

# wildlife matters

australian



wildlife  
conservancy

Winter 2016

Historic partnership:  
AWC to reintroduce  
lost mammals to  
NSW national parks



# Saving Australia's threatened wildlife



Welcome to the Winter 2016 edition of *Wildlife Matters*.

This edition marks the beginning of a historic partnership between Australian Wildlife Conservancy (AWC) and the NSW Government. AWC has been contracted to deliver national park management services in the iconic Pilliga forest and at Mallee Cliffs National Park in the state's south-west. It is the first public-private collaboration of its kind. The centrepiece of this exciting partnership will be the reintroduction of at least 10 mammal species that are currently listed as extinct in NSW.

This is **one of the world's most significant biodiversity reconstruction projects**. The return of mammals such as the Bilby and the Numbat – which disappeared from NSW national parks more than 100 years ago – will represent a defining moment in our quest to halt and reverse the loss of Australia's unique wildlife.

The initiative reflects strong leadership by the NSW Government. It is committing substantial funds for threatened species, including this partnership with AWC. More importantly, the NSW Government recognises the need to develop new approaches to conservation if we are to reverse the catastrophic decline of Australia's natural capital. We believe our pioneering partnership with NSW – in particular, the NSW National Parks and Wildlife Service – will demonstrate the value of public-private collaboration in the conservation sector. It will establish a powerful new model which, applied appropriately, should deliver higher ecological returns from the investment of (scarce) public and private funds.

AWC was selected by the NSW Government after a competitive tender process, which recognised AWC's leadership in feral animal control, fire management, threatened species translocations and science. Our track record in establishing large feral predator-free areas, and their immense contribution to conservation, was recognised. AWC's feral predator-free areas now protect:

- Over 85% of Australia's Bridled Nailtail Wallaby population.
- Almost 30% of the remaining Numbat population.
- Almost 15% of the remaining Bilby population.

AWC's success is based on our commitment to practical land management informed by world class science. Establishing feral predator-free areas is one element of an overall strategy, which includes Australia's largest non-government fire management program and one of the nation's leading feral predator research programs. By getting resources into the field, AWC is delivering effective conservation for many of Australia's most threatened species.

Our work across Australia – from the Kimberley across to Cape York and down to Lake Eyre – is possible only because of your support. As you read this edition of *Wildlife Matters*, I hope you feel a strong sense of ownership and pride in the results being achieved. Thank you for your support to date - we hope you will consider another tax deductible donation before the end of June. We will ensure you receive a great ecological dividend on your investment in AWC.

Atticus Fleming  
Chief Executive

## The AWC mission

The mission of Australian Wildlife Conservancy (AWC) is the effective conservation of all Australian animal species and the habitats in which they live.

To achieve this mission our actions are focused on:

- Establishing a network of sanctuaries which protect threatened wildlife and ecosystems: AWC now manages 25 sanctuaries covering over 3.25 million hectares (8 million acres).
- Implementing practical, on-ground conservation programs to protect the wildlife at our sanctuaries: these programs include feral animal control, fire management and the translocation of endangered species.
- Conducting (either alone or in collaboration with other organisations) scientific research that will help address the key threats to our native wildlife.
- Hosting visitor programs at our sanctuaries for the purpose of education and promoting awareness of the plight of Australia's wildlife.

## About AWC

- AWC is an independent, non-profit organisation based in Perth, Western Australia. Donations to AWC are tax deductible.
- Over the last 10 years, around 88% of AWC's total expenditure was incurred on conservation programs, including land acquisition, while only 12% was allocated to development (fundraising) and administration.

## Australian Wildlife Conservancy

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Cover image:

The Burrowing Bettong (Boodie) survives only in feral cat-free areas *W Lawler*

# Historic NSW deal introduces new model for conservation



The Bilby will be returned to NSW national parks after an absence of 100 years *W Lawler*

**Australian Wildlife Conservancy (AWC) and the NSW Government have signed a historic agreement that will substantially increase the population of at least 10 nationally threatened mammal species within the next 5 – 10 years.**

The agreement provides a new, ground-breaking model for collaboration between the private (non-profit) sector and the public sector. For the first time in Australia, a non-profit organisation has been contracted by a government agency to deliver park management services. The deal, which commenced on 1 May 2016, is a bold initiative that will help trial a public-private model for park management services, which we believe can increase the ecological return on investment – ie, deliver higher ecological outcomes for available resources.

