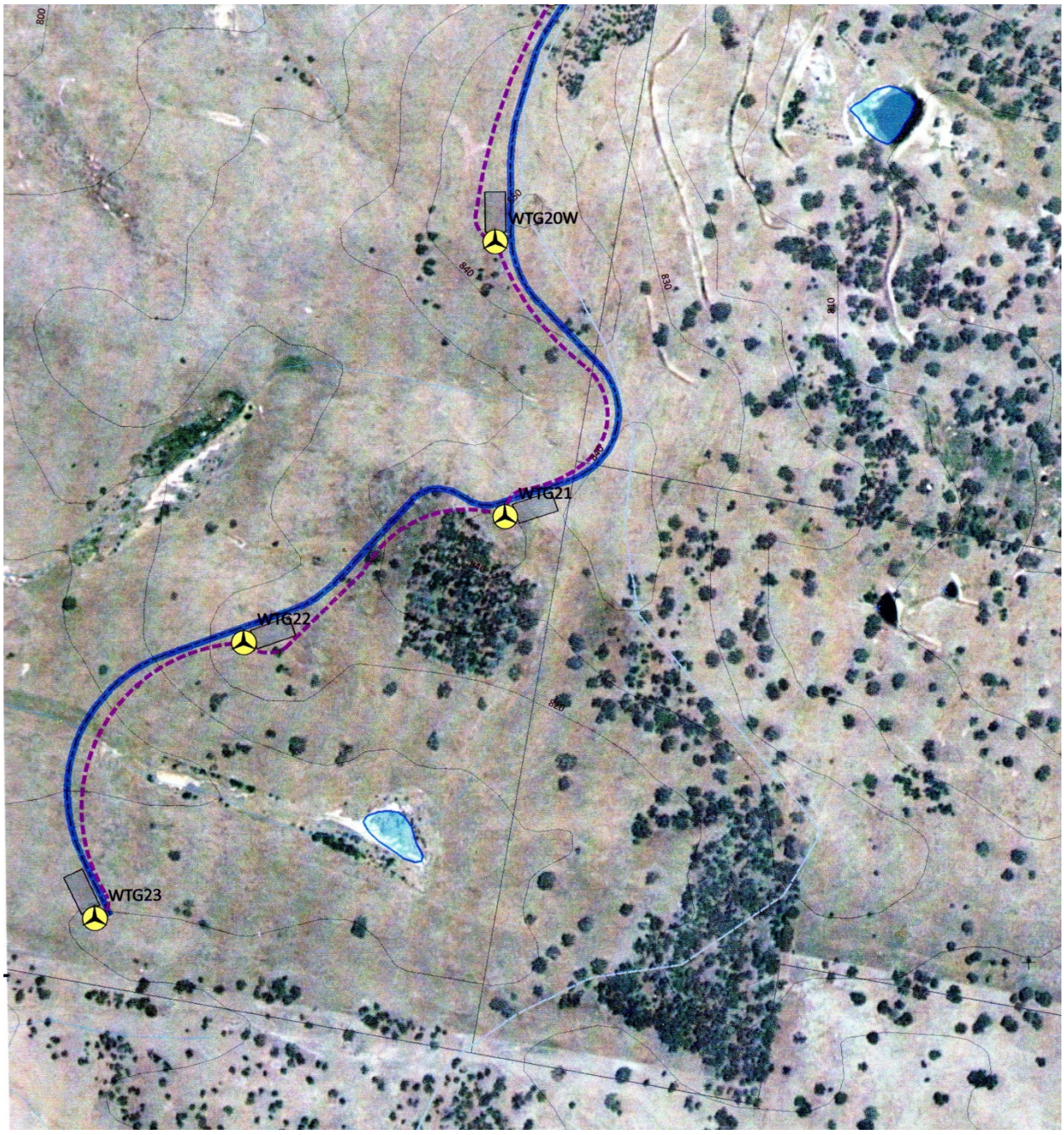


***Figure 1. Location of the New Wind Turbines.***
***New turbines are numbered WTG21 to WTG23; turbine WTG20 is approved.***

# 3. Survey Methods

## 3.1 Flora Survey Method

A flora survey was undertaken in the study area on 30 April 2010. Bearings were taken from a colour aerial photograph provided by Suzlon; see **Figure 1**. The purpose of the flora survey was to classify and describe the vegetation, to map the distribution of the vegetation communities, to record as many as possible of the plant species present and to search for threatened plant species.

The vegetation survey technique combined traverses of the study area with vegetation sampling on the actual development sites. The traverses, which were undertaken on foot, were targeted to cover the full topographic variation of the site, the full range of vegetation communities and potential habitat for threatened plant species.

***Vegetation Classification***
The vegetation communities in the study area were classified on the basis of their structure and the name(s) of the dominant species in the tallest stratum, using the structural classification system devised by Walker and Hopkins (1990). Of most importance on the tablelands are the definitions used to identify grassland types. The following definitions used in this report are widely accepted in the botanical literature; most of those relating to grasslands are from the report by Rehwinkel (1997).

Woodland: a community of well spaced trees (projective foliage cover 10-30%) growing to a height of 4 to 30 metres.

Open Woodland: a community of scattered trees (projective foliage cover <10% growing to a height of 4 to 30 metres.

Grassland: vegetation dominated by grasses and forbs, with <10% tree and/or shrub cover.

Native Grassland: grassland with >50% of vegetation cover composed of indigenous species, >50% of all species are native, and the minimum vegetation cover, alive or dead, is >10%.

