



Additional Crossing of Clarence River at Grafton:
Biodiversity Gap Field Survey (Stage 2)
March 2016



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ABBREVIATIONS

Abbreviation	Description
APO	Affected Property Owner
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
LES	Lewis Ecological Surveys Pty Ltd
RMS	Roads and Maritime
PoM	Plan of Management
TEC	Threatened Ecological Community
Threatened	Species listed on either the NSW <i>Threatened Species Conservation Act (1995)</i> and/or Commonwealth <i>Environmental Protection and Biodiversity Conservation Act (1999)</i> .
Endangered	Species listed as endangered under schedule two of the NSW <i>Threatened Species Conservation Act (1995)</i> and Commonwealth <i>Environmental Protection and Biodiversity Conservation Act (1999)</i> .
Vulnerable	Species listed as vulnerable under schedule two of the NSW <i>Threatened Species Conservation Act (1995)</i> and Commonwealth <i>Environmental Protection and Biodiversity Conservation Act (1999)</i> .

1.0 INTRODUCTION

1.1 Purpose and Scope

Roads and Maritime Services (Roads and Maritime) has obtained approval for the construction of a new bridge over the Clarence River at Grafton on the NSW North Coast. The project involves the construction of a road bridge across the Clarence River, approximately 70 metres downstream of the existing road and rail bridge and upgrading parts of the road network in Grafton and South Grafton to connect the new bridge to the existing road network. This will also require the replacement of the rail viaduct where it crosses Pound Street in Grafton and the provisioning of a pedestrian and cycle path and signalised pedestrian crossings (Biosis 2014). More details can be found within <http://www.rms.nsw.gov.au/projects/northern-nsw-grafton-clarence-river-crossing/environmental-impact>.

The Projects approval was granted under Part 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act / the Act) in December 2014. This approval was based on the Environmental Impact Statement (EIS) and was designated the status of State Significant Infrastructure with a number of conditions, one of these being Ministers Condition of Approval (MCoA) Biodiversity B3 *"The Proponent shall undertake flora and fauna surveys of those parts of the project area previously not surveyed, due to accessibility issues, prior to the commencement of construction that affects those areas....."*. Consequently, the Roads and Maritime engaged Lewis Ecological Surveys (Contract Identifier – 13.2544.0917-0018) on the 11th December 2015 to implement a biodiversity gap survey focusing initially on desktop surveys (Lewis 2016). This desktop survey drew attention and subsequently recommended there was a need to perform field surveys of all previously unsurveyed lands (i.e. 21 residential lots in Grafton and 1 lot in South Grafton) to comply with MCoA B3 *"Proponent to undertake flora and fauna surveys of those parts of the project area previously not surveyed, due to accessibility issues, prior to the commencement of construction that affects those areas.* Consequently, the following targeted survey program was proposed:

- a. Active search raking through leaf litter in gardens, lawn clippings, refuse, fallen timber to search for Three-toed Snake Tooth Skink and at the same time also addressing any survey limitations for the White-crowned Snake (vulnerable under the *TSC* Act) noting this survey must be undertaken when there is sufficient soil moisture, not a simple survey date;
- b. A quick appraisal to assess the potential risk of micro bats inhabiting/roosting in the buildings on these properties. This would involve a visual inspection to look for loose tin on the roof of dwellings, gaps in awnings and eaves corresponding with guano (bat manure) on the ground below. This information would simply inform and facilitate the successful contractors approach with managing microbats in their flora and fauna management sub plan;
- c. Qualification/validation of vegetation mapping previously compiled and build upon the targeted searches for threatened flora (i.e. survey for Hairy Joint Grass) so as to address the flora component in the wording of MCoA B3.

Roads and Maritime subsequently adopted this recommendation and engaged Lewis Ecological Surveys to perform these surveys.