AWC is contracted to deliver land management and science services in two areas of the NSW National Park estate: the Pilliga National Park-Pilliga State Conservation Area (the Pilliga) and Mallee Cliffs National Park (Mallee Cliffs). Working in partnership with the NSW National Parks and Wildlife Service, AWC will establish large feral predator-free areas in the Pilliga and at Mallee Cliffs. Threatened mammal species such as Bilbies, Numbats and Western Quolls will be reintroduced into these areas.

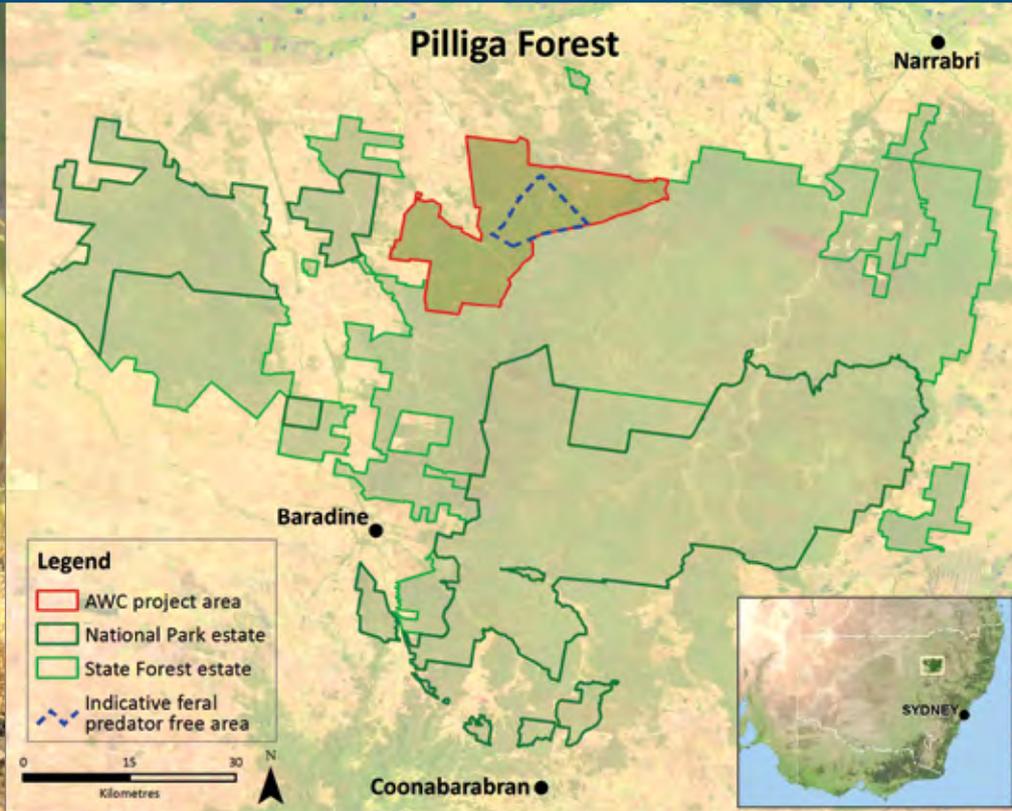
The mammal species to be reintroduced are currently listed as extinct in NSW. Their return to the NSW National Parks estate after an absence of almost a century will be a powerful demonstration of our ability to turn back the tide of extinctions in Australia.

## What is AWC contracted to do?

AWC is contracted to implement a suite of land management and science services across the Pilliga site, covering approximately 35,000 hectares, and Mallee Cliffs, which covers 60,000 hectares. The initial term of the contract is 10 years, with possible extension up to 40 years.

