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↑ Releasing a Greater Stick-nest Rat after routine monitoring. Photo credit Casey Harris

INTRODUCTION

The threatened species issue

The Arid Recovery Reserve has had a rich history of protecting threatened species

BY KIMBERLEY SOLLY

AUSTRALIA HAS ONE OF the worst extinction rates of any country in the world. Within a space of 200 years since European settlement, over 130 of Australia's known species have become extinct. More shocking is the number of species joining the list of threatened with extinction. Australia has a unique array of endemic flora and fauna, yet we are at risk of losing this diversity as more than 1800 species are listed nationally as threatened. Key threats to Australia's biodiversity include pressure

from exotic predators and competitors, invasive plant species, inappropriate fire regimes, and a loss of habitat (overgrazing), along with a changing climate. The fox (*Vulpes vulpes*) and the cat (*Felis catus*) have had the most detrimental impact on arid zone mammals. The European rabbit (*Oryctolagus cuniculus*) has also contributed to loss of species diversity by competing for the same food resources and habitats. Restoration efforts by organisations such as Arid Recovery aim to reverse some

of the damage that exotic species continue to have on Australian ecosystems. The Arid Recovery Reserve offers a site of refuge for threatened species and a protected site to allow locally extinct mammal species to be re-introduced. This issue is dedicated to those threatened species protected by our fence at the Reserve.

For further information on the history of Arid Recovery <http://www.aridrecovery.org.au/history>



Western Quolls at AR

The Australian Research Council Linkage project (ARC project) is well underway at the Reserve and we have two native predators to boast about!

OUR BIG FOUR re-introduced species have proven very successful and are all well-established inside the Reserve, however the Arid Recovery Reserve lacks native mammalian predators. Avian predators such as Wedge-tailed eagles and barn owls, along with reptile predators such as goannas and mulga snakes are present within the Reserve, but do not have a large enough impact to stabilise herbivore populations. Previously, a native reptilian predator, the Woma Python was trialled at the Arid Recovery Reserve however the population failed to establish. In the absence of apex predator(s) it is thought that some re-introduced species, particularly the Burrowing Bettong, are reaching the carrying capacity of the Arid Recovery Reserve. Bettongs have had successful breeding years and have become over-abundant within the confined area of the Reserve, which may actually be limiting the recovery of other animal species and also having negative effects on vegetation. A long term goal of the Arid Recovery Reserve is to re-introduce a native predator to create a natural ecosystem by moderating herbivore populations.

↑ *Sepia* undergoing routine health condition monitoring
Photo credit: Kaarissa Harring-Harris

TWO FEMALE Western Quolls (*Dasyurus geoffroii*) have recently been released into the northern expansion from Western Australia as part of an initial trial to see if they are a suitable and sustainable option for the predator role. The Western Quoll is a native marsupial carnivore that has also experienced a significant reduction in its range size since European arrival. Historically, the Western Quoll, or native cat, would have covered 70% of arid Australia, but is now confined to 2% of the continent wholly in Western Australia. The widespread loss of Western Quolls across Australia can primarily be attributed to predation by foxes and cats. Changes in land use have also contributed through habitat loss, persecution due to their predation of poultry, and being hit by motor vehicles. In 1841 the last Western Quoll specimen was collected in NSW and its range contracted from this point, with the last one recorded in the arid zone during the mid-1950s.

Meet the Quolls

Sepia

Sex: F
Age: 2 + years
Weight: 1000 g
Head length: 90.2 mm
Short pes*: 29.4 mm
Home: Julimar, WA

Koombana

Sex: F
Age: 2 years
Weight: 1100 g
Head length: 98.4 mm
Pes length**: 46.8 mm
Home: Menjimup, WA

Sepia and Koombana are settling well into the 30 km² of the Northern Expansion in the Arid Recovery Reserve. Both have been busy exploring every nook and cranny- which keeps Rebecca West, the Research Officer charged with radio-tracking the quolls, on her toes. Both females have actually been found sharing the same burrow, which is very novel for Western Quolls!

The quolls are primarily being used as native in situ predators as a means of improving anti-predator responses in our native herbivore/ omnivore mammals.

*Short pes is the length from heel to where the digits start.

** Pes length is the length from heel to the longest toe tip.

Moving into the Reserve

It was a long trip from Western Australia and now the fun begins in trying to find out what the quolls are eating



PRELIMINARY RESEARCH revealed that the Arid Recovery Reserve would be a suitable release site for quolls, providing protection from predators and sufficient food and shelter reserves. Another essential criterion for potential re-introduction is to determine the primary prey and to ensure that the prey density is adequate to sustain a moderate level of predation. Western Quolls are generalist feeders that hunt and gather their food opportunistically. Some studies have shown that they will predate the most abundant prey species, while other studies have shown that invertebrates form the bulk of western quoll diets. Scats are being collected to assess the dietary composition of the quolls inside the Reserve. We hope to gain information on what species quolls are predated and if certain species are selectively preferred over others.



