

FURTHER FLORA AND FAUNA STUDIES

LAND AT WEST MOLONGLO AND GINNINDERRA CREEK NEW SOUTH WALES AUSTRALIAN CAPITAL TERRITORY



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Photograph 1 (cover): Looking northwards down the Murrumbidgee River valley, on the western side of the study area. Photograph taken in December 2008.

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Attached Map shows the Following Features:

- Plan of Ginninderra Creek Corridor*
- Habitat of Aprasia parapulchella*
- Extent of River Oak Forest*
- Slopes above 20° Slope*
- Plan of Modified Murrumbidgee River Corridor*

1. Introduction

The West Molonglo study area was investigated in a preliminary report by Kevin Mills & Associates (2009b). That report provided the results of a preliminary flora and fauna survey of the land, that particularly targeted threatened species and communities. The results of that report are not repeated here.

The current investigations included field surveys undertaken in June 2009. This report adds to the above report by providing information on several specific matters, considered important in deciding on the final land use pattern for the land within the study area.

2. Purpose of the Report

The field survey and report have several specific aims, most particularly the matters to be covered are:

- (i) identification and justification for a riparian habitat corridor along Ginninderra Creek;
- (ii) describe and map the habitat of *Aprasia parapulchella* habitat;
- (iii) map the extent of River Oak forest along the Murrumbidgee River;
- (iv) identification and justification for the reserve boundary east of the Murrumbidgee River valley; and
- (v) generally document flora and fauna within the study area to add to the existing information.

3. Study Methods

The following methods were employed for each component of the study.

Delineation of Ginninderra Creek Corridor

Ginninderra Creek is a relatively major creek along the far northern edge of the study area, in New South Wales. No significant features were found there in the previous preliminary study, although the presence of a significant riparian corridor was identified (Kevin Mills & Associates 2009b). The purpose here is to delineate a riparian habitat corridor based on field (ground-truthed) features, map the rock outcrops present, map stands of River Oak *Casuarina cunninghamiana* and determine if native grassland occurs in the area. The above features were mapped adjacent to the creek during the field investigation, being marked directly onto a colour aerial photograph.

Habitat of *Aprasia parapulchella*

The Pink-tailed Worm Lizard *Aprasia parapulchella* is listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the NSW *Threatened Species Conservation Act 1995* as vulnerable, but is not listed as threatened under the ACT *Nature Conservation Act 1980*.

The ACT Riparian Strategy states that “the species is reasonably common, mostly occurs in nature reserves, and is not considered to be in danger of extinction (Osborne and Coghlan 2004). For this reason it is not declared a threatened species in the ACT, but has been assigned Special Protection Status (SPS) under the *Nature Conservation Act 1980* (ACT), recognising the importance of the ACT populations in a national and regional context.”

Surveys were carried out for this species in the preliminary study (Kevin Mills & Associates 2009b); the species was found in many of the rock outcrops surveyed at that time. The habitat of this species was identified as an area containing rock outcrops, whether outcropping rock or scattered, partially buried small rocks. These areas were mapped directly onto a colour aerial photograph in the field.

In this survey, the whole of the study area was resurveyed employing the above methods to produce a habitat map for *Aprasia parapulchella*. At the same time, various site searches were carried out for the lizard and the information gained added to that obtained during the previous surveys.

Mapping of River Oak Forest

Stands of River Oak *Casuarina cunninghamiana* occur along the Murrumbidgee River on the western edge of the study area. This is a restricted and greatly diminished forest type and all stands are important. The ACT Aquatic Species and Riparian Zone Conservation Strategy (2007) recognises the importance of riparian zones for the protection of threatened species, riparian vegetation and the provision of habitat links. The strategy notes the importance of incorporating riparian zone needs in considering changes in

land use in the West Molonglo area. River Oak is the dominant tree within the riparian zone along the Murrumbidgee River. The length of the river fronting the study area is about 15 kilometres.

The stands of River Oak along the river and Ginninderra Creek adjacent to the study area were mapped through a combination of field survey and colour aerial photograph interpretation.

Identification of Murrumbidgee River Reserve Boundary

The Territory Plan identifies a boundary for the Murrumbidgee River corridor reserve; this is generally a series of straight lines at the eastern edge of the top of the steep land falling towards the river. This boundary is rather arbitrary but is apparently designed to cover the river valley. The purpose of this part of the investigation was to delineate a reserve boundary with a view to rationalising it with the significant ground features identified earlier in this study. This study extends the corridor into New South Wales along the river valley, using the same criteria.

The purpose of the field study, then, was to survey the area in the vicinity of the above boundary and map any significant habitats and other features in its vicinity. This was then used to delineate a new reserve boundary based on the important field-proved (ground-truthed) features. The following features were utilised in delineating the new boundary:

- inclusion of the steep valley sides;
- delineation of a boundary that covered the habitat of *Aprasia parapulchella* in a way that was viable in the long term (i.e. small areas of isolated potential habitat are not necessarily included).

Possible future reservations along tributary creeks and over woodland patches to the east of the river valley are not included. Such areas may in future be considered for some kind of local open space reservation.

4. Results

4.1 Ginninderra Creek Corridor

The far northern boundary of the study area is in NSW and follows the course of Ginninderra Creek; the length of creek in the study area is about 13 kilometres. The whole length of the creek was surveyed on 24 June 2009 with the primary aim of identifying and mapping the key habitats associated with the creek corridor. In addition to this mapping work, all plant and animal species encountered were recorded, the numbers of wetland fauna recorded and photographs taken. The survey was undertaken with an aerial photograph in hand, onto which were marked relevant features.

The information gained in the NSW section of the study area is documented separately to the ACT as eventually separate development applications will be required for the NSW and ACT sections of the study area.

Key Habitat Mapping

The following key habitats were identified along Ginninderra Creek and marked onto the aerial photograph in the field:

- riparian habitat (stream channel and immediate low-lying flats);
- rock outcrops on adjacent slopes and flats;
- stands of River Oak *Casuarina cunninghamiana*.

The distribution of these key habitats along Ginninderra Creek is shown on the accompanying map.

The riparian habitats consist of alternating ponds and sand/gravel deposits, with occasional rock bars. The flora is a mix of native wetland plants and weeds. Reeds and sedges occur mainly around the ponds, particularly Common Reed *Phragmites australis* and River Club-rush *Schoenoplectus validus*.

Except for the River Oak discussed below, the trees and shrubs along the creek are almost entirely exotic, and include Willows *Salix* spp., Sweet Briar *Rosa rubiginosa*, Hawthorn *Crataegus monogyna* and, very rarely, the native Red-leaved Wattle *Acacia rubida*.

The banks of the creek are almost entirely covered in exotic grassland, particularly the pasture grass *Phalaris* *Phalaris* sp. and various herbaceous weeds. In a very few locations, there are scattered native

grasses such as Kangaroo Grass *Themeda australis*, Spear-grasses *Austrostipa* sp. and River Tussock *Poa labillardieri*.

The most extensive rock outcrops are found in the western half of the creek length surveyed. There are also extensive rock outcrops on the northern side of the creek, but these were not investigated as they are outside the study area. The grassland associated with the rock outcrops is almost entirely exotic grassland, and in the west it is improved pasture. Outside the fenced paddock in the far western corner, there is a patch of Kangaroo Grass *Themeda australis* amongst the rocks, and a few other natives are present. Elsewhere, Spear-grasses *Austrostipa* spp. Are scattered and seldom account for more than about 20% of the ground cover.

In the far north-western corner of the study area, along a rocky section of creek, there is a small stand of River Oak *Casuarina cunninghamiana*. There are large dead trees, caused by an unknown event, but saplings are present, the living trees are healthy and most of the trees are not ancient specimens. The stand continues onto the neighbouring property to the west.

Wetland Species

During the course of the survey, wetland plants and animals observed along Ginninderra Creek were specifically recorded; the results are presented in **Table 1**. The number of species is generally very depauperate when compared to a natural watercourse because of the highly modified character of the creek corridor.

Table 1
Wetland Flora and Fauna along Ginninderra Creek

| <u>Plant Species</u> | |
|---------------------------------|------------------|
| <i>Trees</i> | |
| <i>Casuarina cunninghamiana</i> | River Oak |
| * <i>Salix babylonica</i> | Weeping Willow |
| * <i>Salix</i> sp. | Willow |
| <i>Other Species</i> | |
| <i>Juncus</i> sp. | Rush |
| <i>Persicaria decipiens</i> | Slender Knotweed |
| <i>Phragmites australis</i> | Common Reed |
| <i>Schoenoplectus validus</i> | River Club-rush |
| <i>Typha orientalis</i> | Cumbungi |
| * <i>Cyperus eragrostis</i> | Umbrella Sedge |
| * <i>Ludwigia peploides</i> | Water Primrose |
| * <i>Rumex crispus</i> | Curled Dock |
| <u>Fauna Species</u> | <u>No.</u> |
| Australian Wood Duck | 24 |
| Black-fronted Dotterel | 1 |
| Common Carp* | 2 |
| Grey Teal | 3 |
| Pacific Black Duck | 20 |
| Smooth Toadlet | 1 |
| Water Rat | 1 |

* Introduced species.