Natural Grassland: native grassland considered to have had <10% tree and/or shrub cover at the time of European settlement.

Secondary Grassland: a native grassland remaining after the removal or dieback of previously occurring trees and/or shrubs, where these occupied >10% cover.

Native Pastures: containing native and introduced species, where introduced species occupy >50%, but <75% of both cover and species present, where pasture species have often been mechanically sown.

Exotic Grassland: where >75% of species and cover are composed of introduced plants.

Natural Temperate Grassland: a threatened grassland community listed under the Commonwealth *Environment Protection and Biodiversity Conservation* Act. The Recovery Plan for Natural Temperate Grassland (Environment ACT 2006) provides the following information:

> "The community is dominated by moderately tall (25-50cm) to tall (50cm – 1.0m), dense to open tussock grasses with up to 70% of the species being forbs. The community may be treeless or contain up to 10% cover of trees, shrubs or sedges. In the Southern Tablelands, Natural Temperate Grasslands are located at altitudes between 560 and 1200 metres in valleys influenced by cold air drainage and in broad plains. The community occurs within the geographical region of the Southern Tablelands of NSW and ACT, which extends southwards from the Abercrombie River to the Victorian Border, from Boorowa and Jindabyne to the west and Goulburn to Braidwood and Bombala to the east."
>
> "Natural Temperate Grassland is a native ecological community that is dominated by native species of perennial tussock grasses. The dominant grasses are *Themeda triandra* [*australis*], *Austrodanthonia* species, *Bothriochloa macra* and *Poa* species. The upper canopy stratum generally varies in height from mid-high (0.25-0.5m) to tall (0.5-1.0m). There is also a diversity of

native herbaceous plants (forbs), which may comprise up to 70% of species present. The community is naturally treeless or has less than 10% projective foliage cover of trees or shrubs in its tallest stratum. The ecological community that makes up NTG-ST [Natural Temperate Grassland – Southern Tablelands] is defined by the vegetation structure thought to have been present at the time of European settlement."

***Plant Species Nomenclature***
The plant species names in this report are the current names published by the National Herbarium of New South Wales in the *Flora of New South Wales* (Harden 1992-2002). Most of the common names are from the *Flora of New South Wales* (op. cit.), *Australian Plant Genera* by Baines (1981) and *Weeds of the South-east* by Richardson, Richardson and Shepherd (2006).

### *3.2 Fauna Survey Method*

A fauna survey was undertaken on 30 April 2010, on the same day as the vegetation survey. Weather conditions at the time of survey were fine, with warm temperatures and little wind. The survey was concentrated on the habitats likely to be used by fauna and those that are particularly important. Those species that were observed or recorded by other means are listed later in this report.

***Purpose of the Fauna Survey***
The purpose of the fauna survey was:
i. to detect as many as possible of the fauna species present;
ii. to describe the fauna habitat in the study area; and
iii. to assess the potential for the habitat in the study area to support threatened fauna.\

All animals observed were identified and recorded. Species were identified by direct observation and call-recognition, and a ground search was conducted for animal scats, tracks, and diggings.

***Animal Species Nomenclature***
Most of the fauna species' names in this report are from the Australian Museum's *The Mammals of Australia* (Strahan 1995), *Australian Bats* (Churchill 1998), *Systematics and Taxonomy of Australian Birds* (Christidis & Boles 2008) and *Reptiles and Amphibians of Australia* (Cogger 1992).

## *4. Flora*

### *4.1 Description of the Plant Communities*

The original vegetation of the area was upland woodland, dominated by Brittle Gum *Eucalyptus mannifera*, Inland scribbly Gum *Eucalyptus rossii* and Broad-leaved Peppermint *Eucalyptus dives*. Patches of Black She-oak *Allocasuarina littoralis* and Hickory Wattle *Acacia falciformis* occur here and there. The understorey was a grassland to shrubland. This woodland differed greatly from the lowland woodland in the valleys that was dominated by Yellow Box *Eucalyptus melliodora* and Blakely's Red Gum *Eucalyptus blakeyli*, with a natural temperate grassland understorey. The above patterns can be seen today in the remnant trees and other vegetation across the landscape.

The three proposed turbine sits are described separately below, along with the track/cable route between each turbine site.

***WTG21***

***Vegetation***
The area likely to be disturbed by the turbine and hardstand area is about 40 metres by 50 metres. This site is covered in treeless, heavily sheep-grazed exotic grassland with few native species; see Plate 1 below looking across the site. The main exotic plant is Phalaris *Phalaris aquatica*. The native Clammy Goosefoot *Chenopodium pumilio* is common, while there are scattered small tussocks of Wallaby Grass *Austrodanthonia racemosa*. The other exotic plants present on the site are Subterranean Clover *Trifolium subterranean*, Capeweed *Arctotheca calendula*, Stork's-bill *Erodium sp.* and Sheep Sorrel *Acetosella vulgaris*.

***Habitats***
The habitat is highly modified grassland of little value to native fauna. The area supports common native ground cover species, but diversity is low and no rare or threatened species were found on the site. The site is treeless.

***Plate 1. Photograph across the site proposed for WTG 21.***

***WTG22***

***Vegetation***
The area likely to be disturbed by the turbine and hardstand area is about 40 metres by 50 metres. This site is covered in treeless, heavily sheep-grazed exotic grassland with few native species; see Plate 2 below looking across the site. The main exotic species are Phalaris *Phalaris aquatica* and Subterranean Clover *Trifolium subterranean*. The native Clammy Goosefoot *Chenopodium pumilio* is common. Other natives are rare, including Corkscrew *Austrostipa scabra* and Wattle Mat-rush *Lomandra filiformis*. The only other exotic noted was Stork's-bill *Erodium sp.* On the edge of the site are four old Black Wattle *Acacia mearnsii* trees.