↑ Quoll scat collected from the Reserve, ready to be sent away for analysis.

What is the ARC project?

Tackling prey naïveté

PREDATION BY CATS and foxes is the chief cause of re-introduction failure in Australian mammals. Australian mammals are vulnerable to predation because they have not evolved effective defences against these introduced predators. This project is working to determine if predator training and selective screening of individuals for predator avoidance traits can improve re-introduction success. The project is a partnership between Arid Recovery and the UNSW, funded by the Australian Research Council. The project is well underway and is using novel methods to enhance predator avoidance behaviour of wild endangered-prey populations, with real predators over successive generations. The results will be used to improve re-introduction protocols for threatened mammals and reestablish populations of endangered wildlife.

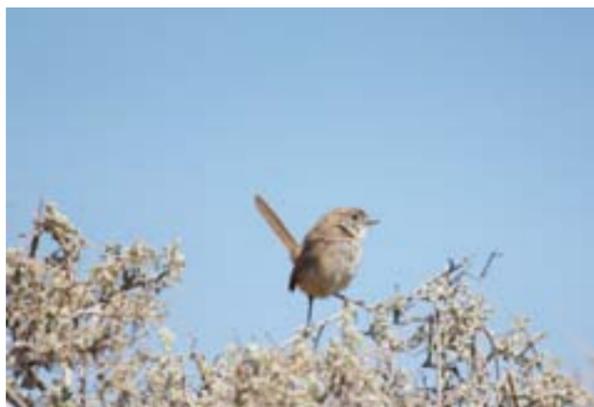
① For further information on the Western Quolls and the ARC Linkage Project head to <http://www.aridrecovery.org.au/tackling-prey-naivete>

Thick-billed Grasswren

BY MATT BOWIE

THE THICK-BILLED GRASSWREN (*Amytornis modestus*) is a small (16 cm), rusty brown songbird, known for its extremely elusive behaviour, which makes them super difficult to spot. They are bigger than a fairy wren and if seen are usually running or hopping, but rarely flying. Individuals are resident in chenopod shrub lands and stony-gibbers, while seeming to avoid sand dunes (Pers. Comms. Amy Slender), preferring areas where shrubs such as *Maireana pyramidata* provide a dense protective cover. This cryptic grasswren is threatened by habitat degradation and predation by cats and foxes. The species is listed as vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). As part of a joint research and conservation program with the Nature Foundation and Flinders University, Amy Slender and Marina Louter (PhD candidates; Flinders University) are studying the species at Witchelina Reserve north-east of Lake Torrens. Initial studies from the pair are providing information on the habitat quality, individual quality of nesting success, and dispersal capabilities of the elusive birds.

The researchers sampled two populations east and west of Lake Torrens, finding morphological differences among the populations,



↑ Thick-billed grasswrens have specific habitat requirements. Pictured here on *Rhagodia spinicens*. Photo credit: Amy Slender

potentially as a result of limited genetic exchange (reduced gene flow) across this ephemeral lake. Genetic analyses will hopefully soon provide more insight into these differences, contributing to the resolution of species distinction within this complex group.

We've only had opportunistic sightings of the TBGW at the Arid Recovery Reserve. This highlights why ongoing monitoring is essential at the Reserve as species not yet found (or in small numbers) could be present, without us even knowing!

📄 If you would like to know more about Thick-billed grasswrens, go online to the Nature Foundation of South Australia's website <http://www.naturefoundation.org.au/>

Plains Rat

PLAINS RATS (*Pseudomys australis*) were once found across much of the continent and extensively across the South Australian arid zone, but now they are restricted to the cracking soils of the Lake Eyre Basin. Listed as Extinct in NSW, Endangered in NT and Qld and Vulnerable in WA and SA, plains rat populations have suffered immensely from cat and fox predation, along with habitat damage by livestock and competition with rabbits. Unlike some species that can tolerate a wide variety of habitats, the plains rat has some pretty specific niche requirements. Gibber (stone covered) plains are the plains rat's preferred habitat, but they are also found in mid slopes with boulders/small stones, and even adjacent sandy plains if the rainfall conditions are very good. During poor seasons the plains rat has been found to survive in low-lying gilgais, which are mounds and depressions in clay soils- a perfect hiding spot for this relatively large rodent during summer months. Coinciding with the release of calici virus in the mid-late 90's, the establishment of the Arid Recovery Reserve (which excludes foxes and cats) saw the appearance of the Plains Rat for the first time in the area. Previously they had been found approximately 100 km north of Billa Kalina

station, but it is expected that the release from competitive pressure with rabbits, decline in predator numbers, and reduction in livestock grazing allowed the Plains Rat to expand its range south. Now these charismatic rodents are very numerous inside the Arid Recovery Reserve and can be seen regularly when spotlighting or on an Arid Recovery tour.