Species Recorded

As noted above, all plant and animal species recorded in the NSW section of the study area were recorded separately. **Appendix 3** lists the plant species for the study area, dividing them into those recorded in NSW and those recorded in the ACT. **Appendix 4** provides the same information for the animals recorded.



Photograph 2. Large rock outcrop in the north-western part of the study area, near Ginninderra Creek. This paddock is pasture improved and has no native grassland.



*Photograph 3. The grassland around the rock outcrops is mainly exotic, with only a space cover of Corkscrew *Austrostipa scabra* in a few locations.*



Photograph 4. Pond on Ginninderra Creek along the western section of the creek; the aquatic plant is Phragmites australis with Casuarina cunninghamiana in the background.



Photograph 5. Typical section of Ginninderra Creek showing channel, exotic creek-side grassland and willows.

4.2 Habitat of *Aprasia parapulchella*

The areas delineated as known and potential habitat for the Pink-tailed Worm Lizard are shown on the attached map; the observations of the lizard in the 2008/2009 survey season are also shown on the plan. Several records of this lizard were made in June 2009; these observations are documented in **Appendix 5.4** in the same format as in the original report (Kevin Mills & Associates 2009b).

The attached map identifies all rock outcrops more than about 10 metres by 10 metres in size throughout the Murrumbidgee River valley and those along Ginninderra Creek; these are shown on the attached map. The main habitat areas are across the ridges and gullies falling down to the Murrumbidgee River; below the delineated boundary rock outcrops are usually abundant (see accompanying photographs). To the east of this line, there are small outcrops in some of the paddocks.

The rocks around the Murrumbidgee River valley are part of a volcanic complex of Silurian age. In the south, the outcropping rocks are mainly rhyolite and dacite of the Walker Volcanics and Mount Pointer Volcanics. In the north, similar rocks of the Laidlow Volcanics crop out along Ginninderra Creek. Sedimentary rocks in the Walker Volcanics and a large area of intrusive rhyodacite occur across the gentler topography in the eastern part of the land.

The grassland associated with these rocky areas is fairly consistent throughout the larger areas of habitat. There, the grassland is a mix of native and exotic species. Other than Speargrasses *Austrostipa*, spp., Wallaby Grasses *Austrodanthonia* spp. and Reg-leg Grass *Bothriochloa macra*, native species are rare. Most of the higher parts of the paddocks are pasture improved and this is reflected in the dominance of exotic plants growing in and around the rocky areas. The isolated rock outcrops mapped in the east are mainly small and sitting in a highly managed pasture of introduced forage plants such as Rye Grass *Lolium* spp. and Subterranean Clover *Trifolium subterranean*. Very few of these areas would be termed native grassland; most would be native pasture because of a higher than 50% native grass cover (primarily *Austrostipa*) and dominance of exotic species in terms of the number of species.

A summary of the observations of *Aprasia parapulchella* in the study area to date (2008-2009) is provided in **Table 2**; all sites surveyed are summarised in **Appendix 6**.

Table 2
Summary of Reptile Survey Effort and Results

| | |
|--|--------------------|
| No. of surveys | 39 |
| No. of rocks moved | 4,032 |
| No. of reptile species recorded | 7 |
| No. of records of <i>Aprasia</i> (live or skins) | 17 live; 15+ skins |
| No. of sites with <i>Aprasia parapulchella</i> | 20 (51%) |
| No. of rocks per live <i>Aprasia</i> record | 237 |
| No. of live lizards per 1,000 rocks moved | 4.2 |
| No. of rocks per live reptile (all species) | 79 |

The West Molonglo survey results indicate that *Aprasia parapulchella* was the most commonly encountered reptile, with over half of the survey sites containing this species (see **Table 4**); the number of sloughed skins increases the impression that this is a common local lizard. For comparison with the above results, the results presented in **Table 3** have been obtained in other surveys for *Aprasia*.

Table 3
Comparison of *Aprasia* Survey Results

| Location | No of live lizards | No. of skins | Live lizard/ 1,000 rocks | Rocks/ live lizard | Reference |
|----------------------------|--------------------|--------------|--------------------------|--------------------|-----------------------|
| ACT/NSW | 53 | 44 | - | - | Osborne et al. (1991) |
| Mt Taylor, ACT | - | - | 9.1 | 109 | Jones (1999) |
| Bathurst | - | - | 5.7 | 175 | NSW NPWS (1999) |
| The Poplars | 35 | 55 | 11.6 | 85 | Biosis (2003a) |
| South Tralee | 3 | 8 | 1.0 | 1006 | Biosis (2003b) |
| South Jerrabomberra | 8 | 11 | 1.6 | 634 | KMA (2009a) |
| West Molonglo (this study) | 17 | 15 | 4.2 | 237 | KMA (2009b) |

Table 4
Summary of Reptile Survey Results 2008/2009

| Species | No. Surveys Species Observed | Total No. Animals Observed |
|---|------------------------------|----------------------------|
| Pink-tailed Worm Lizard <i>Aprasia parapulchella</i> | 20 (51%) | 17 (live); 15+ (skins) |
| Striped Skink <i>Ctenotus robustus</i> | 13 (25%) | 22 |
| Boulenger's Skink <i>Morethia boulengeri</i> | 3 (6%) | 3 |
| Copper-tailed Skink <i>Ctenotus taeniolatus</i> | 3 (6%) | 5 |
| Olive Legless Lizard <i>Delma inornata</i> | 2 (4%) | 2 |
| Eastern Brown Snake <i>Pseudonaja textilis</i> | 1 (2%) | 1 |
| Rainbow Skink <i>Carlia tetradactyla</i> | 1 (2%) | 1 |
| Totals | 39 (100%) | 51 |

Most of the larger rock outcrops that have been shown on the attached map probably support *Aprasia parapulchella*, although not all areas have yet been surveyed. The rocky areas along Ginninderra Creek are mostly within improved pasture and have not been surveyed for the species; these areas mostly fall within a proposed riparian corridor along the creek. Most of the small isolated rock outcrops located in pasture improved paddocks probably do not support the lizard. The grassland there is almost entirely exotic and the rocks are not extensive.

The ACT Riparian Zone Conservation Strategy (2007) discusses the species *Aprasia parapulchella* and threats to its survival. A map of the distribution of the species in the ACT shows it occurs widely along the river corridors in the region. The West Molonglo area is at the far north-western limit of the distribution of the lizard in the ACT; see **Figure 1**.

The Riparian Strategy goes on to state the conservation objective is "protect in perpetuity viable populations of the Pink-tailed Worm Lizard in secure native grassland habitat across the range of the species in the ACT and maintain its potential for evolutionary development in the wild."

The Strategy sets out the following aims to protect and manage the species:

- "Seek to ensure known populations of the Pink-tailed Worm Lizard are protected from inadvertent damaging actions such as the application of fertilisers (e.g. by advising land owners and managers of their presence).
- Seek to ensure that urban development and associated recreational pressures do not adversely impact on the viability of the species in the ACT.
- Encourage management to be undertaken in an adaptive framework, and facilitate the incorporation of the research results into management of the Pink-tailed Worm Lizard and its habitat.
- Manage sites, and provide advice to other landowners and managers, to maintain optimum habitat for the species (in particular, prevention of intensive grazing, maintenance of native grass cover, retention of partially embedded surface rocks).
- To assist landowners and managers, prepare specific management guidelines for the species, where required."