AWC field staff will be based on site at each park, undertaking feral animal control, weed control, infrastructure management and science (biological surveys and research). AWC staff will work closely with NSW National Parks staff to deliver fire management.

At each park, AWC will establish a large feral predator-free area, using conservation fencing, into which a suite of threatened mammal species will be reintroduced (refer table on page 4). The feral predator-free areas will be approximately 5,000 hectares (Pilliga) and 8,000 hectares (Mallee Cliffs). To read more about the importance of feral predator-free areas, refer to page 7. A “beyond the fence” strategy will also be developed to provide for the reintroduction of species, where feasible, in unfenced sections of each national park (refer page 8).



The feral-free areas in NSW national parks are expected to double the global population of the Bridled Nailtail Wallaby *W Lawler*

**Why was AWC selected to partner with NSW National Parks and Wildlife Service?**

The NSW Government ran an extensive competitive tender process to identify and select a partner to reintroduce regionally extinct mammals and deliver the associated park management services. AWC was selected to deliver two projects on the basis of our expertise, track record of success and value for money. A consortium led by the University of NSW will deliver a third project.

**Why is this initiative so important?**

This initiative is important for two reasons:

- It represents one of the world’s most significant biodiversity reconstruction projects. AWC will reintroduce at least 10 mammal species that are currently listed as extinct in NSW - for the first time in almost a century, NSW National Parks will again be home to species

like the Bilby and the Numbat. Australia has the worst mammal extinction record in the world and almost 30% of surviving terrestrial mammals are at risk of extinction. *This project will help turn back the tide of extinctions.*

- It also introduces a bold new public-private partnership model for conservation. This is the first time in Australia that a private (non-profit) organisation has been contracted to deliver national park management services. Around \$1 billion of public funds are currently invested annually in national park management across Australia. This initiative marks the emergence of an important new collaborative model, which can help increase the ecological return on investment, reversing the loss of Australia’s natural capital.

Species	Approx. global population (Mammal Action Plan 2012)	Predicted AWC-NSW populations	Increase in global population
Bridled Nailtail Wallaby	2,500	4,000	160%
Burrowing Bettong	15,000	2,750	18%
Brush-tailed Bettong	<18,000	4,380	25%
Bilby	<10,000	1,520	15%
Western Barred Bandicoot	3,000	3,000	100%
Numbat	<1,000	240	24%
Western Quoll	13,500	150 - 500	1% - 4%
Red-tailed Phascogale	10,000	1,600	16%
Greater Stick-nest Rat	4,000	1,720	43%
Plain’s Mouse	10,000	500	5%



Red Gum surrounded by White Cypress Pine in the Pilliga *W Lawler*

### How do we measure ecological return?

AWC field ecologists will measure the ecological health of the Pilliga and Mallee Cliffs over time. In particular, we will measure:

- The populations of reintroduced mammals such as Bilbies, Numbats and Bridled Nailtail Wallabies - we estimate that this project will deliver substantial increases in the remaining populations of at least 10 nationally threatened species (including doubling the population of two species).
- A range of other ecological health indicators including threat metrics (eg, density/activity of feral animals) and biodiversity indicators (eg, the population of important species like Barking Owls and Malleefowl).

### Will you be able to visit?

Yes, you will be able to visit both projects after the feral-free areas are established and mammals are reintroduced. The visitor experience will be unique. It will be like stepping back in time to a period before the arrival of feral animals ... as the sun sets, you will see the Australian bush as it should be ... alive with small mammals such as Bettongs and Bilbies.

### How is the initiative funded?

The NSW Government is funding the capital costs associated with the fence construction and reintroductions as well as the annual operating costs of park management.

AWC has agreed to co-invest \$1.1 million at each site to establish a field operations base from which our staff will operate (there is no existing base at either of the two parks). AWC therefore needs to raise \$2.2 million to deliver this ground-breaking partnership.



The Pilliga forest is a stronghold for the Barking Owl

### Please help restore regionally extinct mammals to NSW

Please help AWC deliver this extraordinary project by making a tax deductible donation. Your support will be used to establish critical infrastructure – an operations base, scientific research facility and supporting assets – for AWC field staff delivering one of the nation's most important conservation projects.