***Habitats***
The habitat is highly modified grassland of little value to native fauna. The area supports many common native ground cover species, but diversity is low and no rare or threatened species were found on the site. The site is treeless, although the above wattles are nearby.

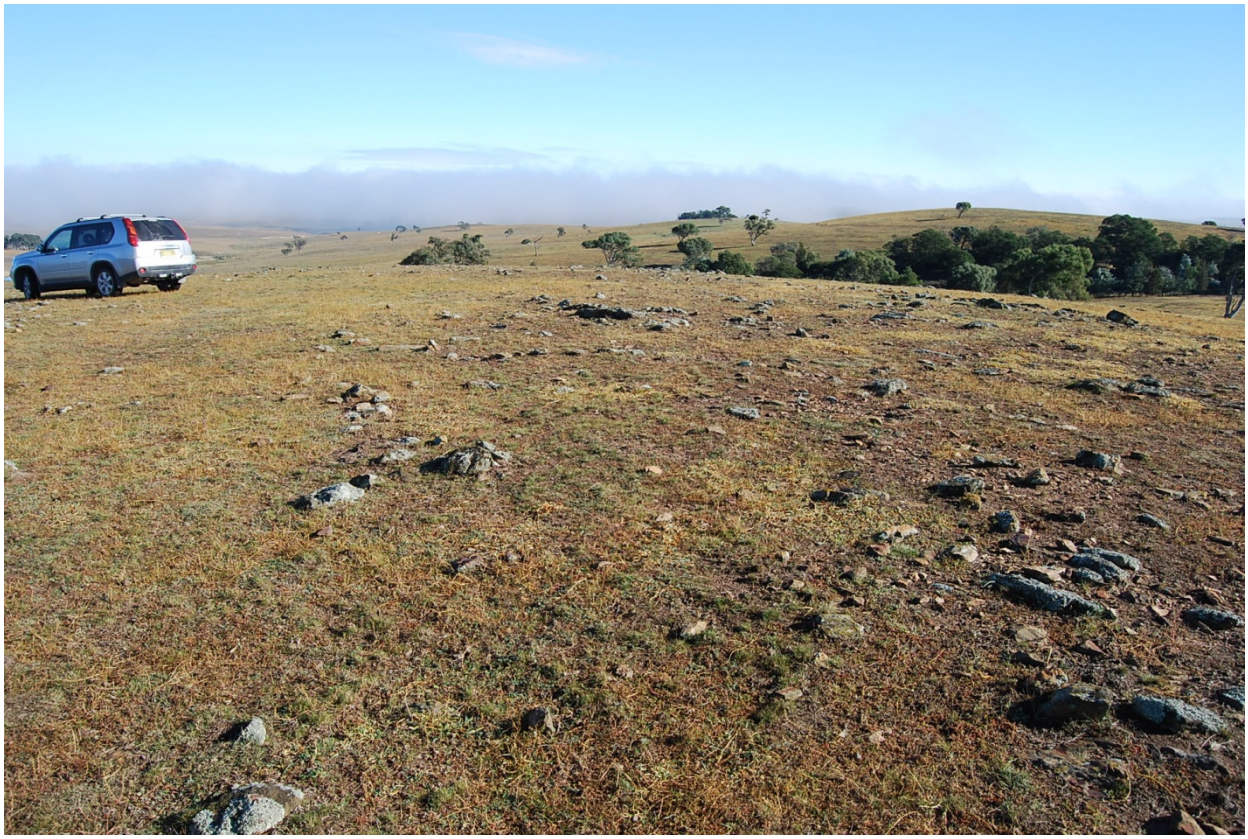

***Plate 2. Photograph across the site proposed for WTG 22.***

***WTG23***

***Vegetation***

The area likely to be disturbed by the turbine and hardstand area is about 40 metres by 50 metres. This site is in the same paddock as WTG 22; it is also covered in treeless, heavily sheep-grazed exotic grassland with some native species forming native pasture in places; see Plate 3 below looking across the site. The main species are the exotic Subterranean Clover *Trifolium subterranean* and the native Clammy Goosefoot *Chenopodium pumilio*. Other natives include Corkscrew Spear-grass *Austrostipa scabra*, Wattle Mat-rush *Lomandra filiformis* and Wallaby Grass *Austrodanthonia racemosa*. Other exotics noted were Stork's-bill *Erodium sp.*, Horehound *Marrubium vulgare* and Sheep Sorrel *Acetosella vulgaris*.

***Habitats***

The habitat is highly modified grassland of little value to native fauna. The area supports some common native ground cover species, but diversity is low and no rare or threatened species were found on the site. The site is treeless.

***Plate 3. Photograph across the site proposed for WTG 23.***

***Track and cable route***

***Vegetation***

The area likely to be disturbed by the track and cable route linking the turbines is about 1,100 metres in length and about 10 metres wide. This route is covered in treeless exotic grassland and native pasture; see Plate 4 below, looking across the site from WTG 20 to proposed WTG 23 near the trees in the mid-distance to right. The grazed grassland is similar to that described for the turbine sites; this is either exotic grassland or native pasture.

***Habitats***

The habitats are highly modified grassland of little value to native fauna. The area supports some common native ground cover species, but diversity is low and no rare or threatened species are likely to occur in the grassland traversed. No trees need to be removed.