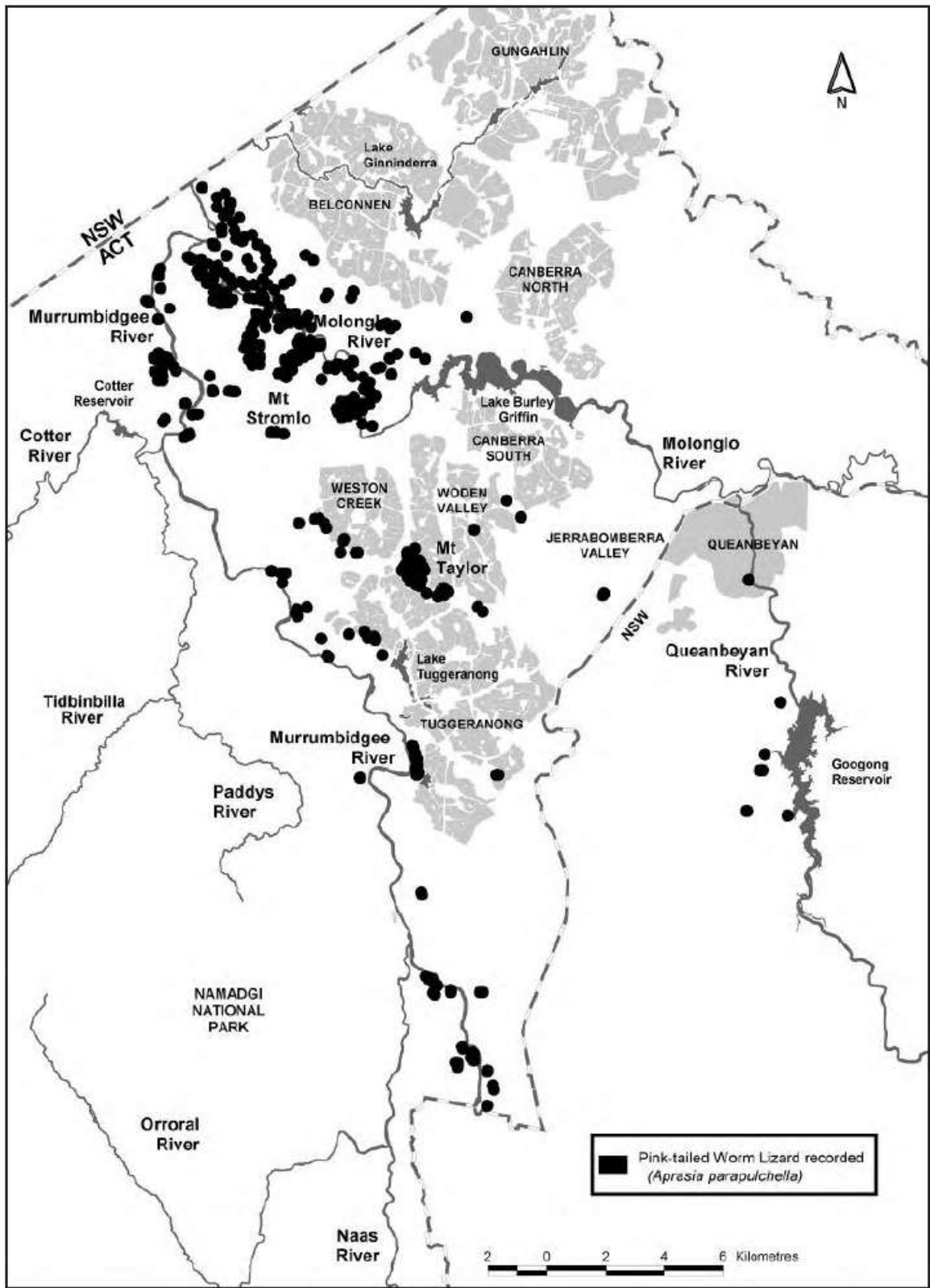


Figure 1
 Distribution of *Aprasia parapulchella* in the ACT. (from ACT Riparian Strategy, ACT 2007).



Photograph 6. Rocky ground typical of the upper slopes of the Murrumbidgee River valley in the study area. Habitat of the threatened lizard *Aprasia parpulchella*.



Photograph 7. The threatened Pink-tailed Worm Lizard *Aprasia parpulchella*. Photographed in the study area in June 2009.



Photograph 8. A Pink-tailed Worm Lizard *Aprasia parpulchella* *in situ*, showing the rock under which it was located. Photographed in the study area in June 2009.



Photograph 9. A sloughed skin of the Pink-tailed Worm Lizard *Aprasia parpulchella* *in situ*. Photographed in the study area in June 2009.

The findings of the surveys to date include:

- *Aprasia parapulchella* is common in the rocky landscape of the study area;
- live animals and sloughed skins were equally common in the study area;
- lizards were recorded over a long period of the year from October (spring) to June (winter);
- the rocks under which the lizards are found are quite small, probably because the smaller rocks heat up faster than large rocks and are therefore more useful to cold-blooded reptiles;
- the lizards were found in areas of coarse-grained volcanic rocks (dacite and similar) and some sedimentary rocks;
- small black ants, the prey of *Aprasia*, were found at many of the sites;
- lizards were often found partially down burrows (probably made by ants) or near such burrows;
- these results are similar to those obtained at South Jerrabomberra near Queanbeyan, where the species is also common on coarse-grained volcanic rocks.

4.3 Extent of River Oak Forest

The extent of River Oak *Casuarina cunninghamiana* along the Murrumbidgee River is shown on the accompanying map. The survey found that River Oak occurs almost continuously along the river, on both sides of the channel. The stands appear to be healthy, with a wide range in the size (age) of the trees.

A small section of Ginninderra Creek also supports a stand of River Oak *Casuarina cunninghamiana*; see attached map.

4.4 Delineation of the Murrumbidgee River Valley Corridor

A new boundary for the Murrumbidgee River Corridor is shown on the attached map; this includes land in the ACT and NSW. The rationale for delineating this boundary is described below.

The boundary has been delineated based on two key factors, the presence of *Aprasia* habitat, as delineated in this study, and the inclusion of all of the very steep topography. There is little woodland in the area, that which is present occurs on the steep slopes. The conservation values of the delineated corridor include extensive areas of *Aprasia* habitat, patches of woodland and shrubland, important local fauna habitat and the river side (riparian) habitats.

The delineation of the reserve boundary did not attempt to include every single rock outcrop, which is not only unnecessary as *Aprasia* appears not to inhabit the smaller isolated outcrops, but would result in a most unworkable boundary for the long term management of the reserve. The boundary has been 'smoothed' to minimise its length and capture the core area of rocky habitat. The exclusion of a few small rocky outcrops will not threaten the survival of the lizard in the locality.

5. Discussion

This report has provided further detail on the vegetation and habitats in the study area at West Molonglo, expanding upon the earlier report by the consultant (Kevin Mills & Associates 2009b). In particular, the study concentrated on the riparian corridors along the Murrumbidgee River and Ginninderra Creek, and the habitat of the nationally threatened lizard *Aprasia parapulchella*.

A revised boundary for the proposed reserve along the Murrumbidgee River corridor has been re-defined based upon field investigations that 'ground-truthed' the efficacy of the boundary. The existing boundary is a series of straight lines that do not match any relevant features on the ground. The boundary proposed here continues into New South Wales, for completeness.

Some additional areas of habitat importance, such as woodland remnants and a few creek-side corridors, may be defined to the east of the river corridor, but these are minor and not considered here.

Future Studies

A few additional surveys have been identified to complete the flora and fauna studies in the West Molonglo property.

- Surveys for the Golden Sun Moth *Synemon plana* in November/December.
- Searches for *Aprasia parapulchella* in rocky areas along Ginninderra Creek.



Photograph 10. The northern part of the study area showing the almost continuous stands of River Oak *Casuarina cunninghamiana* along the Murrumbidgee River.



Photograph 11. The Murrumbidgee River in the north of the study area. Note broad channel and the River Oak *Casuarina cunninghamiana* along the banks.

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Appendix 3
List of Plant Species for the Study Area

| Occurrence | | ACT | NSW |
|--|-------------------------------------|-----|-----|
| Pteridophyta(Ferns) | | | |
| Aspleniaceae | | | |
| | <i>Asplenium flabellifolium</i> | | N |
| Azollaceae | | | |
| | <i>Azolla filiculoides</i> | | N |
| Sinopteridaceae | | | |
| | <i>Cheilanthes austrotenuifolia</i> | A | N |
| | <i>Cheilanthes distans</i> | | N |
| | <i>Cheilanthes sieberi</i> | A | |
| Gymnospermae (Conifers) | | | |
| Cupressaceae | | | |
| | <i>Callitris endlicheri</i> | A | |
| Pinaceae | | | |
| | * <i>Pinus radiata</i> | A | |
| Angiospermae (Flowering Plants) | | | |
| Aceraceae | | | |
| | * <i>Acer negundo</i> | A | |
| Amaranthaceae | | | |
| | <i>Alternanthera sp. A</i> | A | |
| | * <i>Amaranthus sp.</i> | A | |
| Anthericaceae | | | |
| | <i>Tricoryne elatior</i> | A | |
| Apiaceae | | | |
| | <i>Daucus glochidiatus</i> | A | |
| | <i>Hydrocotyle laxiflora</i> | A | N |
| | * <i>Conium maculatum</i> | A | |
| | * <i>Foeniculum vulgare</i> | A | N |
| Asteraceae | | | |
| | <i>Calotis lappulacea</i> | A | |
| | <i>Cassinia longifolia</i> | A | |
| | <i>Cassinia quinquefaria</i> | | N |
| | <i>Centipeda minima</i> | A | |
| | <i>Chrysocephalum apiculatum</i> | A | N |
| | <i>Chrysocephalum semipapposum</i> | A | N |
| | <i>Euchiton sphaericus</i> | A | |
| | <i>Leptorhynchus squamatus</i> | A | |
| | <i>Pseudognaphalium luteoalbum</i> | A | |
| | <i>Senecio quadridentatus</i> | A | |
| | <i>Solenogyne dominii</i> | A | |
| | <i>Triptilodiscus pygmaeus</i> | A | |
| | <i>Vittadinia cuneata</i> | A | |
| | <i>Vittadinia muelleri</i> | A | N |
| | * <i>Arctotheca calendula</i> | A | N |
| | * <i>Aster subulatus</i> | A | N |
| | * <i>Carthamus lanatus</i> | A | N |
| | * <i>Chondrilla juncea</i> | | N |