← Plains Rat (*Pseudomys australis*)

Atriplex kochiana

The threatened plant species that is back from the brink of extinction

VEGETATION IS OFTEN the unsung hero of the outback, particularly when cute and fluffy animals like bilbies steal the limelight. We have recorded 257 plant species within the Arid Recovery Reserve, one of which was historically thought to be very rare. Listed as Vulnerable in South Australia, Koch's saltbush (*Atriplex kochiana* Maiden) was known from four different stony plains regions in South Australia, but between 1987 and 2006 was only known from a single population of approximately 390 plants within 5km² of Andamooka opal fields.

Despite broad scale surveys additional populations were not found until 2006, where three new populations were discovered. One of these populations was located within Arid Recovery's Red Lake expansion, which at the time was newly fenced off from stock. More than 300 plants of *A. kochiana* were found within the Red Lake expansion, but what was more staggering were the tens of thousands of *A. kochiana* that were recorded along 8 km of escarpment on the outside of the Reserve. In 2007 the Reserve was extended by 37 km² which enclosed the large Koch's saltbush population within Arid Recovery's fenced Reserve. The Andamooka opal field's population of Koch's saltbush was found to be resilient as it was not impacted by cattle or sheep and actually regenerated on track verges, however, some characteristics of the species make it more susceptible to disappearance. *A. kochiana* has a short life span and large population fluctuations over years.

Understanding the ecological factors that determine the distribution and reproduction success in a vulnerable/threatened species is essential to providing informed conservation management.



↑ Herbarium specimen of *Atriplex kochiana*

Although sometimes underappreciated, the diversity of plant life essentially underpins the arid ecosystem, it's what our mammals eat and shelter in and we are sure to protect for our very special population of Koch's saltbush.

Buffel Grass

Has emerged as one of the most significant threats to the environment and cultures of central Australia

LANDSCAPE ECOLOGISTS HAVE LABELLED BUFFEL GRASS as one of Australia's worst weeds, as it threatens arid zone biodiversity and alters fire regimes. Introduced to Australia as a pasture grass and dust suppressant, buffel grass is now declared noxious weed in South Australia. It grows quickly to form a dense monoculture, which is far more fire-loving and flammable than native plant species in the arid zone. Buffel grass can outcompete all native understorey plants and invasion of an ecosystem can significantly increase the frequency and intensity of fires, which can eliminate fire sensitive plants such as the Western Myall, Mulga and Callitris trees, which you see around Roxby Downs.



← Buffel Buster Rebecca West volunteering at the working bee held at the Roxby Downs golf course.



WHO YOU GONNA CALL?

BUFFEL BUSTERS!

The Roxby Downs Buffel Busters are a volunteer group tackling the invasive plant species, buffel grass.

To volunteer at our next Buffel Busters event like us on Facebook: <https://www.facebook.com/groups/670114393124647/>

UPCOMING EVENTS

What better way to get involved with Arid Recovery than meeting all our wonderful team and volunteers at our quiz night!

Quiz night

When: Friday 20th of November **Time:** 7pm **Where:** The Club

Bookings can be made in tables of 8 for \$80

Tickets are available from the Arid Recovery website (under the donate tab), Market Day or the Arid Recovery Office

HOW TO HELP

You can assist the ongoing work of Arid Recovery through a variety of ways. Visit the website or contact the Arid Recovery Office on 08 8671 2402 for further information.

Donate

Donate online or over the phone to assist the work of Arid Recovery.

Volunteer

Join us for a working bee or assist around the office, there are many opportunities to volunteer with the staff of Arid Recovery.

Join

Become a member of Arid Recovery for as little as \$25 a year and receive our quarterly newsletters and monthly e-news updates.

Sponsor

Contact the Arid Recovery office if you or your organisation would like to become a sponsor.



↑ Blue skies and rattlepod (*Crotalaria eremaea*)

Thankyou to the sponsors and supporters of Arid Recovery:



Government of South Australia
Department of Environment,
Water and Natural Resources



Arid Recovery is a conservation initiative supported by BHP Billiton, the SA Department of Environment, Water and Natural Resources, the University of Adelaide and the local community.

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