***Plate 4. Photograph across the sites proposed for the additional turbines.***

### *4.2 Plant Species Recorded*

The native plant species recorded in the study area have been listed in **Appendix 1**. This is a combined list for the three turbine sites and the inter-connecting track and cable route. The species recorded are all common and widespread species in the region. Neither threatened species nor rare species were located.

## *5. Fauna*

### *5.1 Fauna Habitat*

The fauna habitat in the study area consists of paddocks heavily grazed by sheep and mainly supporting native pasture and exotic grassland, with native secondary grassland on the higher ridges. This highly modified grassland has little value to native fauna, although various species, mainly birds, do forage in this grassland.

Patches of remnant woodland occur here and there in the vicinity of the development. The woodland is composed of small trees typical of the woodland growing on the hilly country in this region, as described in the section on vegetation above. The trees have some hollows but those adjacent to the three turbine sites are small and without hollows. Very few trees are actually on the sites affected by the developments, as indicated on the accompanying photographs and the aerial view at **Figure 1**.

### 5.2 Fauna Species Recorded

The fauna species recorded in the study area have been listed in **Appendix 2**. These species were recorded at the time of the current survey; the list is a sample of the fauna that is present. A full assessment of the local fauna is provided in the original environmental assessment for the Woodlawn Wind Farm prepared by URS (2004).

## 6. Presence of Threatened Species, Populations and Communities

### 6.1 Threatened Species

Threatened species in New South Wales are listed on schedules under the New South Wales *Threatened Species Conservation Act 1995* (TSC Act), where they are classified "endangered" (Schedule 1, Part 1), "vulnerable" (Schedule 2) or "presumed extinct" (Schedule 1, Part 4). Nationally threatened species are listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as "extinct", "critically endangered", "endangered", "vulnerable" or "conservation dependent".

Information on the occurrence of threatened species in New South Wales is available online from the NSW Wildlife Atlas, maintained by the NSW National Parks and Wildlife Service. The Atlas was searched for threatened species previously recorded in the local area. Most of the threatened species were dealt with in the report by URS (2004) as part of the original environmental assessment for the Woodlawn Wind Farm. These species have been included below, in **Table 1**, with their classification under the TSC and EPBC Acts, and a summary assessment of their potential to occur in the study area.

No threatened plant species were recorded in the study area and none are expected to occur there given the highly modified character of the development areas.

Habitat assessment plays an important role in predicting which threatened species are likely to occur in any given area. The type of vegetation present, the presence/absence of rock outcrops, tree hollows, watercourses, wetlands and special food plants for fauna are all taken into account. Based on habitat assessment and a knowledge of the distribution and habitat preferences of locally occurring threatened fauna species, several species of threatened fauna would occur in the study area from time to time, see **Table 1**, but would be incidental given the type of habitats present.

### 6.2 Migratory Species

In addition to threatened species, the EPBC Act allows for the listing of internationally protected migratory species, i.e. species listed under the Japan - Australia Migratory Bird Agreement (JAMBA), the China - Australia Migratory Bird Agreement (CAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Various internationally protected migratory species occur in the district, many of which are very common in rural landscape, such as native ducks and diurnal birds of prey. However, there is no important habitat on the sites of the turbines for such species and the habitat on the sites is not likely to support an ecologically important proportion of a population of migratory species.

***Table 1***
***Threatened species previously recorded in the local area***

| Species | TSC Act[+] | EPBC Act[+] | Habitat Requirements/Preferences, etc. | Potential to occur in the Study Area (Recorded / High / Medium / Low) |
|---|---|---|---|---|
| **Plants** | | | | |
| Buttercup Double-tail *Diuris aequalis* | E | V | Grows in woodland and forest with a grassy understorey. | The grassland is the study area is so heavily modified and grazed by sheep that this orchid could not have survived there. |
| Creeping Hop Bush *Dodonaea procumbens* | V | V | Grows in woodland on low-lying sandy soils. Recorded well to the south of Woodlawn. | An obvious species that was not found during the survey and which could not survive in the heavily grazed paddocks in the area. |
| Silky Swainson-pea *Swainsonia sericea* | V | - | Grows in native grassland where grazing is not too intensive. | Not found during the survey; unlikely to be present in such heavily grazed paddocks. |
| **Mammals** | | | | |
| Eastern Bentwing Bat *Miniopterus schreibersii oceanensis* | V | - | Bentwing Bats occur in a wide range of habitats, such as rainforest, eucalypt forest, woodland and grassland. The species is cave-dwelling, roosting in caves and under rock Overhangs; they also roost in built structures, such as buildings. Natural caves free of disturbance and degradation are essential for breeding. | Likely to forage in the area. There are no roosting sites in the area. |
| Eastern False Pipistrelle *Falsistrellus tasmaniensis* | V | - | This bat prefers moist forest habitat containing trees taller than 20 metres. The species usually roosts in tree hollows, and sometimes roost in tree bark and in buildings. | May forage in the area; no hollow-bearing Trees will be removed. |
| Koala *Phascolarctos cinereus* | V | - | Koalas occur in eucalypt forest and woodland containing their preferred feed tree species, such as *Eucalyptus tereticornis* and *E. viminalis.* One or more food tree species occur where Koalas are found. | Very unlikely to occur in the area, where there are few food trees. |
| **Birds** | | | | |
| Brown Treecreeper *Climacteris picumnus* | V | - ` | The Brown Treecreeper is an inland species that occurs in eucalypt woodland, preferably open woodland, without dense shrubs. They forage on tree trunks and on the ground among fallen logs and leaf litter. Brown Treecreepers nest in tree hollows. | May occur in the area where woodland is found. Not likely in the vicinity of the turbines. |
| Diamond Firetail *Stagonopleura guttata* | V | - | Woodland and grassland,; forages widely in the cooler months, including grazing paddocks. | Likely to occur in the area, as it forages across rural land. |
| Freckled Duck *Stictonetta naevosa* | V | - | A freshwater wetland species. | There is no suitable wetland habitat in the vicinity of the turbines. |
| Gang-gang Cockatoo *Callocephalon fimbriatum* | V | - | Gang-gang Cockatoos mainly occur in eucalypt forest, where they feed on eucalypt fruit and wattle seed. Nesting is in large old trees with hollows. The species is nomadic, with some seasonal movements, as well, the cockatoos wander over wide areas in response to the seasonal availability of food. | Recorded in the general area, and expected to be a regular winter visitor to the locality. |
| Glossy Black-Cockatoo *Calyptorhynchus lathami* | V | - | Glossy Black-Cockatoos live in mature eucalypt forest and woodland containing stands of cone-bearing Black She-oak *Allocasuarina littoralis* trees, which are their primary source of food. They prefer mature forest, because only mature forest contains tall old eucalypts with | Unlikely to occur; no Casuarinas and no potential nest trees in the area of the proposed turbines. |