| | | | |
|---------------------------------------|----------------------|---|---|
| * <i>Cirsium vulgare</i> | Spear Thistle | A | N |
| * <i>Conyza</i> sp. | Fleabane | A | N |
| * <i>Gamochaeta americana</i> | American Cudweed | A | |
| * <i>Gamochaeta calviceps</i> | Cudweed | A | |
| * <i>Hypochaeris glabra</i> | Smooth Flatweed | A | |
| * <i>Hypochaeris radicata</i> | Flatweed | A | N |
| * <i>Lactuca serriola</i> | Prickly Lettuce | A | |
| * <i>Onopordium acanthium</i> | Scotch Thistle | A | N |
| * <i>Silybum marianum</i> | Variegated Thistle | A | N |
| * <i>Tolpis umbellata</i> | Yellow Hawkweed | A | |
| Boraginaceae | | | |
| * <i>Echium plantagineum</i> | Paterson's Curse | A | N |
| * <i>Echium vulgare</i> | Viper's Bugliss | A | N |
| Brassicaceae | | | |
| * <i>Capsella bursa-pastoris</i> | Shepherd's Purse | A | |
| * <i>Lepidium</i> sp. | Peppercress | A | N |
| * <i>Rorippa nasturtium-aquaticum</i> | Watercress | A | N |
| Campanulaceae | | | |
| <i>Wahlenbergia communis</i> | Tufted Bluebell | A | |
| <i>Wahlenbergia luteola</i> | Yellowish Bluebell | A | |
| Caryophyllaceae | | | |
| <i>Stellaria pungens</i> | Prickly Starwort | | N |
| * <i>Petrorhagia nanteuillii</i> | Proliferous Pink | A | |
| Casuarinaceae | | | |
| <i>Casuarina cunninghamiana</i> | River Oak | A | N |
| Chenopodiaceae | | | |
| <i>Chenopodium pumilio</i> | Clammy Goosefoot | A | |
| <i>Einadia nutans</i> | Nodding Saltbush | A | N |
| * <i>Chenopodium album</i> | Fat Hen | A | |
| Colchicaceae | | | |
| <i>Wurmbea dioica</i> | Early Nancy | A | |
| Convolvulaceae | | | |
| <i>Convolvulus erubescens</i> | Australian Bindweed | A | |
| Crassulaceae | | | |
| <i>Crassula sieberiana</i> | Stonecrop | A | |
| Cyperaceae | | | |
| <i>Carex appressa</i> | Tall Sedge | A | |
| <i>Carex inversa</i> | Knob Sedge | A | |
| <i>Schoenoplectus validus</i> | River Club-rush | A | N |
| * <i>Cyperus eragrostis</i> | Umbrella Sedge | A | N |
| Dilleniaceae | | | |
| <i>Hibbertia obtusifolia</i> | Grey Guinea Flower | A | |
| Epacridaceae | | | |
| <i>Brachyloma daphnoides</i> | Daphne Heath | A | |
| <i>Melichrus urceolatus</i> | Urn Heath | A | |
| Fabaceae | | | |
| Faboideae (subfamily) | | | |
| <i>Desmodium varians</i> | Slender Tick-trefoil | A | |
| <i>Dillwynia sericea</i> | Showy Parrot Pea | A | |

| | | | |
|----------------------------------|-------------------------|---|----|
| <i>Glycine tabacina</i> | Vanilla Glycine | A | |
| <i>Indigofera australis</i> | Austral Indigo | A | |
| <i>Pultenaea cunninghamii</i> | Bush Pea | A | |
| * <i>Trifolium arvense</i> | Haresfoot Clover | A | |
| * <i>Trifolium augustifolium</i> | Narrow-leaf Clover | A | |
| * <i>Trifolium campestre</i> | Hop Clover | A | |
| * <i>Trifolium glomeratum</i> | Clustered Clover | A | |
| * <i>Trifolium repens</i> | White Clover | A | |
| * <i>Trifolium subterraneum</i> | Subterranean Clover | A | N |
| Mimosoideae (subfamily) | | | |
| <i>Acacia dealbata</i> | Silver Wattle | A | N |
| <i>Acacia implexa</i> | Hickory Wattle | A | |
| <i>Acacia rubida</i> | Red-leaved Wattle | A | N |
| * <i>Acacia baileyana</i> | Cootamundra Wattle | A | |
| Gentianaceae | | | |
| * <i>Centaurium erythraea</i> | Common Centaury | A | N |
| Geraniaceae | | | |
| <i>Geranium solanderi</i> | Native Geranium | A | |
| * <i>Erodium cicutarium</i> | Common Stork's-bill | A | N |
| Goodeniaceae | | | |
| <i>Goodenia hederacea</i> | Ivy Goodenia | A | |
| Haloragaceae | | | |
| <i>Gonocarpus tetragynus</i> | Poverty Raspwort | A | |
| Hypericaceae | | | |
| <i>Hypericum gramineum</i> | Small St John's Wort | A | |
| * <i>Hypericum perforatum</i> | St John's Wort | A | N |
| Juncaceae | | | |
| <i>Juncus australis</i> | Austral Rush | A | |
| <i>Juncus usitatus</i> | Common Rush | A | N? |
| Lamiaceae | | | |
| <i>Scutellaria humilis</i> | Dwarf Skullcap | A | |
| * <i>Salvia verbenaca</i> | Wild Sage | A | N |
| Lauraceae | | | |
| <i>Cassytha pubescens</i> | Downy Dodder-laurel | A | |
| Lomandraceae | | | |
| <i>Lomandra filiformis</i> | Wattle Mat-rush | A | |
| <i>Lomandra longifolia</i> | Spiny-headed Mat-rush | A | |
| Loranthaceae | | | |
| <i>Amyema cambagei</i> | Mistletoe | A | N |
| Lythraceae | | | |
| <i>Lythrum hyssopifolia</i> | Hyssop Loosestrife | A | N |
| Malvaceae | | | |
| * <i>Malva neglecta</i> | Dwarf Mallow | A | N |
| * <i>Modiola caroliniana</i> | Red-flowered Mallow | A | N |
| Myrtaceae | | | |
| <i>Eucalyptus blakelyi</i> | Blakely's Red Gum | A | |
| <i>Eucalyptus dives</i> | Broad-leaved Peppermint | A | |

| | | | |
|-----------------------------------|------------------------|---|----|
| <i>Eucalyptus macrorhyncha</i> | Red Stringybark | A | N |
| <i>Eucalyptus melliodora</i> | Yellow Box | A | N |
| <i>Eucalyptus pauciflora</i> | Snow Gum | A | N |
| <i>Eucalyptus rossii</i> | Inland Scribbly Gum | A | N |
| <i>Kunzea ericoides</i> | Burgan | A | N |
| <i>Leptospermum multicaule</i> | Tea Tree | A | |
| Onagraceae | | | |
| <i>Epilobium billardierianum</i> | Willowherb | A | |
| * <i>Ludwigia peploides</i> | Water Primrose | | N |
| Orobanchaceae | | | |
| * <i>Orobanche minor</i> | Lesser Broomrape | A | |
| Oxalidaceae | | | |
| <i>Oxalis perennans</i> | Grassland Wood Sorrel | A | N? |
| <i>Oxalis radicata</i> | Wood Sorrel | A | |
| Papaveraceae | | | |
| * <i>Eschshoizia californica</i> | Californian Poppy | A | N |
| Phormiaceae | | | |
| <i>Stypandra glauca</i> | Nodding Blue Lily | A | |
| Pittosporaceae | | | |
| <i>Bursaria lasiophylla</i> | Blackthorn | A | N |
| Plantaginaceae | | | |
| <i>Plantago varia</i> | Variable Plantain | A | N |
| * <i>Plantago lanceolata</i> | Ribbed Plantain | A | N |
| Poaceae | | | |
| <i>Agrostis avenacea</i> | Blown Grass | A | |
| <i>Aristida ramosa</i> | Three-awned Speargrass | A | |
| <i>Austrodanthonia racemosa</i> | Wallaby Grass | A | |
| <i>Austrodanthonia carphoides</i> | Short Wallaby Grass | A | |
| <i>Austrostipa bigeniculata</i> | Tall Speargrass | A | N |
| <i>Austrostipa densiflora</i> | Brushtail Speargrass | A | |
| <i>Austrostipa scabra</i> | Corkscrew | A | N |
| <i>Bothriochloa macra</i> | Red-leg Grass | A | N |
| <i>Cynodon dactylon</i> | Couch Grass | A | N |
| <i>Dichelachne micrantha</i> | Short-hair Plume-grass | A | |
| <i>Elymus scaber</i> | Wheatgrass | A | |
| <i>Enneapogon nigricans</i> | Nineawn Grass | A | |
| <i>Eragrostis</i> sp. | Love-grass | A | |
| <i>Microlaena stipoides</i> | Weeping Grass | A | N |
| <i>Panicum effusum</i> | Hairy Panic | A | |
| <i>Poa labillardieri</i> | River Tussock | A | N |
| <i>Poa sieberiana</i> | Poa Tussock | A | N |
| <i>Themeda australis</i> | Kangaroo Grass | A | N |
| * <i>Aira elegantissima</i> | Delicate Hairgrass | A | |
| * <i>Avena</i> sp. | Oats | A | N |
| * <i>Briza maxima</i> | Large Quaking Grass | A | |
| * <i>Briza minor</i> | Lesser Quaking Grass | A | |
| * <i>Bromus cartharticus</i> | Prairie Grass | A | N |
| * <i>Bromus diandrus</i> | Great Brome | A | |
| * <i>Bromus hordeaceus</i> | Soft Brome | A | |
| * <i>Dactylis glomerata</i> | Cocksfoot | A | |
| * <i>Eragrostis curvula</i> | African Lovegrass | A | |
| * <i>Holcus lanatus</i> | Yorkshire Fog | A | N |
| * <i>Hordeum</i> sp. | Barley Grasses | A | |

