

## APPENDIX

# 1 | Threatened Riparian Species in the ACT (Listed Under the *Nature Conservation Act 1980* (ACT) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth))

## Appendix 1.1

### Tuggeranong Lignum *Muehlenbeckia tuggeranong*

In accordance with section 21 of the *Nature Conservation Act 1980*, the **Tuggeranong Lignum (*Muehlenbeckia tuggeranong*)** was declared an **endangered** species on 7 August 1998 (Instrument No. 192 of 1998). Section 23 of the Act requires the Conservator of Flora and Fauna to prepare an Action Plan in response to each declaration. The Action Plan requirements are incorporated into this *Aquatic Species and Riparian Zone Conservation Strategy*. This supersedes the original Action Plan (ACT Government 1999e).

*Muehlenbeckia tuggeranong* is a declared endangered species under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

#### Conservation Status (ACT) Endangered

##### Criteria satisfied (ACT Flora and Fauna Committee 1995)

The species is observed, estimated, inferred or suspected to be at risk of premature extinction in the ACT region in the medium-term future, as demonstrated by:

- Extremely small population.

#### SPECIES DESCRIPTION

The Tuggeranong Lignum *Muehlenbeckia tuggeranong* Mallinson (Figure 1) is a sprawling or procumbent shrub, eventually becoming a mounded loosely tangled mass to approximately 1 m high and 1–2 m across. Stems are wiry, brownish, and weakly and irregularly longitudinally striate. Leaves are alternate, persistent, green, not glaucous, simple, petiolate, solitary and well-spaced along the stems. Petioles are 0.5 to 3 mm long and leaf blades 5–13 mm long by 2–4 mm wide, showing considerable variation in form.

Inflorescences are terminal (sometimes on short lateral branches) or very rarely axillary, simple or 2-branched; range from 12–20 mm from the subtending leaf to the apex; and bear 3–9 flowers in a lax spike. Flowers are unisexual or rarely hermaphrodite, and cream-green in colour. Plants are also mostly unisexual.

The species was formally described by Makinson and Mallinson (1997).

#### DISTRIBUTION AND ABUNDANCE

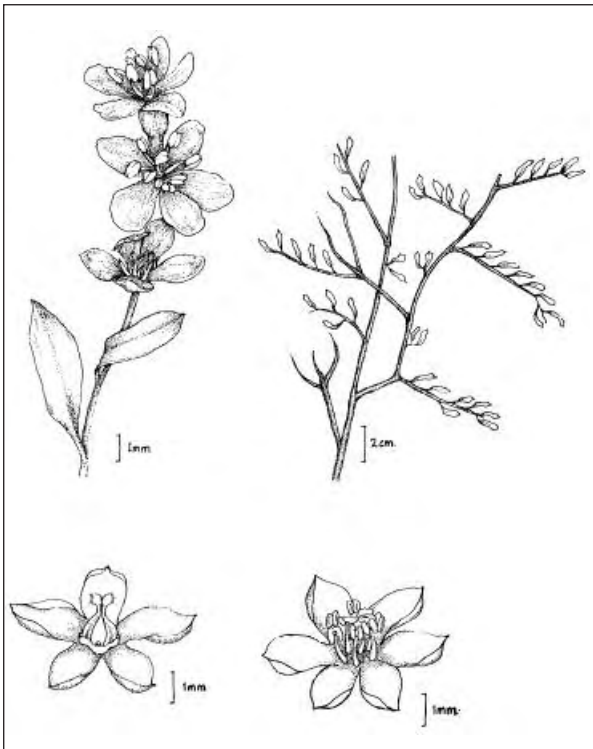
*M. tuggeranong* was described from a single female plant and six male plants discovered in the Murrumbidgee River Corridor (MRC) near Tuggeranong in 1997. In May 1999, an additional male plant was discovered in the MRC a short distance from the other seven plants. Although extensive searches have been undertaken, (R. Makinson pers. comm.), this population appears to be the only one in existence.

*M. tuggeranong* is similar in many respects to *M. axillaris* which occurs at higher altitudes (680–1200 m asl) in the ACT, NSW Southern Highlands, Victoria, Tasmania and New Zealand (Makinson and Mallinson 1997). The nearest known occurrences of *M. axillaris* to the *M. tuggeranong* site are about 25 km east-south-east in the Googong Reservoir area (altitude c. 680 m), and 35 km to the west-north-west on the upper Cotter River system (altitude c. 1010 m) (Makinson and Mallinson 1997).

#### HABITAT

The known habitat of the species is restricted to flood terraces, altitude c. 550 m, on the eastern bank of the Murrumbidgee River near Tuggeranong in the ACT, in areas of rocky outcrops with pockets of silty sandy soil (Makinson and Mallinson 1997).

