# Threatened Species Assessment

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

### Taxonomy

*Aprasia parapulchella* Kluge, 1974

### Current conservation status

Listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1996).

Categorised as Endangered in the 2013 Advisory list of threatened vertebrate fauna in Victoria (DSE 2013).

### Proposed conservation status

Endangered in Victoria

Criteria B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

### Species Information

#### Description and Life History

The Pink-tailed Worm-lizard is a small, legless and very slender lizard that lives underground, growing to about 25 cm in length, nearly half of which is tail. The snout and the tail are rounded and blunt. The presence of small hind-limb flaps distinguishes it from a juvenile snake. Colouration is predominantly grey-brown to pale grey, with a slightly darker head and nape and a paler underside. The end part of the tail is pinkish to reddish-brown. Each dorsal scale has a short dark mark, forming indistinct, broken, longitudinal stripes that often come together on the tail. There are no external ear openings (Cogger 2000; Wong et al. 2011).

Pink-tailed Worm-lizards mostly live under rocks and occupies inhabited or uninhabited ant nests (Wong 2011). They primarily use thigmothermy as a strategy for thermoregulation, drawing heat from the underside of surface rocks. They sometimes display gregarious behaviour, with records of aggregations of two to eight individuals. It is reported to have an even sex-ratio and displays sexual dimorphism, with females being longer and heavier than males (Jones 1999; Robertson and Heard 2008). The taxon has been found in association with 15 species of ants (representing 4 to 5 sub-families) and one termite species. They almost exclusively consume ant brood.

#### Generation Length

The generation length of the Pink-tailed Worm-lizard is inferred to be 7 to 8 years. This is based on the observation that males reach sexual maturity in the third year and females in the fourth year. the lizards are suspected to be relatively long-lived (to ten years or more) and females produce a clutch of two eggs.

#### Distribution

In Victoria, all records of the taxon are located near Bendigo. Robertson and Heard (2008) suggest that the range of the populations near Bendigo probably encompasses the Big Hill Range to the south (as yet not recorded at this location), Marong to the west, Kamarooka, approximately 25 km to the north and the Sugarloaf Range, approximately 18 km to the east. It is very likely that the taxon occurs at other locations in Victoria, including north-eastern Victoria, Kiewa Valley, Barnawartha Scenic Reserve and McFarlane's Hill near Wodonga (Wong et al. 2011).

Thirteen surveys were conducted in October and November 2008 by Geoff Brown (ARI) and others at three sites near Bendigo, where the only known extant Victorian populations occur. The general objectives of these surveys were to confirm the extent of the stronghold population at One-tree Hill, search potential habitat at Big Hill (SW of Bendigo) and Mount Sugarloaf (NE of Bendigo), and gather habitat data for sites where the lizard was found. Standardised searches resulted in the rolling of 16,721 rocks and yielded a total of 42 animals, most of which (37) were located at One-tree Hill. No individuals were found at Big Hill, and 5 new records were obtained for the Mt Sugarloaf site.

### Habitat

The taxon's habitat includes primary and secondary grassland, grassy woodland and woodland communities, and the species usually inhabits sloping sites that contain rocky outcrops or scattered, partially buried rocks (Robertson and Heard 2008; Wong et al. 2011). These rocky habitats tend to be well-drained mid-slope or ridge-top sites with loosely embedded rocks on soil substrate with ant galleries present (Osborne and Jones 1995; Robertson and Heard 2008). Individuals are most commonly found sheltering under these rocks and spend considerable time in ant burrows below these rocks, which are considered important foraging and shelter sites (Wong et al. 2011; DSE 2013; NSW OEH 2014). Microhabitat attributes, such as rockiness and the presence of ground-layer species, especially native grasses, are the principal determinants of occurrence (DSE 2013).

The taxon generally occupies sites with a grassy ground layer with little or no leaf litter, and relatively low tree and shrub cover (Osborne et al. 1991; Osborne and McKergow 1993; Michael and Herring 2005; Robertson and Heard 2008). In Victoria, tree canopy cover has not been found to influence the occurrence of the taxon. However, the cover of bare ground was found to be higher and the cover of leaf litter lower, at sites with *A. parapulchella* compared with randomly-selected sites.

### Threats

Ongoing key threats, including those that are likely to have had an impact and continue to impact into the future, include habitat loss (mostly to urban development) or modification (through fire, recreation activities, perhaps even rock-rolling lizard surveys) and predation (probably from domestic pets and introduced predators).