| | | | |
|--|-----------------------|---|----|
| * <i>Lolium</i> sp. | Ryegrass | A | N |
| * <i>Nassella trichotoma</i> | Serrated Tussock | A | |
| * <i>Phalaris aquatica</i> | Phalaris | A | N |
| Polygonaceae | | | |
| <i>Persicaria decipiens</i> | Slender Knotweed | | N |
| <i>Rumex brownii</i> | Swamp Dock | A | N |
| * <i>Acetosella vulgaris</i> | Sheep Sorrel | A | N |
| * <i>Polygonum aviculare</i> | Wireweed | A | |
| * <i>Rumex crispis</i> | Curled Dock | A | N |
| Portulacaceae | | | |
| <i>Portulaca oleracea</i> | Purslane | A | |
| Proteaceae | | | |
| <i>Grevillea juniperina</i> subsp. <i>fortis</i> | Prickly Grevillea | | N |
| Ranunculaceae | | | |
| <i>Clematis microphylla</i> | Small-leaved Clematis | | N |
| Rosaceae | | | |
| <i>Acaena ovina</i> | Sheep's Burr | A | N? |
| <i>Rubus parvifolius</i> | Native Raspberry | A | N |
| * <i>Crataegus monogyna</i> | Hawthorn | A | N |
| * <i>Pyracantha</i> sp. | Fire Thorn | A | |
| * <i>Rosa rubiginosa</i> | Sweet Briar | A | N |
| * <i>Rubus fruticosus</i> sp. agg. | Black berry | A | N |
| Rubiaceae | | | |
| <i>Asperula conferta</i> | Common Woodruff | A | N |
| * <i>Galium aparine</i> | Cleavers | A | |
| Salicaceae | | | |
| * <i>Salix babylonica</i> | Weeping Willow | A | N |
| * <i>Salix</i> sp. | Willow | A | N |
| Scrophulariaceae | | | |
| * <i>Linaria pelisserana</i> | Pelisser's Toadflax | A | |
| * <i>Verbascum thapsus</i> | Great Mullein | A | N |
| * <i>Veronica anagallis-aquatica</i> | Blue Speedwell | A | |
| Solanaceae | | | |
| * <i>Datura stromonium</i> | Common Thornapple | | N |
| Sterculiaceae | | | |
| <i>Brachychiton populneus</i> | Kurrajong | A | N |
| Thymelaeaceae | | | |
| <i>Pimelea curviflora</i> | Curved Rice-flower | A | |
| Typhaceae | | | |
| <i>Typha orientalis</i> | Cumbungi | A | N |
| Verbenaceae | | | |
| * <i>Verbena bonariensis</i> | Purpletop | A | N |

Appendix 4

List of Animal Species for the Study Area

1. Recorded in the NSW Wildlife Atlas within 5 km of the study area (W).

2. Recorded in the study area in 2008/09: A - ACT; N - NSW.

3. ANABAT recordings: DE - definite identification; PR - probable identification, PO - possible identification. Introduced species are indicated by an asterisk (*).

MAMMAL SPECIES

| FAMILY | | NSW Wildlife Atlas ¹ | This Study ² |
|----------------------------|---------------------------------|---------------------------------|-------------------------|
| ORNITHORHYNCHIDAE | | | |
| Platypus | <i>Ornithorhynchus anatinus</i> | W | |
| TACHYGLOSSIDAE | | | |
| Short-beaked Echidna | <i>Tachyglossus aculeatus</i> | W | |
| DASYURIDAE | | | |
| Spotted-tailed Quoll | <i>Dasyurus maculatus</i> | W | |
| PHASCOLARCTIDAE | | | |
| Koala | <i>Phascolarctos cinereus</i> | W | |
| VOMBATIDAE | | | |
| Common Wombat | <i>Vombatus ursinus</i> | W | A,N |
| PHALANGERIDAE | | | |
| Common Brushtail Possum | <i>Trichosurus vulpecula</i> | | A,N |
| MACROPODIDAE | | | |
| Eastern Grey Kangaroo | <i>Macropus giganteus</i> | W | A,N |
| Common Wallaroo | <i>Macropus robustus</i> | W | A,N |
| Red-necked Wallaby | <i>Macropus rufogriseus</i> | W | |
| Swamp Wallaby | <i>Wallabia bicolor</i> | W | |
| MOLOSSIDAE | | | |
| Eastern Freetail Bat | <i>Mormopterus</i> species | | (PR) ³ |
| White-striped Freetail Bat | <i>Nyctinomus australis</i> | | (DE) |
| VESPERTILIONIDAE | | | |
| Eastern Bentwing Bat | <i>Miniopterus schreibersii</i> | | (DE) |
| Long-eared Bat species | <i>Nyctophilus</i> sp. | | (PR) |
| Gould's Wattled Bat | <i>Chalinolobus gouldii</i> | | (DE) |
| Chocolate Wattled Bat | <i>Chalinolobus morio</i> | | (DE) |
| Large Forest Bat | <i>Vespadelus darlingtoni</i> | | (PR) |
| Southern Forest Bat | <i>Vespadelus regulus</i> | | (PR) |
| Little Forest Bat | <i>Vespadelus vulturnus</i> | | (DE) |
| CANIDAE | | | |
| Fox* | <i>Vulpes vulpes</i> | W | A,N |
| LEPORIDAE | | | |
| Rabbit* | <i>Oryctolagus cuniculus</i> | | A,N |
| Brown Hare* | <i>Lepus capensis</i> | | A |
| MURIDAE | | | |
| Water Rat | <i>Hydromys chrysogaster</i> | | N |
| BOVIDAE | | | |
| Cattle* | <i>Bos taurus</i> | | A,N |

CERVIDAE

| | | | |
|--------------|------------------------|---|-----|
| Sambar Deer* | <i>Cervus unicolor</i> | W | A,N |
|--------------|------------------------|---|-----|

