

Ecology of warru

(*Petrogale lateralis* MacDonnell Ranges race) in the
Anangu Pitjantjatjara Yankunytjatjara Lands,
South Australia



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Declaration

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Cover photograph: Warru in the APY Lands wearing a VHF radio-collar. N. Staniford.

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Abstract

Australia has one of the world's worst rates of mammal extinctions, accounting for about one third of the mammal species that have become extinct in the world since 1600 (Burbidge and Manly 2002). Most of these documented declines and extinctions have been concentrated towards mammals in the arid-zone of central Australia. In South Australia (SA), one of the arid-zone species that has undergone substantial declines in range and abundance is the black-footed rock-wallaby, *Petrogale lateralis* (MacDonnell Ranges race). Animals are now restricted to the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands in the state's far north-west, where there remain two known metapopulations. The decline of this race, which is known as „warru“ by Western Desert Indigenous people, is presumed to have been precipitated by introduced predators. However, in order to exclude other potential causes and establish if recovery is feasible, the current project investigated the ecology of warru in the SA APY Lands.

In order to make inferences about the habitat and environmental conditions that best facilitate warru persistence, a modelling approach at multiple spatial scales was used. At a landscape scale, warru presence was correlated to geology, slope, soil type and elevation. At a finer scale, fieldwork established that a number of parameters, including aspect, vegetation, rock complexity and refuges' physical characteristics were important determinants of warru presence and use. The work presents the first analysis of *P. lateralis* habitat requirements.

To establish animals' use of this preferred habitat, the thesis provides preliminary data on warru home range and movement patterns. Unfortunately, catastrophic failure of Global Positioning System collars meant that data were limited to those from one adult female in one month. Nevertheless, during this time, the animal had a larger than expected home range and undertook a number of long-range movements, including a sojourn off the hill. These results have implications for management, including predator and fire management strategies.

An investigation of the genetic structure of animals in the three largest-known warru colonies indicated that all colonies are genetically diverse, with levels of heterozygosity approximating expected values. All three also exhibited substantial population structuring, with genetic groups correlating to geographic colonies. However, there was also evidence for sub-structuring being present within one of the colonies and for migration occurring into two

colonies, with approximately 5% of sampled individuals having mixed ancestry. An analysis of the parentage of offspring indicated that warru have a polygamous mating structure, although one instance of intra- and inter-year monogamy was also established.

Population modelling was used to provide an estimate of the sizes of each of the three studied colonies. Combined with recent aerial survey data, these data suggested that there are likely to be fewer than 200 warru remaining in SA. However, all three colonies showed signs conducive to potential recovery, including high average reproductive rates, even sex ratios and high adult survivorship (>75%). Juvenile survival, however, was significantly lower (51%) and positively correlated with winter rainfall, indicating that access to water is important during the drier winter months.

The potential for warru recovery was supported by an analysis of warru blood chemistry in both the wild and captive colonies. The latter was established as part of the recovery program and aimed to produce animals for *in-situ* supplementation and reintroduction. In 2009, when blood samples were taken, warru colonies did not manifest with results that are indicative of population-wide disease. However, the biochemical parameters of animals in one of the *in-situ* colonies, „New Well“, suggested some level of nutritional and water stress. This suggests that managers could consider providing warru at New Well with supplementary food and water during drought, and/or using fire to promote vegetational diversity. The study presents the first detailed haematological reference values for *P. lateralis* and potentially, a methodology for other threatened species recovery programs to follow in order to establish the health of their populations.

The current results have implications for management of both the *in-* and *ex-situ* warru populations. For example, results pertaining to habitat selection can be used to guide selection of appropriate reintroduction sites. Overall, results indicate that although the extant colonies have small population sizes, the animals therein have high reproductive rates, are not suffering the effects of disease and are genetically diverse. The rock-wallabies“ polygamous mating strategy is also likely to continue to facilitate this genetic diversity. Furthermore, although warru have specific habitat preferences, they have the capacity to disperse to surrounding available habitat. Overall, this suggests that, given appropriate management, warru recovery is feasible. Some of these data may also be pertinent for management of *P. lateralis* in the Northern Territory and Western Australia.

When conditions were...still virgin...both the mammal fauna and the aboriginal population being virtually undisturbed, (P. lateralis MacDonnell Ranges race) was one of the commonest mammals...with swarming populations in many of the rocky outliers of the main ranges.

Hedley Finlayson, 1961

Warru has been here for a long time, before us, and they should be in our lands because they are Traditional Owners too. Alice Springs are responsible for their warru, we are responsible for ours. We want to see them back in all places where they used to be. And not just warru, we should bring back ninu, mala, stick-nest rat and possum too. All of them.

Frank Young, Traditional Owner, APY Land Management



Warru Recovery Team Logo by Amanyi Haggie, Traditional Owner, Pukatja, APY Lands. The painting depicts warru, the puli and kulpi in which warru live and piranpa scientists and Anangu working together to conserve warru.

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Glossary

Pitjantjatjara/Yankunytjatjara	English
An <u>a</u> ngu.....	term used by Indigenous people of the Central Desert to refer to themselves
An <u>a</u> ngu Pitjantjatjara Yankunytjatjara.....	traditional land in north-western South Australia that is owned by An <u>a</u> ngu
kulpi.....	cave, cavern, shelter
minyma.....	female Indigenous elders
pir <u>a</u> npa.....	white (non-Indigenous) people
Pitjantjatjara.....	one of the two main Indigenous languages spoken on the APY Lands
puli.....	hill
tjilpi.....	male Indigenous elder
warru.....	black-footed rock-wallaby, <i>Petrogale lateralis</i> MacDonnell Ranges race
Yankunytjatjara.....	one of the two main Indigenous languages spoken on the APY Lands