## IUCN Criteria

**Criterion A. Population size reduction.**
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

| | Critically Endangered | Endangered | Vulnerable |
|---|---|---|---|
| A1 | ≥ 90% | ≥ 70% | ≥ 50% |
| A2, A3, A4 | ≥ 80% | ≥ 50% | ≥ 30% |

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [*(a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

*based on any of the following:*

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

## Evidence:

**Eligible under Criterion A2 as Endangered**

The population reduction over the past 21 to 24 years is suspected to be 10 to 50%, based on (c) and (e) above.

This is based on 2008 survey results (42 animals from ~16,700 rocks rolled), and pas t losses of suitable habitat. Many historical VBA records have not been confirmed. Thus, some (satellite) populations have probably disappeared.

**Eligible under Criterion A3 as Endangered**

The population reduction over the next 21 to 24 years is suspected to be 10 to 50%, based on (c) and (e) above. Future decline is based on 2008 survey results, the possible extent of unsurveyed, and potentially suitable, habitat, and the likely continuing or increased negative impacts on the lizard or its habitat. Threats at the key location (One Tree Hill) continue. Habitat loss has increased the level of habitat fragmentation, and this may have serious implications for dispersal and gene flow

**Eligible under Criterion A3 as Endangered**

The population reduction over any 21 to 24 year period, including both past and future, is suspected to be 10 to 50%, based on (c) and (e) above.

Declines are based on 2008 survey results, past habitat losses, the possible extent of unsurveyed, and potentially suitable habitat, and the likely continuing or increased negative impacts on the lizard or its habitat.

However, it is difficult to estimate past, current and future population levels for this lizard, given the limited data available, its (specialised) ecology, and the lack of knowledge of the impact of different threats, potentially including some management actions.

| Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy | | | |
|---|---|---|---|
| | Critically Endangered<br>Very restricted | Endangered<br>Restricted | Vulnerable<br>Limited |
| B1. Extent of occurrence (EOO) | < 100 km² | < 5,000 km² | < 20,000 km² |
| B2. Area of occupancy (AOO) | < 10 km² | < 500 km² | < 2,000 km² |
| AND at least 2 of the following 3 conditions: | | | |
| (a) Severely fragmented OR Number of locations | = 1 | ≤ 5 | ≤ 10 |
| (b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals | | | |
| (c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals | | | |

## Evidence:

**Eligible under Criterion B1 as Endangered**

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 646 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented. The primary population is at One Tree Hill/Mandurang/Strathfieldsaye, south of Bendigo CBD. All other populations, if they still exist, are small, localised,

and located well away from the primary population. Therefore the probability of recolonisation, in the event of local extinction, is remote.

It is estimated to have five locations, based on current and historical records (including recent exploratory and standardised surveys). Each subpopulation is likely to be a separate location, although the ongoing threats may potentially affect them all.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above. Threats at the key location (One Tree Hill) continue. Habitat loss has increased the level of habitat fragmentation, and this may have serious implications for dispersal and gene flow.

**Eligible under Criterion B2 as Endangered**

The Area of Occupancy (AoO) across the taxon's range is estimated to be 72 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 5 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

| Criterion C. Small Population size and decline | | | | |
|---|---|---|---|---|
| | | Critically Endangered | Endangered | Vulnerable |
| Number of mature individuals | | < 250 | < 2,500 | < 10,000 |
| AND at least one of C1 or C2 | | | | |
| C1 | An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future): | 25% in 3 years or 1 generation (whichever is longer) | 20% in 5 years or 2 generations (whichever is longer) | 10% in 10 years or 3 generations (whichever is longer) |
| C2 | An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions: | | | |
| (a) | (i) Number of mature individuals in each subpopulation | ≤ 50 | ≤ 250 | ≤ 1,000 |
| | (ii) % of mature individuals in one subpopulation = | 90 – 100% | 95 – 100% | 100% |
| (b) Extreme fluctuations in the number of mature individuals | | | | |

## Evidence:

**Ineligible under Criterion C**

It is inferred that there are 50 to 200 mature individuals, but this qualifier is too weak to meet this criterion.

| Criterion D. Very small or restricted population | | | |
|---|---|---|---|
| | Critically Endangered | Endangered | Vulnerable |
| Number of mature individuals (observed or estimated) | < 50 | < 250 | < 1,000 |
| D2 Only applies to the VU category<br>Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time. | - | - | D2. Typically:<br>AoO < 20 km2 or number of locations ≤ 5 |

## Evidence:

**Eligible under Criterion D2 as Vulnerable**

The taxon has a restricted distribution because it occurs in 5 locations, such that this restriction makes the taxon capable of becoming critically endangered or even extinct within a time period of one or two generations, due to the identified threats. Additionally, very few populations are now known and there appears to be have been local extinctions of satellite populations (i.e. those outside of Bendigo) for which there are (few) historical records.

**Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.**

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