BIRD SPECIES

| FAMILY | | COG | This |
|--------------------------|-------------------------------------|---------------------|--------------------|
| Species | | (1990) ¹ | Study ² |
| PHASIANIDAE | | | |
| Stubble Quail | <i>Coturnix pectoralis</i> | W | A |
| Brown Quail | <i>Coturnix ypsilophora</i> | W | |
| ANATIDAE | | | |
| Blue-billed Duck | <i>Oxyura australis</i> | | |
| Musk Duck | <i>Biziura lobata</i> | W | |
| Australian Wood Duck | <i>Chenonetta jubata</i> | W | A,N |
| Pacific Black Duck | <i>Anas superciliosa</i> | W | A,N |
| Grey Teal | <i>Anas gracilis</i> | W | A,N |
| Hardhead | <i>Aythya australis</i> | W | A |
| PODICIPEDIDAE | | | |
| Australasian Grebe | <i>Tachybaptus novaehollandiae</i> | W | A |
| Hoary-headed Grebe | <i>Poliiocephalus poliocephalus</i> | W | |
| PHALACROCORACIDAE | | | |
| Little Pied Cormorant | <i>Microcarbo melanoleucos</i> | W | A,N |
| Great Cormorant | <i>Phalacrocorax carbo</i> | W | A,N |
| PELECANIDAE | | | |
| Australian Pelican | <i>Pelecanus conspicillatus</i> | W | |
| ARDEIDAE | | | |
| White-faced Heron | <i>Egretta novaehollandiae</i> | W | A |
| White-necked Heron | <i>Ardea pacifica</i> | W | |
| Eastern Great Egret | <i>Ardea modesta</i> | W | |
| Cattle Egret | <i>Ardea ibis</i> | W | |
| Nankeen Night Heron | <i>Nycticorax caledonicus</i> | W | |
| THRESKIORNITHIDAE | | | |
| Glossy Ibis | <i>Plegadis falcinellus</i> | | |
| Australian White Ibis | <i>Threskiornis molucca</i> | W | A |
| Straw-necked Ibis | <i>Threskiornis spinicollis</i> | W | A |
| ACCIPITRIDAE | | | |
| Black Kite | <i>Milvus migrans</i> | | A |
| Black-shouldered Kite | <i>Elanus axillaris</i> | W | |
| Whistling Kite | <i>Haliastur sphenurus</i> | W | |
| White-bellied Sea-Eagle | <i>Haliaeetus leucogaster</i> | W | |
| Variable Goshawk | <i>Accipiter hiogaster</i> | W | |
| Grey Goshawk | <i>Accipiter novaehollandiae</i> | W | |
| Collared Sparrowhawk | <i>Accipiter cirrhocephalus</i> | | A |
| Wedge-tailed Eagle | <i>Aquila audax</i> | W | A |
| Little Eagle | <i>Hieraaetus morphnoides</i> | W | |
| FALCONIDAE | | | |
| Brown Falcon | <i>Falco berigora</i> | W | |
| Australian Hobby | <i>Falco longipennis</i> | W | A |
| Peregrine Falcon | <i>Falco peregrinus</i> | W | A |
| Nankeen Kestrel | <i>Falco cenchroides</i> | W | A |
| RALLIDAE | | | |
| Purple Swamphen | <i>Porphyrio porphyrio</i> | | A |

| | | | |
|------------------------------|--------------------------------------|---|-----|
| Dusky Moorhen | <i>Gallinula tenebrosa</i> | W | A |
| Eurasian Coot | <i>Fulica atra</i> | W | |
| SCOLOPACIDAE | | | |
| Red-necked Avocet | <i>Recurvirostra novaehollandiae</i> | W | |
| CHARADRIIDAE | | | |
| Black-fronted Dotterel | <i>Euseyornis melanops</i> | W | A,N |
| Red-kneed Dotterel | <i>Erythrogonys cinctus</i> | W | |
| Banded Lapwing | <i>Vanellus tricolor</i> | W | |
| Masked Lapwing | <i>Vanellus miles</i> | W | A,N |
| COLUMBIDAE | | | |
| Rock Dove* | <i>Columba livia</i> | | A |
| Common Bronzewing | <i>Phaps chalcoptera</i> | W | |
| Crested Pigeon | <i>Ocyphaps lophotes</i> | W | A,N |
| Diamond Dove | <i>Geopelia cuneata</i> | W | |
| Peaceful Dove | <i>Geopelia striata</i> | W | |
| CACATUIDAE | | | |
| Yellow-tailed Black-Cockatoo | <i>Calyptorhynchus funereus</i> | W | A |
| Gang-gang Cockatoo | <i>Callocephalon fimbriatum</i> | W | |
| Galah | <i>Eolophus roseicapillus</i> | W | A,N |
| Little Corella | <i>Cacatua sanguinea</i> | | A |
| Sulphur-crested Cockatoo | <i>Cacatua galerita</i> | W | A,N |
| PSITTACIDAE | | | |
| Australian King-Parrot | <i>Alisterus scapularis</i> | W | A,N |
| Superb Parrot | <i>Polytelis swainsonii</i> | | A |
| Crimson Rosella | <i>Platycercus elegans</i> | W | A,N |
| Eastern Rosella | <i>Platycercus eximius</i> | W | A,N |
| Red-rumped Parrot | <i>Psephotus haematonotus</i> | W | A,N |
| CUCULIDAE | | | |
| Pallid Cuckoo | <i>Cacomantis pallidus</i> | W | A |
| Brush Cuckoo | <i>Cacomantis variolosus</i> | W | |
| Fan-tailed Cuckoo | <i>Cacomantis flabelliformis</i> | W | |
| Horsfield's Bronze-Cuckoo | <i>Chalcites basalis</i> | W | |
| Shining Bronze-Cuckoo | <i>Chalcites lucidus</i> | W | |
| STRIGIDAE | | | |
| Southern Boobook | <i>Ninox novaeseelandiae</i> | W | A |
| PODARGIDAE | | | |
| Tawny Frogmouth | <i>Podargus strigoides</i> | | A |
| APODIDAE | | | |
| White-throated Needle-tail | <i>Hirundapus caudacutus</i> | W | |
| Fork-tailed Swift | <i>Apus pacificus</i> | W | |
| HALCYONIDAE | | | |
| Laughing Kookaburra | <i>Dacelo novaeguineae</i> | W | A |
| Sacred Kingfisher | <i>Todiramphus sanctus</i> | W | A |
| MEROPIIDAE | | | |
| Rainbow Bee-eater | <i>Merops ornatus</i> | W | A |
| CORACIIDAE | | | |
| Dollarbird | <i>Eurystomus orientalis</i> | W | A |