| | | | | |
|---|---|---|---|---|
| | | | hollows for nesting and casuarina fruit in sufficient quantities to sustain whole populations. Glossy Black-Cockatoos are nomadic and sedentary in behaviour. Their movements are mostly local, as the cockatoos roam from one foraging area to another in a district. | |
| Hooded Robin *Melanodryas cucullata* | V | - | Woodland; forages widely outside the breeding season. | May occur in and near the patches of woodland; less likely on the turbine sites. |
| Speckled Warbler *Chthonicola sagittata* | V | - | Woodland and paddocks with shrubs. A shrubby understorey is required, whether native or exotic. | Probably occurs in the woodland in the general area; unlikely on the turbine sites. |
| Flame Robin *Petroica phoenicea* | V | - | Woodland and grassland, whether native or exotic. Nomadic in the winter months, when flocks may be observed. | Recorded nearby. No doubt occurs in the area from time to time; incidental to the turbine sites. |
| Little Eagle *Hieraaetus morphnoides* | V | - | Forages widely over woodland and farmland; nest in tall eucalypts. | Probably occurs in the general area from time to time. |
| Varied Sittella *Daphoenositta chrysoptera* | V | - | Forest and woodland; occurs in small flocks. | May occur in woodland in vicinity of development. |
| Scarlet Robin *Petroica multicolor* | V | - | Woodland; foraging widely outside the breeding season. | No doubt occurs in general area from time to time. |
| **Frogs** | | | | |
| Green and Golden Bell Frog *Litoria aurea* | E | V | Green and Golden Bell Frogs occur in freshwater streams, swamps, lagoons, dams, soaks and ponds, preferably those containing bullrushes and spike-rushes. However, sometimes occur on highly disturbed sites, e.g. disused industrial sites, brick pits and landfill areas. Their optimum habitat is an unshaded body of water that is free of predatory fish, with a grassy area nearby and daytime shelter sites, such as vegetation and/or rocks. | There is no wetland habitat on or near the development sites. |
| **Reptiles** | | | | |
| Pink-tailed Legless Lizard *Aprasia parapulchella* | V | V | Mainly native grassland amongst rocky outcrops; on course-grained volcanic rock type. | There is no rocky habitat in the area, nor any native grassland that could provide suitable habitat. |
| Rosenberg's Goanna *Varanus rosenbergi* | V | - | Woodland, important components are native ground cover, fallen timber and debris and termite mounds, the latter used for breeding. | It is unlikely to be present in such small and isolated patches of woodland; there is no suitable habitat on the development sites. |
| Striped Legless Lizard *Delma impar* | V | V | Natural temperate grassland; occasionally is modified grassland even exotic grassland. | No suitable habitat in the area. |
| Little Whip Snake *Suta flagellum* | V | - | Woodland with a grassy ground cover, usually in rocky areas. | No suitable habitat present on or near the development sites. |
| **Invertebrates** | | | | |
| Golden Sun Moth *Synemon plana* | C | CE | An inhabitant of native grassland , usually with a high component of wallaby grasses *Austrodanthonia* spp. No local records although once widespread on the tablelands. | There is no suitable native grassland in the area of the developments. |

+ V = vulnerable, E = endangered, - = not listed.

### *6.3 Endangered Populations*

Endangered populations in New South Wales are listed under the TSC Act (Schedule 1, Part 2). There are no provisions under the EPBC Act for the listing of endangered populations. No endangered populations have been declared in or near the study area.

### *6.4 Endangered Ecological Communities*

Endangered ecological communities in New South Wales are listed under the TSC Act (Schedule 1, Part 3). Nationally threatened ecological communities are listed under the EPBC Act. No endangered or nationally threatened ecological communities occur in the study area. The woodland that once grew in the area is not the Yellow Box - Red Gum Woodland that is listed under both Acts and which occurs on lowland parts of the district. The 'secondary' grassland that grows in some parts of the area today is not part of the listed community, as it is derived from the original woodland.

## *7. Impact of the Proposed Development*

### *7.1 Assessment under the TSC Act*

Under the provisions of the *Threatened Species Conservation Act 1995*, the impact of a proposed action, development or activity on species, populations and communities (and their habitats) is assessed by applying various factors set out under Section 5A of the New South Wales *Environmental Planning and Assessment Act 1979* (EPA Act). Commonly referred to as the "seven part test" or "test of significance", these factors assist the proponent and the determining authority to decide whether the impact is likely to be significant and whether a Species Impact Statement (SIS) should be prepared.