*M. tuggeranong* is found in a highly disturbed riparian shrubby woodland association, heavily invaded by exotic weeds. The tree layer is largely remnant. The species is found on nearly bare rock, or tangled amongst other vegetation (D. Mallinson pers. comm.).



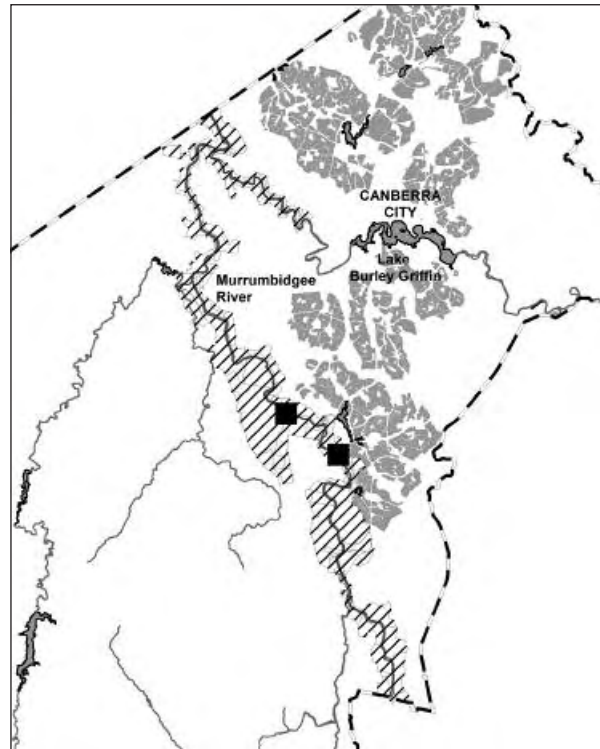
**Figure 1: Muehlenbeckia tuggeranong**

Top: Left—flowers and leaves;

Right—stems and leaves.

Bottom: Left—detail of female flower;

Right—detail of male flower.



**Figure 2: Map showing location (■) of M. tuggeranong**

(Hatched area represents the Murrumbidgee and Molonglo River corridors)

Associated native species include River Oak *Casuarina cunninghamiana*; Burgan *Kunzea ericoides*; Silver Wattle *Acacia dealbata*; *Grevillea juniperina*; Purple Loosestrife *Lythrum salicaria*; Narrow-leaved Cumbungi *Typha domingensis*; a sedge *Isolepis* sp.; Common Tussock Grass *Poa labillardieri* and Common Reed *Phragmites australis*. There are also a range of introduced species including White Willow *Salix alba*; Briar Rose *Rosa rubiginosa*; Great Mullein *Verbascum thapsus*; *Oenothera* sp.; Viper's Bugloss *Echium vulgare*; Fennel *Foeniculum vulgare*; Lamb's Tongue *Plantago lanceolata*; Curled Dock *Rumex crispus*;

St John's Wort *Hypericum perforatum*; Umbrella Sedge *Cyperus eragrostis*; Phalaris *Phalaris aquatica*; African Lovegrass *Eragrostis curvula* and Yorkshire Fog *Holcus lanatus* (D. Mallinson pers. comm.).

The response of the species to fire was not recorded until 2001 when a fire burnt one plant and this recovered from basal shoots. A fire of very high severity burnt the area in January 2003. A subsequent survey showed the recovery of all plants from basal shoots (Carey *et al.* 2003).

## Appendix 1.2

### Pink-tailed Worm Lizard *Aprasia parapulchella*

The Pink-tailed Worm Lizard has Special Protection Status in the ACT under s. 16 of the *Nature Conservation Act 1980*. The species is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth).

#### SPECIES DESCRIPTION

The Pink-tailed Worm Lizard *Aprasia parapulchella* is a member of the family Pygopodidae (legless lizards). The family contains 36 species in eight genera (NSW NPWS 1999). The Pink-tailed Worm Lizard was described by Kluge (1974) from 20 specimens collected from the type locality at Coppins Crossing in the ACT and one specimen from Tarcutta, New South Wales.

All pygopodids are small, slender lizards with a worm like appearance (Figure 1). They have an elongate body form and reduced limbs. The Pink-tailed Worm Lizard has a maximum snout–vent length of about 14 cm, and a total length of about 24 cm (Jones 1992). The ear opening is absent and the hind limb flaps are reduced to a single scale. The species has a dark brown to black head region and a grey to grey-brown body colour, becoming pink or reddish-brown beneath the tail. The body appears to have faint longitudinal lines on the upper surface because of the presence of a dark dot or longitudinal bar at the centre of each scale (Osborne and Jones 1995).

#### DISTRIBUTION AND ABUNDANCE

It is likely that the Pink-tailed Worm Lizard was formerly widespread in south-eastern Australia. However, it now occurs in disjunct populations in an altitudinal range 300–800 m. In the 1990s, the species was thought to be largely restricted to the ACT, where numerous populations have been recorded; however, surveys in recent years have revealed that it has a wider distribution (Osborne and Coghlan 2004).