2.0 FIELD SURVEY (STAGE 2) METHODS

The field survey focused on those lands that could not be accessed during the preparation of the EIS (Figure 2-1). In all, 22 lots were subject to the following survey methods:

- a. Active search raking through leaf litter in gardens, lawn clippings, refuse, fallen timber to search for Three-toed Snake Tooth Skink and at the same time also addressing any survey limitations for the White-crowned Snake (vulnerable under the *TSC* Act) noting this survey must be undertaken when there is sufficient soil moisture, not a simple survey date;
- b. A quick appraisal to assess the potential risk of micro bats inhabiting/roosting in the buildings on these properties. This would involve a visual inspection to look for loose tin on the roof of dwellings, gaps in awnings and eaves corresponding with guano (bat manure) on the ground below. This information would simply inform and facilitate the successful contractors approach with managing micro bats in their flora and fauna management sub plan;
- c. Qualification/validation of vegetation mapping previously compiled and build upon the targeted searches for threatened flora (i.e. survey for Hairy Joint Grass) so as to address the flora component in the wording of MCoA B3.

Field surveys were conducted on the 8th and 9th February so as to coincide with a period of warm and humid weather to ensure fossorial skinks were active. This time was also viewed as advantageous to inspect for potential bat roosts in and around dwellings as this period generally is nearing the end of the breeding season and the increased rates of guano would enable easier detection. February was also viewed as an ideal time for surveying Hairy Joint Grass (*Arthraxon hispidus*) given it is normally seeding around this time (pers. obs).