The "test of significance" is considered below to assist in determining whether the proposed development is likely to have a significant effect on species, populations and communities (and their habitats) listed under the TSC Act. In addressing the 'seven part test of significance', consideration has been given to those matters discussed in the document titled "Threatened Species Assessment Guidelines. The Assessment of Significance" prepared by the Department of Environment and Climate Change in August 2007. Quotes from that document are provided below where relevant to clarify interpretation of the significance assessment. The *Guidelines* use two important terms when discussing assessment procedures.

**Subject site** means the area directly affected by the proposal.
**Study area** means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all potential impacts into account.

*(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction*

The Guidelines define the following relevant terms:
**Life cycle:** the series of stages of reproduction, growth, development, ageing and death of an organism.
**Viable:** the capacity to successfully complete each stage of the life cycle under normal conditions.
**Local population** the population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions:

- The *local population* of a threatened *plant* species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.
- The *local population* of *resident fauna* species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.

- The *local population* of *migratory or nomadic fauna* species comprises those individuals that are likely to occur in the study area from time to time.

In cases where multiples populations occur in the study area, each population should be assessed separately.
**Risk of extinction:** the likelihood that the local population will become extinct either in the short-term *or* in the long-term as a result of direct or indirect impacts on the viability of that population.

Threatened Plant Species
The surveys of the study area did not find any threatened plant species and none are expected to be found in these areas. The heavily grazed habitats there are very unlikely to support such species. It is concluded that the proposal will not have an adverse effect on the life cycle of threatened plant species such that a viable local population is likely to be placed at risk of extinction.

Threatened Animal Species
The only occurrence of threatened animals in the study area is likely to be occasional visits by listed woodland bird species. Their occurrence there is not unique to the study area; these species range widely across the landscape but do not find high value habitat in the areas involved in the development. In our view, threatened fauna is not a significant issue on the development area. It is concluded that the proposal will not have an adverse effect on the life cycle of threatened plant species such that a viable local population is likely to be placed at risk of extinction.

*(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction*

The Guidelines note that:
This factor is essentially identical to factor (a) except that it refers only to endangered populations listed in Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

The proposed development is not likely to have an adverse effect on the life cycle of any endangered population. No endangered populations occur within the study area.

*(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*
*(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction*
*(ii) is likely to substantially and adversely modify the composition of the ecological community such that its occurrence is likely to be placed at risk of extinction*

The Guidelines define the following important terms:
**Local occurrence:** the ecological community that occurs within the study area. However the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.
**Risk of extinction:** similar to the meaning set out in factor (a), this is the likelihood that the local occurrence of the ecological community will become extinct either in the short term *or* in the long-term as a result of direct or indirect impacts on the ecological community, and includes changes to ecological function.
**Composition:** both the plant and animal species present, and the physical structure of the ecological community. Note that while many ecological communities are identified primarily by their vascular plant composition, an ecological community consists of all plants and animals as defined under the TSC and FM Acts that occur in that ecological community.

The patches of native grassland and remnant woodland are not part of the White Box - Yellow Box - Red Gum Woodland listed endangered ecological community; this community does occur on some of the lowlands in the locality. The study area did not and does not support this type of woodland, as it is located on land where the remnant vegetation indicates a different type of woodland is and was originally present.

The proposed development is not likely to have an adverse effect on the extent any endangered ecological community to the extent that it is likely to place a community at risk of extinction.

*(d) in relation to the habitat of a threatened species, population or ecological community:*
*(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed*
*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action*
*(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality*

The Guidelines define the following relevant terms:
**Habitat:** the area occupied, or periodically or occasionally occupied, by any threatened species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycles.
**Extent:** the physical area removed and/or to the compositional components of the habitat and the degree to which each is affected.
**Importance:** related to the stages of the species' life cycles and how reproductive success may be affected.
**Locality:** the same meaning as ascribed to local population of a species or local occurrence of an ecological community.

The proposal is not likely to remove or impact in any way on habitat that is important for any listed threatened species, population or community. There are no listed plant species, populations or communities within the development areas and threatened fauna are only ever likely to be incidental visitors to the area.

*(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)*

The Guidelines note that:
This factor is aimed at assessing whether the proposal is likely to affect (directly or indirectly) areas of critical habitat present in the study area. Critical habitat refers only to those areas of land listed in the following registers:

- The Register of Critical Habitat kept by the Director General, DECC [www.nationalparks.nsw.gov.au/npws.nsw/content/critical+hjabitat+protection]
- The Register of Critical Habitat kept by the Director General, DPI [www.fisheries.nsw.gov.au/threatened_species/general/register of critical habitat]

Critical habitat refers only to those areas of land listed in the Registers of Critical Habitat. No critical habitat has been declared in the study area.

*(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan*

In regard to this factor, the *Guidelines* note that
When deciding whether the proposal is consistent with the objectives or actions of a recovery plan or threat abatement plan, applicants/proponents must consider all relevant approved recovery plans and threat abatement plans.
In 2004 amendments were made to the TSC Act and the FM Act that remove the mandatory requirement to prepare recovery plans and threat abatement plans, and instead requires the preparation of a *threatened species priorities action statement* (TSC Act s. 90A and FM Act s. 220ZVA).
The priorities action statements will set out the measures required to promote the recovery of each threatened species, population and ecological community to a position of viability in nature and for managing each key threatening process. In applying this factor, consideration should be given to measures outlined in the priorities action statements as well as existing recovery plans and threat abatement plans which will remain in place.