In the ACT, the species has a widespread but patchy distribution in the hilly slopes of the Molonglo and Murrumbidgee river valleys and on hills such as Mt Taylor and Googong Hill (Osborne and Coghlan 2004). There are records from a number of locations in NSW adjacent to the ACT including Dog Trap Road (16 km north of the ACT), Queanbeyan, Burra and Googong Reservoir (NSW NPWS 1999). Other outlying NSW populations occur at Tarcutta, Cootamundra, West Wyalong, Yass, Cooma and Bathurst. The species (or a closely related species) has been recently reported



**Figure 1: Pink-tailed Worm Lizard (*Aprasia parapulchella*)**

from Goulburn River National Park (near Merriwa and Mudgee). There is also a report from near Bendigo in Victoria (Osborne and Coghlan 2004).

The Pink-tailed Worm Lizard generally occurs in low abundance at individual sites, however, there is some uncertainty with regard to abundance due to the difficulty in obtaining population estimates. Low population counts reflect the difficulty in locating individuals and the small size of populations also relates to the small size of remaining habitat patches (NSW NPWS 1999). Populations tend to be higher than indicated by single surveys, with one ACT site having at least four times more animals than was initially recorded (Jones 1999).

Accurate estimates of the sizes of Pink-tailed Worm Lizard populations are difficult to obtain because of low recapture rates for the species. Density estimates based on the number of rocks turned to find the species tend to be low, with the highest density recorded by Jones (1999) as 9.1 lizards per 1000 rocks turned at Mt Taylor, ACT. Density estimates at a Bathurst site were 5.7 lizards per 1000 rocks turned (NSW NPWS 1999).

#### HABITAT

Key habitat features for the presence of the Pink-tailed Worm Lizard are a cover of native grasses, particularly Kangaroo Grass (*Themeda triandra*), sparse or no tree cover, little or no leaf litter, and scattered small rocks with shallow embedment in the soil surface (Osborne *et al.* 1991).

The distribution of the species is centred on the ACT and this appears to be related to less soil (and rock) disturbance evidenced by the presence of a native grass cover, particularly Kangaroo Grass *Themeda triandra*, Red-leg Grass *Bothriochloa macra*, and

Wattle Mat-rush *Lomandra filiformis*. The likelihood of occurrence of the lizard increases with increasing cover of Kangaroo Grass. By contrast, increase in cover of speargrasses (*Stipa falcata*, *S. bigeniculata*) (which may indicate disturbance) and Common Tussock Grass *Poa labillardieri* decreases the likelihood of finding the species (Osborne and Coghlan 2004). In NSW sites, dominance by Kangaroo Grass is not a common feature, but the sites would still be described as native grassland (NSW NPWS 1999).

Livestock grazing and agricultural activities (e.g. pasture improvement, cropping) have probably had the most impact on populations of the species through ground disturbance and changes to groundcover vegetation, and remain a threat to the lizard outside reserves. Rocks are an important micro-habitat feature for the species and rock removal is a threat.

At most sites the Pink-tailed Worm Lizard is found sheltering beneath partially embedded rocks. Rocks most commonly used are 100–150 mm wide, 120–220 mm long and 50–150 mm thick (Jones 1999). Rocks are used for thermo-regulation, with lizards preferring rocks in direct sunlight (Barrer 1992b). Individuals may remain with the same rock for long periods. The lizards utilise ant burrows beneath the rocks and it is likely they retreat deeper into burrows during hot, dry weather (Osborne and Jones 1995).

**BEHAVIOUR AND BIOLOGY**

The Pink-tailed Worm Lizard lives a largely subterranean existence apparently spending a

considerable time in burrows constructed by and often still inhabited by ants. Little is known of their movements within or between habitat patches. There is some evidence of movement (e.g. capture in pitfall traps) and research on other *Aprasia* spp. indicates considerable movement. Movement between habitat sites is likely to be hindered by the fragmentation and isolation of these sites (NSW NPWS 1999).

The species is oviparous (egg-laying) with a clutch size of two. Data on the few lizards found when gravid, suggest that only larger females produce eggs, and therefore, they may need to be three or four years old to reproduce (Jones 1999). The oviposition site may be within ant nests, but there is no evidence to support this. Gravid specimens have been found in December and hatching may occur in March, the time when the smallest juveniles have been collected (NSW NPWS 1999).

The Pink-tailed Worm Lizard is known to live with at least fifteen species of ants and one species of termite. Jones (1999) found that 75% of all lizards captured were beneath rocks in the nests of ants. Over 50% of all co-habitations were with the ant species group *Iridomyrmex 'rufoniger'* (Jones 1999). This is the dominant ant species in the diet of the Pink-tailed Worm Lizard, with eggs and larvae being the main food, and adults ingested infrequently and probably accidentally (NSW NPWS 1999).