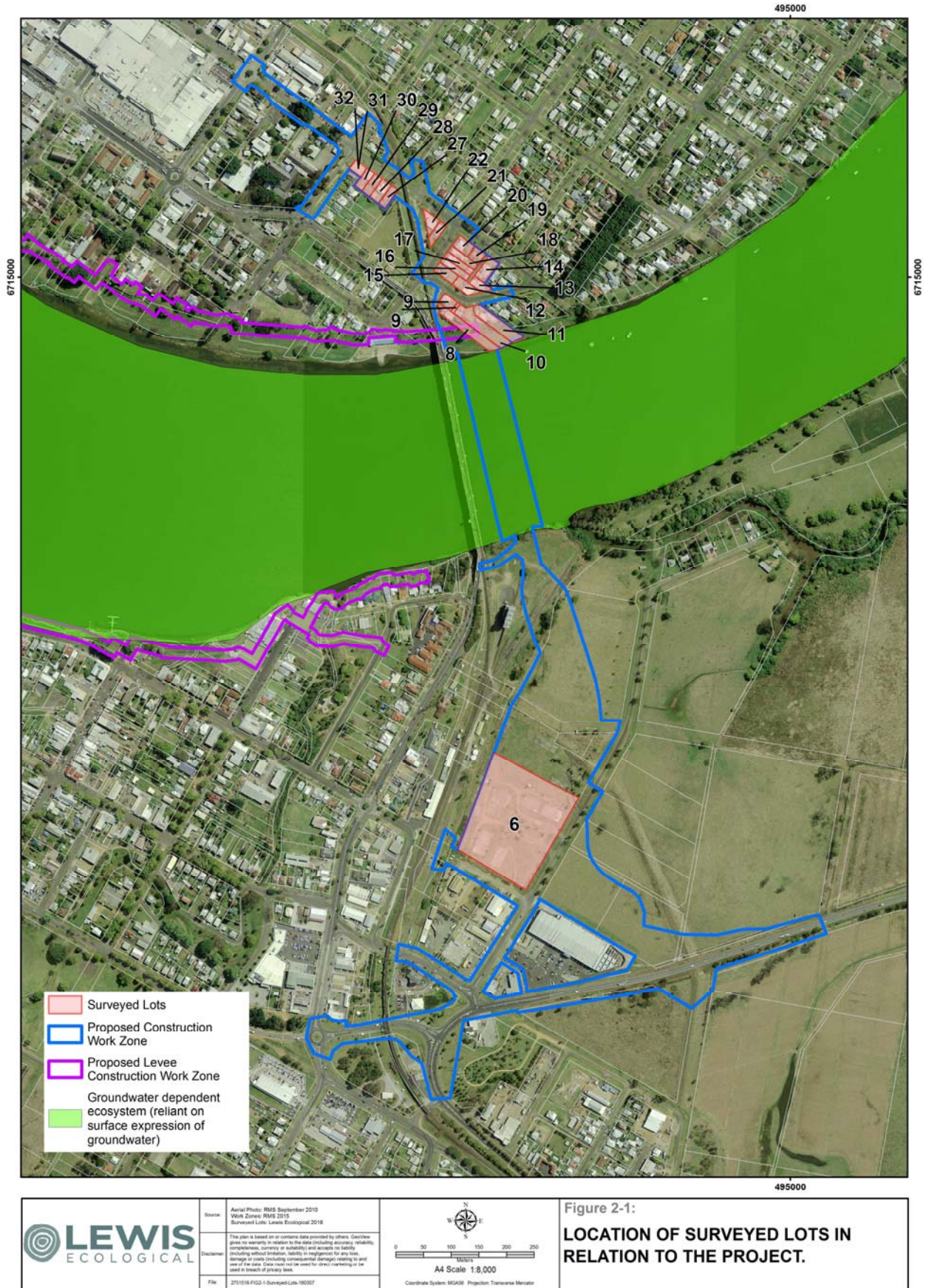


Figure 2-1. Lots requiring surveys (red polygons) with APO numbers within the project study area. Note that was an additional ancillary area to assess as requested by RMS (APO 6).

3.0 SURVEY RESULTS

3.1 Plant Community Types

No native plant community types were recorded during the field survey (Figure 3-1). At Affected Property Owner (hereafter APO) 8, there were a number of native plants growing on the river bank, however, most of these have been introduced and for the purposes of this investigation they are not considered a naturally occurring community. Consequently, none of the vegetation within the investigation area is considered a Threatened Ecological Community pursuant to either, the *Environmental Protection and Biodiversity Conservation Act (1999)* or *Threatened Species Conservation Act (1995)*. The foreshore area at and beyond the boundary of APO 8 has been previously mapped as Freshwater Wetlands on Coastal Floodplains, a Threatened Ecological Community.

3.2 Threatened Flora

No threatened flora were recorded during the survey nor are any naturally occurring species likely to occur (i.e. not transplanting or horticultural derivatives like *Macadamia tetraphylla*).

3.3 Threatened Fauna

The Three-toed Snake Tooth Skink (*Saiphos reticulatus*) was recorded at two locations and at another unconfirmed but likely location (Figure 3-2). They are summarised as follows:

Location 1 - APO 8 with one adult (Snout-vent 118 mm and Total Length 229 mm) recorded in leaf litter beneath a mature Avocado Tree (*Persea americana*) immediately adjacent to the block wall levee (Plate 3-1; Plate 3-2). Micro habitat at the capture site included a leaf litter layer up to 300 mm in depth and loose friable soil adjacent to some mown lawns. Numerous earth worms were also observed at this location.



Plate 3-1. Adult Three-toed Snake Tooth Skink captured from APO 8.



Figure 3-1. Distribution of plant community types in the Project study area.