Not applicable; recovery plans have not been prepared for any relevant threatened species, endangered ecological community or population, and no relevant threat abatement plans have been prepared.

*(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Guidelines state that:
In addition to deciding whether the action/activity constitutes a KTP, consideration must also be given to whether the proposal is likely to exacerbate a KTP. Species listed in the determination as being 'at risk' warrant particular consideration if these species are known or likely to occur within the study area of the development or activity.

Key threatening processes in New South Wales are listed under the *Threatened Species Conservation Act 1995* (TSC Act) and *Fisheries Management Act 1994* (FMA Act). Key threatening processes are the things that threaten, or could threaten, the survival or evolutionary development of species, populations or ecological communities. The listed threatening processes can be divided into several categories.
**Key threatening processes** are the things that threaten - or could threaten - the survival or evolutionary development of species, populations or ecological communities. They are listed in the *Threatened Species Conservation Act*, and include:
**Pest animals**. Introduced animal species can compete with, and prey upon, native animals. They can also damage native plants and degrade natural habitats.
**Weeds.** Weeds compete with native plants for resources such as light and nutrients. They can aggressively invade areas, displacing native plants and animals.
**Diseases.** Exotic fungal infections, viruses and other pathogens can weaken and kill native species.
**Habitat loss/change**. From large-scale land clearing to the gathering of bushrock for suburban gardens, humans have degraded many native environments across the state.

A small amount of native vegetation in the study area will be cleared as a few ground cover plants grow in the grazing paddocks. This amount of clearing is negligible.

**Conclusion of Significance Assessment**

The Guidelines make the following comments in regard to forming a conclusion about the significance of the potential impact on threatened species, etc.
The threatened species assessment of significance should **not** be considered a 'pass or fail' test. Instead, consideration of the factors will inform the decision-making process of the likelihood of significant effect. Where necessary, the process will trigger further assessment in the form of a species impact statement.
All factors should be considered as well as any other information deemed relevant to the assessment. The assessment of significance should not be used as a substitute for a species impact statement. Application of the precautionary principle requires that a lack of scientific certainty about the potential impacts of an action does not itself justify a decision that the action is not likely to have a significant impact. If information is not available to conclusively determine that there will not be a significant impact on a threatened species, population or ecological community, or its habitat, then it should be assumed that a significant impact is likely and a species impact statement should be prepared.
Proposed measures that mitigate, improve or compensate for the action, development or activity should not be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been used successfully for that species in a similar situation.

In our opinion, the development of the proposed additional wind turbines at the Woodlawn Wind Farm is not likely to have a significant effect on any threatened species, populations or communities listed under the *Threatened Species Conservation Act 1995*, or their habitats, and the preparation of a Species Impact Statement (SIS) is not warranted.

### *7.2 Assessment under the EPBC Act*

***Matters of National Environmental Significance***
The impact of a proposed action on matters of national environmental significance is assessed under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Matters of national environmental significance are:

- World Heritage properties,
- National Heritage places,
- wetlands of international importance (RAMSAR wetlands),
- listed threatened species and ecological communities
- migratory species;
- Commonwealth marine areas;
- Great Barrier Reef Marine Park;
- nuclear actions (including uranium mining).

An "action" is a project, a development, an undertaking, an activity or a series of activities, and an alteration of any of the above. An action can be on Commonwealth land, State land council land, private land, or water.

Approval is required from the Commonwealth Environment Minister for actions that are likely to have a significant impact on a matter of national environmental significance; these are called "controlled actions". A proposed action is a "controlled action" if:

- is likely to have a significant impact on a matter of national environmental significance,
- is likely to have a significant impact on the environment of Commonwealth land,
- is to be undertaken on Commonwealth land and is likely to have a significant impact on the environment anywhere, and
- is an action to be taken by the Commonwealth that is likely to have a significant impact on the environment anywhere.

Only the Commonwealth can advise definitively whether a proposed action is a controlled action; however, the Department of the Environment and Heritage has prepared guidelines to help proponents decide whether an action is likely be a controlled action that should be referred to the Minister for assessment and approval; these are known as the *Significant Impact Guidelines: Matters of National Environmental Significance* (DEH 2006).

***Presence of Matters of National Environmental Significance***

The study area does not contain any threatened species, as assessed earlier in this report. Remnants of native grassland and woodland on and near the development areas are not part of either of the listed communities Natural Temperate Grassland or White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Grasslands. Further assessment of listed threatened species and communities is not required. Migratory species do occur in the general area, as all species of native duck and all native diurnal birds of prey are listed. Migratory species are considered below.

***Listed migratory species***

The EPBC Act allows for the listing of internationally protected migratory species, i.e. species listed under the Japan - Australia Migratory Bird Agreement (JAMBA), the China - Australia Migratory Bird Agreement (CAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Many internationally protected migratory species occur in general area, as many common and widespread species are listed. Some of these species occur on the site from time to time, but there is no important habitat on the site for such species and the habitat on the site does not support an ecologically important proportion of a population of such species.

*Significant Impact Criteria for Listed Migratory Species*

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An area of "important habitat" for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at particular life-cycle stages; and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. An "ecologically significant proportion" of a population therefore varies from species to species. In relation to migratory species, "population" means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

*Impact of the Proposed Development on Listed Migratory Species*
The construction of the proposed wind turbines and associated track and cable routes is not likely to have a significant impact on listed migratory species. There is no "important habitat" in the area for such species and the habitats there are not likely to support an “ecologically important proportion” of a population of a migratory species.