MENURIDAE

Superb Lyrebird *Menura novaehollandiae* W

CLIMACTERIDAE

White-throated Treecreeper *Cormobates leucophaea* W

Brown Treecreeper *Climacteris picumnus* W

MALURIDAE

Superb Fairy-wren *Malurus cyaneus* W A,N

PARDALOTIDAE

Spotted Pardalote *Pardalotus punctatus* W

Striated Pardalote *Pardalotus striatus* W A

White-browed Scrubwren *Sericornis frontalis* W A

Speckled Warbler *Chthonicola sagittata* W A

Weebill *Smicrornis brevirostris* W A

Western Gerygone *Gerygone fusca* W

White-throated Gerygone *Gerygone albogularis* W A

Brown Thornbill *Acanthiza pusilla* W

Buff-rumped Thornbill *Acanthiza reguloides* W A

Yellow-rumped Thornbill *Acanthiza chrysorrhoa* W A

Yellow Thornbill *Acanthiza nana* W

Striated Thornbill *Acanthiza lineata* W A

Southern Whiteface *Aphelocephala leucopsis* W

MELIPHAGIDAE

Red Wattlebird *Anthochaera carunculata* W A

Noisy Friarbird *Philemon corniculatus* W A

Noisy Miner *Manorina melanocephala* W A

Yellow-faced Honeyeater *Lichenostomus chrysops* W A

White-eared Honeyeater *Lichenostomus leucotis* W

White-plumed Honeyeater *Lichenostomus penicillatus* W

Brown-headed Honeyeater *Melithreptus brevirostris* W A

White-naped Honeyeater *Melithreptus lunatus* W

Crescent Honeyeater *Phylidonyris pyrrhoptera* W

New Holland Honeyeater *Phylidonyris novaehollandiae* W

Eastern Spinebill *Acanthorhynchus tenuirostris* W

White-fronted Chat *Epthianura albifrons* W

PETROICIDAE

Scarlet Robin *Petroica boodang* W

Flame Robin *Petroica phoenicea* W A

CINCLOSOMATIDAE

Eastern Whipbird *Psophodes olivaceus* W

NEOSITTIDAE

Varied Sittella *Daphoenositta chrysoptera* W

PACHYCEPHALIDAE

Rufous Whistler *Pachycephala rufiventris* A

Grey Shrike-thrush *Colluricincla harmonica* A,N

DICRURIDAE

Magpie-lark *Grallina cyanoleuca* W A,N

Rufous Fantail *Rhipidura rufifrons* W A

Grey Fantail *Rhipidura albiscapa* W A

Willie Wagtail *Rhipidura leucophrys* W A,N

CAMPEPHAGIDAE

Black-faced Cuckoo-shrike *Coracina novaehollandiae* W A

White-winged Triller *Lalage sueurii* W

| | | | |
|--------------------------|----------------------------------|---|-----|
| ORIOLIDAE | | | |
| Olive-backed Oriole | <i>Oriolus sagittatus</i> | W | |
| ARTAMIDAE | | | |
| White-browed Woodswallow | <i>Artamus superciliosus</i> | W | |
| Dusky Woodswallow | <i>Artamus cyanopterus</i> | W | |
| Grey Butcherbird | <i>Cracticus torquatus</i> | W | |
| Australian Magpie | <i>Cracticus tibicen</i> | W | A,N |
| Pied Currawong | <i>Strepera graculina</i> | W | A,N |
| Grey Currawong | <i>Strepera versicolor</i> | W | |
| CORVIDAE | | | |
| Australian Raven | <i>Corvus coronoides</i> | W | A,N |
| Little Raven | <i>Corvus mellori</i> | W | |
| CORCORACIDAE | | | |
| White-winged Chough | <i>Corcorax melanorhamphos</i> | W | A,N |
| PTILONORHYNCHIDAE | | | |
| Satin Bowerbird | <i>Ptilonorhynchus violaceus</i> | W | |
| ALAUDIDAE | | | |
| Eurasian Skylark* | <i>Alauda arvensis</i> | W | |
| MOTACILLIDAE | | | |
| Australasian Pipit | <i>Anthus novaeseelandiae</i> | W | A,N |
| PASSERIDAE | | | |
| House Sparrow* | <i>Passer domesticus</i> | W | A |
| Double-barred Finch | <i>Taeniopygia bichenovii</i> | W | A |
| Red-browed Finch | <i>Neochmia temporalis</i> | W | A,N |
| Diamond Firetail | <i>Stagonopleura guttata</i> | W | |
| FRINGILLIDAE | | | |
| European Goldfinch* | <i>Carduelis carduelis</i> | W | A |
| DICAEIDAE | | | |
| Mistletoebird | <i>Dicaeum hirundinaceum</i> | W | |
| HIRUNDINIDAE | | | |
| Welcome Swallow | <i>Hirundo neoxena</i> | W | A,N |
| Tree Martin | <i>Petrochelidon nigricans</i> | W | A |
| Fairy Martin | <i>Petrochelidon ariel</i> | W | A |
| SYLVIIDAE | | | |
| Australian Reed-Warbler | <i>Acrocephalus australis</i> | W | A |
| Rufous Songlark | <i>Cincloramphus mathewsi</i> | W | |
| Brown Songlark | <i>Cincloramphus cruralis</i> | W | A |
| Golden-headed Cisticola | <i>Cisticola exilis</i> | W | |
| ZOSTEROPIDAE | | | |
| Silveryeye | <i>Zosterops lateralis</i> | W | A |
| MUSCICAPIDAE | | | |
| Common Blackbird* | <i>Turdus merula</i> | W | A |
| STURNIDAE | | | |
| Common Starling* | <i>Sturnus vulgaris</i> | W | A,N |
| Common Myna* | <i>Sturnus tristis</i> | W | A,N |

| FROGS | | | |
|-----------------------------|-----------------------------------|---------------------------------------|----------------------------|
| FAMILY | | NSW Wildlife ¹ Atlas | This Study ² |
| Species | | | |
| MYOBATRACHIDAE | | | |
| Spotted Grass Frog | <i>Limnodynastes tasmaniensis</i> | | A |
| MYOBATRACHIDAE | | | |
| Smooth Toadlet | <i>Uperoleia laevigata</i> | | A,N |
| Common Eastern Froglet | <i>Crinia signifera</i> | | A,N |
| HYLIDAE | | | |
| Green and Golden Bell Frog | <i>Litoria aurea</i> | W | |
| Peron's Tree Frog | <i>Litoria peronii</i> | | A |
| REPTILES | | | |
| FAMILY | | NSW Wildlife Atlas ¹ | This Study ² |
| Species | | | |
| CHELIDAE | | | |
| Long-necked Tortoise | <i>Chelodina longicollis</i> | | A |
| SCINCIDAE | | | |
| Striped Skink | <i>Ctenotus robustus</i> | | A,N |
| Rainbow Skink | <i>Carlia tetradactyla</i> | | A |
| Copper-tailed Skink | <i>Ctenotus taeniolatus</i> | | A,N |
| Boulenger's Skink | <i>Morethia boulengeri</i> | | A |
| Eastern Blue-tongued Lizard | <i>Tiliqua scincoides</i> | | A |
| PYGOPODIDAE | | | |
| Olive Legless Lizard | <i>Delma inorata</i> | | A |
| Pink-tailed Worm Lizard | <i>Aprasia parapulchella</i> | | A,N |
| ELAPIDAE | | | |
| Eastern Brown Snake | <i>Pseudonaja textilis</i> | | A |
| FISH | | | |
| FAMILY | | NSW Wildlife Atlas ¹ | This Study ² |
| Species | | | |
| CYPRINIDAE | | | |
| Common Carp* | <i>Cyprinus carpio</i> | | N |

Appendix 5.4
Reptile Survey Results

HERPETOFAUNA CENSUS SURVEY SHEET 31

| | | | | |
|---|---|--------------------|----------------------------|-----------------|
| PROJECT West Molonglo | | | | |
| Name of surveyor | K. Mills | | Contact number | 0419248094 |
| Number of surveyors | 1 | | Date of survey | 24.06.09 |
| Location description | North-facing steep rocky slope, above STP site. | | | |
| Start details | | | Finish details | |
| Easting (6 digits) | 680463 | | Easting (6 digits) | na |
| Northing (7 digits) | 6098171 | | Northing (7 digits) | na |
| Start time (24hr) | 15.45 | | Finish time (24hr) | 16.15 |
| Weather Details At start of survey, record: | Sunny to overcast | | Cloud cover* | variable |
| Wind direction/speed* | nil | | Rain* | N/A |
| Temperature (°C) | 13 | | Moon* | N/A |
| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
| Striped Skink <i>Ctenotus robustus</i> | 4 | Hand capture | Under rock | 82 rocks moved |
| Olive Legless Lizard <i>Delma inornata</i> | 1 | " | " | |
| Pink-tailed Worm Lizard <i>Aprasia parapulchella</i> | 1 | " | " | |

HERPETOFAUNA CENSUS SURVEY SHEET 32

| | | | | |
|---|----------------------------------|--------------------|----------------------------|-----------------|
| PROJECT West Molonglo | | | | |
| Name of surveyor | K. Mills | | Contact number | 0419248094 |
| Number of surveyors | 1 | | Date of survey | 25.06.09 |
| Location description | North-facing gentle rocky slope. | | | |
| Start details | | | Finish details | |
| Easting (6 digits) | 680282 | | Easting (6 digits) | na |
| Northing (7 digits) | 6099514 | | Northing (7 digits) | na |
| Start time (24hr) | 09.45 | | Finish time (24hr) | 10.00 |
| Weather Details At start of survey, record: | Sunny to overcast | | Cloud cover* | variable |
| Wind direction/speed* | nil | | Rain* | N/A |
| Temperature (°C) | 11 | | Moon* | N/A |
| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
| Pink-tailed Worm Lizard <i>Aprasia parapulchella</i> | 1 | Hand capture | Under rock | 45 rocks moved |

HERPETOFAUNA CENSUS SURVEY SHEET 33

| | | | | |
|---|--|--------------------|----------------------------|-----------------|
| PROJECT West Molonglo | | | | |
| Name of surveyor | K. Mills | | Contact number | 0419248094 |
| Number of surveyors | 1 | | Date of survey | 25.06.09 |
| Location description | West-facing rocky gentle slope, edge of river gorge. | | | |
| Start details | | | Finish details | |
| Easting (6 digits) | 680002 | | Easting (6 digits) | na |
| Northing (7 digits) | 6099226 | | Northing (7 digits) | na |
| Start time (24hr) | 10.05 | | Finish time (24hr) | 10.20 |
| Weather Details At start of survey, record: | Sunny to overcast | | Cloud cover* | variable |
| Wind direction/speed* | nil | | Rain* | N/A |
| Temperature (°C) | 12 | | Moon* | N/A |
| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
| Pink-tailed Worm Lizard <i>Aprasia parapulchella</i> | 1 | Hand capture | Under rock | 78 rocks moved |
| Rainbow Skink <i>Carlia tetradactyla</i> | 1 | " | " | |

HERPETOFAUNA CENSUS SURVEY SHEET

34

PROJECT West Molonglo

| | | | |
|--|---|----------------------------|------------|
| Name of surveyor | K. Mills | Contact number | 0419248094 |
| Number of surveyors | 1 | Date of survey | 26.06.09 |
| Location description | Isolated rocks, south of landfill site. | | |
| Start details | | Finish details | |
| Easting (6 digits) | 680233 | Easting (6 digits) | na |
| Northing (7 digits) | 6100610 | Northing (7 digits) | na |
| Start time (24hr) | 15 mins | Finish time (24hr) | |
| Weather Details At start of survey, record: | Sunny to overcast | Cloud cover* | variable |
| Wind direction/speed* | nil | Rain* | N/A |
| Temperature (°C) | 12 | Moon* | N/A |

| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
|--|------------|--------------|---------------|----------------|
| Striped Skink <i>Ctenotus robustus</i> | 1 | Hand capture | Under rock | 18 rocks moved |

HERPETOFAUNA CENSUS SURVEY SHEET

35

PROJECT West Molonglo

| | | | |
|--|--|----------------------------|------------|
| Name of surveyor | K. Mills | Contact number | 0419248094 |
| Number of surveyors | 1 | Date of survey | 26.06.09 |
| Location description | North-facing slope, just inside the ACT. | | |
| Start details | | Finish details | |
| Easting (6 digits) | 678959 | Easting (6 digits) | na |
| Northing (7 digits) | 6101002 | Northing (7 digits) | na |
| Start time (24hr) | 20 mins | Finish time (24hr) | |
| Weather Details At start of survey, record: | Sunny to overcast | Cloud cover* | variable |
| Wind direction/speed* | nil | Rain* | N/A |
| Temperature (°C) | 12 | Moon* | N/A |

| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
|--|------------|--------------|---------------|----------------|
| Striped Skink <i>Ctenotus robustus</i> | 1 | Hand capture | Under rock | 64 rocks Moved |
| Copper-tailed Skink <i>Ctenotus taeniolatus</i> | 3 | Hand capture | Under rock | |