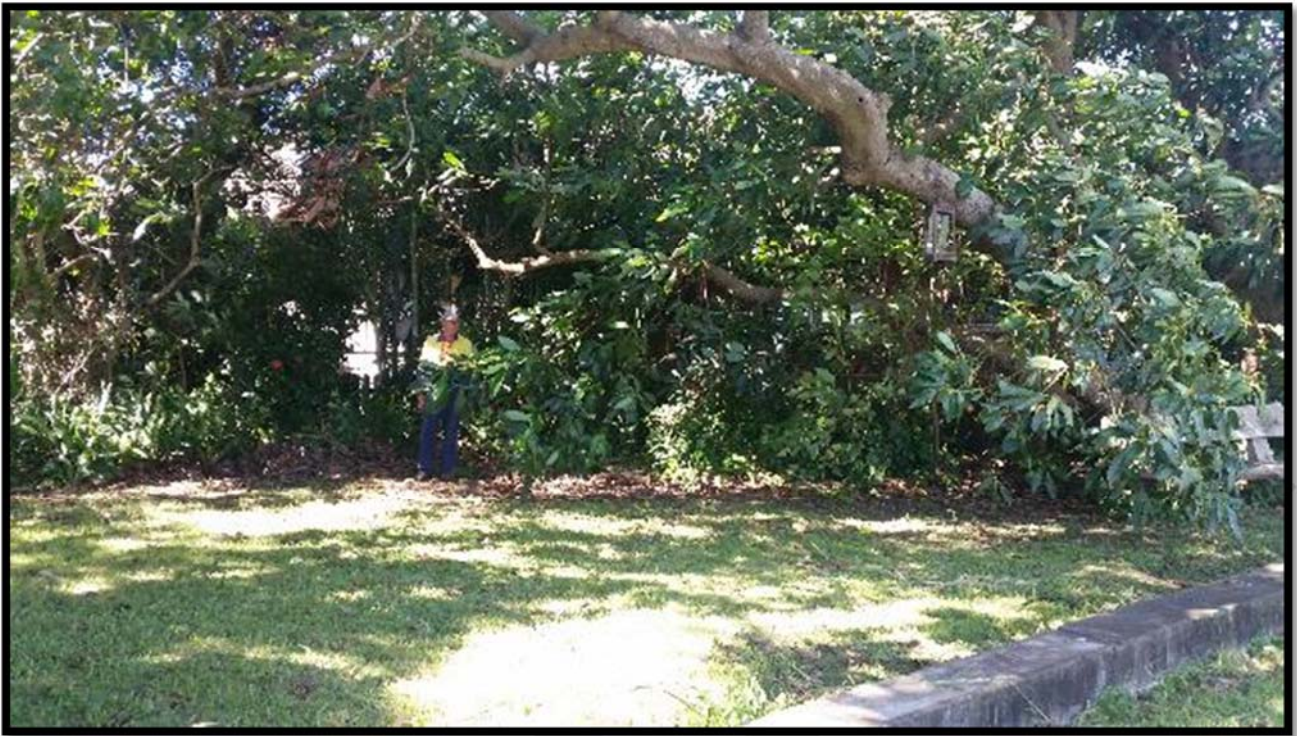


Plate 3-2. Capture location (R. Jago positioned) beneath a mature Avocado Tree. Note levee block wall in foreground.

Location 2 – Greaves Street - APO 13 where a sub adult or juvenile (Snout-vent 56 mm and Total Length 97 mm) was recorded beneath a house brick on the eastern side of the dwelling (Plate 3-3 and Plate 3-4). This property has regularly maintained gardens with deep mulch beds to reduce moisture loss for ornamental plantings.



Plate 3-3. Juvenile or sub adult Three-toed Snake Tooth Skink captured from APO 13



Location 3 – A skink originally thought to be a Three-clawed Skink (*Anomalopus verreauxii*) eluded capture but was briefly seen at APO 19. The consistency of the blue grey tail as observed on other adult Three-toed Snake Tooth Skinks would suggest it was probably an adult of this species.

Microhabitat at APO 19 was a decayed Palm stump in a side garden at the front of the dwelling.

Plate 3-4. Capture location at APO 13 with brick displaced.

3.4 Micro Bat Habitat

Cursory roost surveys found no evidence to suggest micro bats currently inhabit the surveyed APO's. There was, however, a number of dwellings which provide potential roost habitat. They have been summarised below.

1. APO 27 – Front eave provides roost opportunities (Plate 3-5);
2. APO 28 – Brick void beneath the house provides roost opportunities (Plate 3-6);
3. APO 30 – Eaves on the east, west and southern side provide egress points into the roof;
4. APO 20 – Some small holes in eaves not covered in vermin proof wire would allow micro bats to access the roof;
5. APO 12 – Some points along eaves provide access for micro bats
6. APO 10 – Restricted to eave sections of the self-contained dwelling on western boundary



Plate 3-5. Potential roost habitat for micro bats at APO 27.

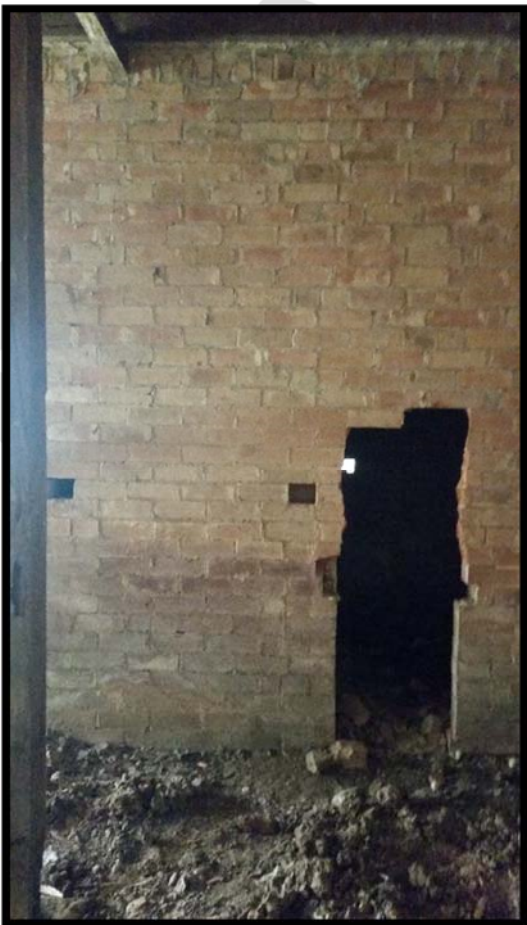


Plate 3-6. Potential roost habitat for micro bats at APO 28.