***Conclusion, EPBC Act***
In our opinion, the proposed expansion of the Woodlawn Wind Farm is not likely to have a significant impact on any matters of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act 1999*. Referral to the Commonwealth Minister for the Environment for assessment is, in our view, unwarranted.

## *8. Conclusion and Recommendations*

This report provides a description of the flora and fauna in a part of the Woodlawn Wind Farm site proposed for three additional wind turbines and their associated track and cable routes. The areas where these developments are to be undertaken, heavily grazed sheep paddocks, are highly modified environments. Some areas of native grassland and remnant woodland occur in the general area, but these communities are not part of any listed threatened ecological community. Threatened bird species occur in the general area from time to time, but the developments do not significantly impact upon any habitat likely to be important for such species.

***Recommendations***
The following recommendations are made to minimise and avoid impacts of flora and fauna.

i) Avoid removing or disturbing the remnant woodland patches near the development sites; these are the only habitats that could be important for threatened woodland birds in the locality.

ii) Develop a soil and water management plan to ensure that adequate controls over soil movement is minimised and that the there is appropriate rehabilitation of the disturbed areas.

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## *Appendix 1*
### *List of Plant Species*

| | |
|---|---|
| *Acacia falciformis* | Broad-leaved Hickory Wattle |
| *Acacia mearnsii* | Black Wattle |
| *Aristida ramosa* | Three-awned Speargrass |
| *Austrodanthonia carphoides* | Short Wallaby Grass |
| *Austrodanthonia racemosa* | Wallaby Grass |
| *Austrostipa bigeniculata* | Tall Speargrass |
| *Austrostipa scabra* | Corkscrew |
| *Austrostipa semibarbata* | Spear-grass |
| *Bothriochloa macra* | Red-leg Grass |
| *Carex appressa* | Tall Sedge |
| *Chenopodium pumilio* | Clammy Goosefoot |
| *Chloris truncata* | Windmill Grass |
| *Chrysocephalum apiculatum* | Common Everlasting |
| *Cymbonotus lawsonianus* | Austral Bears-ear |
| *Cynodon dactylon* | Couch Grass |
| *Einadia nutans* | Nodding Saltbush |
| *Enneapogon nigricans* | Nineawn Grass |
| *Eucalyptus dives* | Broad-leaved Peppermint |
| *Eucalyptus mannifera* | Brittle Gum |
| *Eucalyptus rossii* | Inland Scribbly Gum |
| *Hibbertia obtusifolia* | Grey Guinea Flower |
| *Hydrocotyle laxiflora* | Stinking Pennywort |
| *Juncus* sp. | Rush |
| *Lomandra filiformis* | Wattle Mat-rush |
| *Microlaena stipoides* | Weeping Grass |
| *Panicum effusum* | Hairy Panic |
| *Poa labillardieri* | River Tussock |
| *Pteridium esculentum* | Bracken |
| *Rumex brownii* | Swamp Dock |
| *Solenogyne dominii* | Smooth Solenogyne |
| *Themeda australis* | Kangaroo Grass |
| *Wahlenbergia communis* | Tufted Bluebell |
| | |
| **Acetosella vulgaris* | Sheep Sorrel |
| **Arctotheca calendula* | Capeweed |
| **Cirsium vulgare* | Spear Thistle |
| **Crataegus monogyna* | Hawthorn |
| **Dactylis glomerata* | Cocksfoot |
| **Erodium sp.* | Stork's-bill |
| **Hordeum sp.* | Barley Grass |
| **Hypochaeris radicata* | Flatweed |
| * | Horehound |
| **Paronychia brasiliana* | Brazilian Whitlow |
| **Phalaris aquatica* | Phalaris |
| **Nassella trichotoma* | Serrated Tussock |
| **Spergularia rubra* | Sandspurry |
| **Trifolium subterraneum* | Subterranean Clover |

* Introduced species.

## *Appendix 2*
### *List of Animal Species*

**Mammals**

| | |
|---|---|
| Common Wombat | *Vombatus ursinus* |
| Eastern Grey Kangaroo | *Macropus giganteus* |

**Birds**

| | |
|---|---|
| Australian Magpie | *Gymnorhina tibicen* |
| Australian Raven | *Corvus coronoides* |
| Black-faced Cuckoo-shrike | *Coracina novaehollandiae* |
| Crimson Rosella | *Platycercus elegans* |
| Eastern Rosella | *Platycercus eximius* |
| Flame Robin | *Petroica phoenicea* |
| Galah | *Cacatua roseicapilla* |
| Gang-gang Cockatoo | *Callocephalon fimbriatum* |
| Grey Currawong | *Strepera versicolor* |
| Laughing Kookaburra | *Dacelo novaeguineae* |
| Little Raven | *Corvus mellori* |
| Magpie-lark | *Grallina cyanoleuca* |
| Pied Currawong | *Strepera graculina* |
| Red Wattlebird | *Anthochaera carunculata* |
| Spotted Pardalote | *Pardalotus punctatus* |
| Superb Fairy-wren | *Malurus cyaneus* |
| White-throated Treecreeper | *Cormobates leucophaeus* |
| White-winged Chough | *Corcorax melanorhamphos* |
| Willie Wagtail | *Rhipidura leucophrys* |
| Yellow-rumped Thornbill | *Acanthiza chrysorrhoa* |

**Frogs**

| | |
|---|---|
| Common Eastern Froglet | *Crinia signifera* |