

Threatened lizards colonise experimental phase of restoration project

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How can we protect the nationally threatened pink-tailed worm lizard (PTWL) *Aprasia parapulchella* while managing fire fuel loads in grasslands around Canberra? This is the question that Richard Milner (Australian Capital Territory, Parks and Conservation Service, PCS) set out to answer in November 2013 when he teamed up with Annabel Smith, Don Driscoll, Alice McDougall (Australian National University) and Will Osborne (University of Canberra) to establish a habitat restoration experiment.



A pink-tailed worm lizard emerges from a network of ant burrows found under a rock (Photo: A. Smith).

As the name suggests, the worm-lizard looks rather like a worm, lives in ant burrows under rocks and eats ant eggs and larvae. It's associated with native grasslands dominated by *Themeda*, *Austrostipa*, *Poa*, *Bothriochloa* and *Rhytidosperra* species (see Wong et al. 2011, *Aust. Zool.* 35: 927-940). Rocks are a critical resource for PTWLs. No rocks, no lizards.

Unfortunately, much of the grasslands where PTWLs occur are heavily degraded. Application of fertilizer in the past has increased soil nutrient levels allowing exotic species to invade and dominate. The invasion of exotic species has substantially increased fuel loads and the risk of grassland fire. However, amidst areas of wild oats, St John's wort, blackberry and other weeds, small patches of native grassland persist. These patches are often on rocky slopes that have been spared of phosphorus enrichment and they have naturally low fuel loads. In the Molonglo Valley region of Canberra these grassland patches are home to PTWLs and were recently classified as Natural Temperate Grassland – an endangered ecological community.

The Molonglo Valley is undergoing rapid urban development and Richard Milner is part of a team within PCS responsible for ensuring that Matters of National Environmental Significance are conserved during this development. Richard, Annabel and Don set up an experiment to develop an effective restoration technique for PTWL habitat. Given that PTWL habitat often has naturally low fuel loads, successful restoration



High quality pink-tailed worm lizard habitat within Natural Temperate Grassland. Patches like this occur within a sea of degraded grassland dominated by exotic invasive species. Photo: A. Smith.

of their habitat may also reduce the fire risk – a critical consideration for this future urban area where asset protection and human safety will be important management priorities. Fuel management and biodiversity conservation often demand conflicting management approaches. Our goal was to develop a sympathetic fuel management technique that can be applied in sensitive ecological communities with positive biodiversity outcomes.

Alice McDougall joined the team in 2014 to work on the experiment for her honours project. Plots of 4 x 4 m had rocks added at a rate of 6.5 rocks per m² while *Themeda triandra* and *Poa sieberiana* tubestock were planted at about 8 plants per m² (a total of 3000 plants were planted across the experiment). Five treatments were applied: fire, herbicide, fire + herbicide, rocks and plants only, control (no rocks or plants). Six replicates were established and each one included a nearby plot in high quality PTWL habitat as a reference site. Treatments focussed on practical solutions that could be applied broad-scale in future restoration efforts.



The Parks and Conservation Service burns plots for the restoration experiment (left) while rocks are applied to plots as critical habitat features for pink-tailed worm lizards (right). Photos: R. Milner.

Initial results from Alice's thesis indicate that the fire + herbicide treatment was most effective at encouraging ants to colonise the rocks, promoting growth and survival of *Themeda* and *Poa* and increasing cover of native species while reducing exotic species cover. Analysis is now underway to determine which treatment was most effective at reducing fuel loads and restoring key habitat features for PTWLs following recent surveys. The most exciting results from our experiment are those from our rock-rolling surveys which we undertook in February this year, ten months after the rocks were added and treatments applied. After rolling every rock in every plot we were amazed to find a total of 11 pink-tailed worm lizards! Our intention for this experiment was to use habitat features such as native grass species and ants as indicators of restoration success. We envisaged that such small, worm-like lizards would take several more years to colonise rocks within the experimental plots which are 10-20 m from the nearest high-quality habitat. It was a huge and pleasant surprise to see that the lizards are already colonising the experimental phase of the project.

Restoration treatments will soon be applied to larger areas (1 ha) based on our pending results. We are encouraged and excited to see we have already provided new habitat for the threatened PTWL and will continue to build up this habitat in the coming years. We hope to publish our initial results soon, so keep an eye out.