3.5 Other Fauna

Field surveys recorded 43 other species of vertebrate fauna including 31 species of bird, three species of frog, eight other species of reptile and one species of mammal. Six of the species recorded are introduced or exotic species, however, only the Rabbit (*Oryctolagus cuniculus*) has prescriptions associated with Key Threatening Processes (see Lewis 2016). A summary of the recorded species is shown in Appendix A.

4.0 DISCUSSION

None of the surveyed properties are considered to contain examples of native plant community types. This is consistent with previous findings of other ecological surveys in the immediate area (Biosis 2011; 2012; 2014). Given this, clearing calculations should quantify these areas as ornamental gardens and street plantings or something of a similar nature so as to clearly distinguish them from potential native plant community types occurring elsewhere in the Project study area. Similarly, the surveys concluded there is little likelihood that naturally occurring examples of threatened flora occur as surveys were conducted during an ideal time period for cryptic species like Hairy Joint Grass (*Arthraxon hispidus*).

Field surveys confirm the continued presence of Three-toed Snake Tooth Skink on the northern side of the Clarence River. The two confirmed discoveries at APO 8 and APO 13 represent the first records of this species in the Grafton area in more than 30 years (OEH 2015) and given the micro habitat features where both individuals were captured, it is likely that a population extends throughout the Dovedale area and potentially more broadly through the Grafton township or at least where some form of mulch cover exists on alluvial soils. In many instances these areas are likely to be residential gardens, a previously unrecorded known habitat type for this species (TSSC 2008). Further surveys would provide greater context with respect to local distributional extent and the implications of the Project and its potential impact on this species.

Cursory surveys for micro bats revealed about a quarter of the inspected dwellings provide potential roosting opportunities. If micro bats had been using or had recently used any of these structures, guano deposits (i.e. bat manure) and rub marks should have been evident as the survey period reflects a time when most bats capable of using such voids would have formed maternity roosts. The development of a micro bat management plan would provide adequate framework to manage bat roosts during construction.

5.0 CONCLUSION AND RECOMMENDATIONS

The Project area contains known habitat for the Three-toed Snake Tooth Skink on the northern side of the Clarence River and reconfirms the existence of a population in the Dovedale area. It is conceivable that this population extends for some distance, both upstream and downstream of the Project. Similarly, almost a quarter of the dwellings provide potential roosting habitat for micro bats, however, there is no evidence to suggest recent or current use.

In light of the findings, the following recommendations are made:

1. Survey areas adjacent to the Project to confirm the status of Three-toed Snake Tooth Skink in Grafton, particularly those areas in the general vicinity of old historic records. This would enable Roads and Maritime to establish the extent of the TTSTS population that exists outside of the project area;
2. Survey other areas of the Project study area for Three-toed Snake Tooth Skink, particularly the levee treatment areas, southern banks of the Clarence River and any substantial street tree plantings that may need to be removed or modified to accommodate the Project;
3. Update the significance assessments for both the *Environmental Protection and Biodiversity Conservation Act (1999)* and *Threatened Species Conservation Act (1995)*;
4. Prepare a Three-toed Snake Tooth Skink management plan for implementation as part of constructing the Project;
5. Ensure a micro bat management plan is prepared to manage the discovery of both temporal and maternity roost sites; and
6. Ensure ornamental gardens and other associated non-native plantings are clearly defined from clearing calculations of native vegetation communities.

6.0 REFERENCES

Biosis (2011) *Main Road 83 Summerland Way- Additional Crossing of the Clarence River at Grafton: Preliminary Route Options Report. Technical Paper: Ecology*. Report to Arup on behalf of the Roads and Maritime Services – Northern Regional Office. Authors: J. Charlton, A. Troy & J Dessmann. Biosis Pty Ltd, Sydney. Project no. 12605

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TSSC (2008) Commonwealth Conservation Advice on *Coeranoscincus reticulatus* (Three-toed Snake-tooth Skink) Threatened Species Scientific Committee.