HERPETOFAUNA CENSUS SURVEY SHEET

36

PROJECT West Molonglo

| | | | |
|--|---|----------------------------|------------|
| Name of surveyor | K. Mills | Contact number | 0419248094 |
| Number of surveyors | 1 | Date of survey | 26.06.09 |
| Location description | Improved pasture, isolated rocks, in NSW. | | |
| Start details | | Finish details | |
| Easting (6 digits) | 678867 | Easting (6 digits) | na |
| Northing (7 digits) | 6101734 | Northing (7 digits) | na |
| Start time (24hr) | 20 mins | Finish time (24hr) | |
| Weather Details At start of survey, record: | Sunny to overcast | Cloud cover* | variable |
| Wind direction/speed* | nil | Rain* | N/A |
| Temperature (°C) | 12 | Moon* | N/A |

| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
|---------|------------|-------------|---------------|----------------|
| Nil | | | | 45 rocks moved |

| HERPETOFAUNA CENSUS SURVEY SHEET | | | | 37 |
|---|-----------------------------|---------------------|---------------|-----------------|
| PROJECT West Molonglo | | | | |
| Name of surveyor | K. Mills | Contact number | 0419248094 | |
| Number of surveyors | 1 | Date of survey | 26.06.09 | |
| Location description | North-facing slope, in NSW. | | | |
| Start details | | Finish details | | |
| Easting (6 digits) | 678673 | Easting (6 digits) | na | |
| Northing (7 digits) | 6101885 | Northing (7 digits) | na | |
| Start time (24hr) | 15 mins | Finish time (24hr) | | |
| Weather Details At start of survey, record: | Sunny to overcast | Cloud cover* | variable | |
| Wind direction/speed* | Nil | Rain* | N/A | |
| Temperature (°C) | 12 | Moon* | N/A | |
| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
| Pink-tailed Worm Lizard <i>Aprasia parapulchella</i> | 8 | Shed Skins | Under rocks | 116 rocks moved |

| HERPETOFAUNA CENSUS SURVEY SHEET | | | | 38 |
|---|-----------------------------|---------------------|---------------|----------------|
| PROJECT West Molonglo | | | | |
| Name of surveyor | K. Mills | Contact number | 0419248094 | |
| Number of surveyors | 1 | Date of survey | 26.06.09 | |
| Location description | North-facing slope, in NSW. | | | |
| Start details | | Finish details | | |
| Easting (6 digits) | 678490 | Easting (6 digits) | Na | |
| Northing (7 digits) | 6101607 | Northing (7 digits) | Na | |
| Start time (24hr) | 15 mins | Finish time (24hr) | | |
| Weather Details At start of survey, record: | Sunny to overcast | Cloud cover* | Variable | |
| Wind direction/speed* | Nil | Rain* | N/A | |
| Temperature (°C) | 12 | Moon* | N/A | |
| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
| Nil | | | | 68 rocks moved |

| HERPETOFAUNA CENSUS SURVEY SHEET | | | | 39 |
|---|---|---------------------|---------------|----------------|
| PROJECT West Molonglo | | | | |
| Name of surveyor | K. Mills | Contact number | 0419248094 | |
| Number of surveyors | 1 | Date of survey | 26.06.09 | |
| Location description | North-facing slope - exposed ridge, in NSW. | | | |
| Start details | | Finish details | | |
| Easting (6 digits) | 678663 | Easting (6 digits) | na | |
| Northing (7 digits) | 6101266 | Northing (7 digits) | na | |
| Start time (24hr) | 13.15 | Finish time (24hr) | 13.30 | |
| Weather Details At start of survey, record: | Sunny to overcast | Cloud cover* | variable | |
| Wind direction/speed* | nil | Rain* | N/A | |
| Temperature (°C) | 12 | Moon* | N/A | |
| SPECIES | No. INDIVS | RECORD TYPE | MICRO HABITAT | COMMENTS |
| Pink-tailed Worm Lizard <i>Aprasia parapulchella</i> | 1 | Hand capture | Under rock | 46 rocks moved |
| Copper-tailed Skink <i>Ctenotus taeniolatus</i> | 1 | Hand capture | Under rock | |

Appendix 6

Summary of Survey sites for *Aprasia parapulchella*, West Molonglo

| No. | Date | Location (WGS 84) | Record of <i>Aprasia</i> | No. of rocks moved | Other species recorded |
|-----|----------|--------------------------|----------------------------|--------------------|--|
| 1 | 02.12.08 | 0679733 6100483 | nil | 183 | Striped Skink |
| 2 | 02.12.08 | 0679567 6100278 | 2 live lizards | 97 | - |
| 3 | 02.12.08 | 0679397 6100305 | nil | 132 | - |
| 4 | 02.12.08 | 0679407 6100561 | 2 live lizards | 36 | - |
| 5 | 02.12.08 | 0679626 6100587 | nil | 131 | - |
| 6 | 02.12.08 | 0679154 6100552 | 2 live lizards | 39 | - |
| 7 | 02.12.08 | 0679244 6100588 | 1 live lizard | 165 | Striped Skink |
| 8 | 11.12.08 | 0680623 6099460 | 1 shed skin | 87 | Striped Skink |
| 9 | 11.12.08 | 0680514 6099476 | nil | 193 | Striped Skink |
| 10 | 11.12.08 | 0680278 6099734 | nil | 159 | Boulenger's Skink, Striped Skink, Olive Legless Lizard |
| 11 | 11.12.08 | 0679676 6099585 | 1 live lizard | 36 | - |
| 12 | 11.12.08 | 0679899 6099338 | 1 live lizard | 111 | - |
| 13 | 11.12.08 | 0679989 6099356 | nil | 169 | - |
| 14 | 11.12.08 | 06099439 679967 | 1 live lizard | 72 | - |
| 15 | 11.12.08 | 0680507 6099070 | 1 live lizard, 1 shed skin | 87 | - |
| 16 | 11.12.08 | 0680944 6098978 | 2 shed skins | 123 | - |
| 17 | 15.12.08 | 0680236 6100047 | nil | 31 | - |
| 18 | 15.12.08 | 0680257 6100159 | nil | 63 | Boulenger's Skink |
| 19 | 15.12.08 | 0680244 6100337 | 1 live lizard | 115 | - |
| 20 | 15.12.08 | 0680127 6100523 | nil | 46 | - |
| 21 | 15.12.08 | 0679173 6100393 | 1 shed skin | 133 | Copper-tailed skink, Striped Skink |
| 22 | 15.12.08 | 0679376 6100271 | nil | 132 | - |
| 23 | 15.12.08 | 0679586 6100182 | 1 shed skin | 105 | Spotted Grass Frog |
| 24 | 15.12.08 | 0679699 6100320 | nil | 92 | - |
| 25 | 15.12.08 | 0679845 6099989 | 1 live animal | 69 | - |
| 26 | 27.11.08 | 0680451 6099326 (AGD 66) | nil | 220 | Striped Skink |
| 27 | 27.11.08 | 0680216 6099675 (AGD 66) | nil | 280 | Striped Skink |
| 28 | 27.11.08 | 0679861 609956 ?(AGD 66) | nil | 163 | Striped Skink, Boulenger's Skink |
| 29 | 27.11.08 | 0679974 6099932 (AGD 66) | nil | 181 | Striped Skink |
| 30 | 29.10.08 | 0680451 6099326 (AGD 66) | shed skins | 20 | Striped Skink, Eastern Brown Snake (same site as 26) |
| 31 | 24.06.09 | 0680463 6098171 | 1 live lizard | 82 | Striped Skink, Olive Legless Lizard |
| 32 | 25.06.09 | 0680282 6099514 | 1 live lizard | 45 | - |

| | | | | | |
|--------|----------|-----------------|-----------------------------------|-------|------------------------------------|
| 33 | 25.06.09 | 0680002 6099226 | 1 live lizard | 78 | Rainbow Skink |
| 34 | 26.06.09 | 0680233 6100610 | nil | 18 | Striped Skink |
| 35 | 26.06.09 | 0678959 6101002 | nil | 64 | Striped Skink, Copper-tailed Skink |
| 36 | 26.06.09 | 0678867 6101734 | nil | 45 | - |
| 37 | 26.06.09 | 0678673 6101885 | 8 shed skins | 116 | - |
| 38 | 26.06.09 | 0678490 6101607 | nil | 68 | - |
| 39 | 26.6.09 | 0678663 6101266 | 1 live lizard | 46 | Copper-tailed Skink |
| TOTALS | | | 17 live lizards 15+ shed skins | 4,032 | |