7.0 APPENDIX A – SURVEY RESULTS

Table 7-1. Vertebrate fauna recorded during the survey.

Common Name	Scientific Name	Recorded on Affected Property Owner (APO) Number (see Figure 2-1)
FROGS		
Striped Marsh Frog	<i>Limnodynastes peroni</i>	27,6
Common Green Tree Frog	<i>Litoria caerulea</i>	8
Eastern Dwarf Frog	<i>Litoria fallax</i>	6, 8
REPTILES		
Eastern Water Skink	<i>Eulamprus quoyii</i>	28, 9, 10, 11
Grass Skink	<i>Lampropholis delicata</i>	27, 28, 29, 31, 32, 22, 19, 20, 18, 17, 16, 15, 13, 12, 9, 10, 8, 6.
Three Toed Skink	<i>Saiphos equalis</i>	27, 29, 31, 32, 19, 20, 8
Three-toed Snake Tooth Skink	<i>Saiphos reticulatus</i>	19 (unconfirmed), 13, 8
Asian House Gecko#	<i>Hemidactylus frenatus</i> #	27, 10, 11
Scute-snouted Calyptotis	<i>Calyptotis scutirostrum</i>	12
Robust Skink	<i>Ctenotus robustus</i>	29, 6
Wail Skink	<i>Cryptoblepharus virgatus</i>	17, 19, 29, 30
Eastern Water Dragon	<i>Physignathus lesueurii</i>	10, 11, 6
BIRDS		
Australian Magpie	<i>Cracticus tibicen</i>	27, 28, 29, 22, 19, 20, 18, 17, 16, 15, 13, 12, 9, 10, 8, 6.
Australian White Ibis	<i>Threskiornis moluccus</i>	6
Australian Wood Duck	<i>Chenonetta jubata</i>	6
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	27, 28, 15
Brown Gerygone	<i>Gerygone mouki</i>	28, 29
Brown Honeyeater	<i>Lichmera indistincta</i>	29, 13, 8, 9, 10
Cattle Egret	<i>Ardea ibis</i>	6
Chestnut Breasted Mannikin#	<i>Lonchura castaneothorax</i> #	6
Common Koel	<i>Eudynamys scolopaceus</i>	10
Crested Pigeon	<i>Ocyphaps lophotes</i>	6
Double Barred Finch	<i>Taeniopygia bichenovii</i>	6
Figbird	<i>Sphecotheres vieilloti</i>	10, 28, 29
Golden-headed Cisticola	<i>Cisticola exilis</i>	6
House Sparrow#	<i>Passer domesticus</i> #	12
Intermediate Egret	<i>Mesophoyx intermedia</i>	6
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	6
Little-pied Cormorant	<i>Microcarbo melanoleucos</i>	11
Masked Lapwing	<i>Vanellus miles</i>	11
Mistletoe Bird	<i>Dicaeum hirundinaceum</i>	27, 28, 29, 8, 10, 16
Pacific Black Duck	<i>Anas superciliosa</i>	11
Rainbow Lorikeet	<i>Trichoglossus moluccanus</i>	6, 27, 28, 29, 30
Red-browed Firetail	<i>Neochmia temporalis</i>	6
Rock Dove#	<i>Columba livia</i> #	10
Silver Gull	<i>Chroicocephalus novaehollandiae</i>	11
Silvereye	<i>Zosterops lateralis</i>	8, 9, 10, 27, 29
Spotted Turtle Dove#	<i>Spilopelia chinensis</i> #	6
Striated Pardalote	<i>Pardalotus striatus</i>	19, 20
Superb Blue Wren	<i>Malurus cyaneus</i>	6, 8
Tawny Grassbird	<i>Megalurus timoriensis</i>	6
Torresian Crow	<i>Corvus orru</i>	8, 9, 10, 28
Willie Wagtail	<i>Rhipidura leucophrys</i>	6, 9, 10, 28, 29, 30
MAMMALS		
European Rabbit #	<i>Oryctolagus cuniculus</i> #	6

Bold type denotes threatened species pursuant to the NSW Threatened Species Conservation Act (1995) and Environmental Protection and Biodiversity Conservation Act (1999).

= Introduced or exotic species.