Please visit [www.australianwildlife.org](http://www.australianwildlife.org) or fill out and post the enclosed donation form.

# Newhaven: the planet's largest feral cat eradication project



A flock of Princess Parrots at Newhaven L. Harris

In addition to the two large feral predator-free areas being established in partnership with the NSW government in the Pilliga and at Mallee Cliffs, AWC is also establishing a massive fox and cat-free area at Newhaven Wildlife Sanctuary in central Australia. AWC already manages more feral cat-free land on mainland Australia than any other organisation. Our projects in NSW and at Newhaven represent the next phase in our development of a national network of feral predator-free areas – encompassing a diversity of bioregions and habitat types - that will protect and restore populations of many of Australia's most endangered mammals, birds and reptiles.

At Newhaven, the feral-free area will deliver a significant increase in the global populations of at least 10 mammal species including iconic central Australian natives such as the Central Rock Rat (critically endangered) and the Mala (extinct in the wild on the mainland), as well as the Golden Bandicoot (which has disappeared from over 95% of its former range). It will also benefit endangered reptiles (Great Desert Skink) and a suite of rare and declining birds.

Stage 1 of the Newhaven project involves establishing a feral predator-free area of approximately 13,000 hectares, involving a feral-proof fence of around 50 kilometres. **This will be the largest feral cat and fox-free area on the Australian mainland.** Stage 2 involves extending the conservation fence to establish a total feral cat and fox-free area of at least 65,000 hectares (650 square kilometres). **This will be the planet's largest (by area) feral cat eradication.**

Our partners at Newhaven include the Commonwealth Government and the Northern Territory Government. The Commonwealth Government has provided \$750,000 as part of its *National Threatened Species Strategy*, launched in 2015 by Federal Environment Minister, the Hon Greg Hunt MP. AWC must raise an additional \$2.25 million to fund the implementation of Stage 1.

The Central Land Council, traditional owners and the Newhaven Warlpiri Rangers are also important partners in our Newhaven project. The Newhaven Warlpiri Rangers have for several years assisted in the delivery of fire management (benefitting threatened species such as the Princess Parrot), feral predator control and biological surveys. The specialist cat tracking skills of the Warlpiri Rangers will be critically important in delivering a globally significant outcome at Newhaven – the removal of feral cats at a scale never before attempted on mainland Australia.

Please help us implement the world's largest feral cat eradication ... and restore the lost mammals of central Australia

The return on your tax deductible donation will be exceptional:

- A gift of \$250 will clear two hectares of feral cats forever
- A gift of \$1,000 will increase the Golden Bandicoot population by more than 40 animals
- A gift of \$5,000 will increase the Mala population by 120 animals

# Conservation fencing: the difference between survival and extinction



AWC field ecologist, Bryony Palmer, releases a Banded Hare-wallaby, which survives only in feral-free areas, like Faure Island *H Ward*



AWC has established the largest network of feral-free areas in Australia (Sanctuary Manager Josh McAllister, Scotia) *W Lawler*

**There is a strong consensus among scientists and policy-makers that establishing a network of large feral predator-free areas using conservation fencing is an essential component of a national strategy to ensure the survival of Australia's threatened mammals.**

Other than conservation fencing there is currently no strategy that will deliver, at a landscape level, a long-term increase in the populations of those mammal species that are most vulnerable to feral cats. Accordingly, conservation fencing is an essential complement to other strategies - such as baiting, trapping and shooting – which are only effective in some locations, at certain times and for some species.

The need for a network of feral predator-free areas on mainland Australia is widely recognised:

- Australia's *National Threatened Species Strategy* contains a target to establish 10 new feral-free mainland fenced areas by 2020.
- In 2013, a Federal Parliamentary Committee issued a consensus (cross-party) report of an inquiry into the "Effectiveness of Threatened Species and Ecological Communities' Protection in Australia" which included the following recommendation:

*4.139 The committee recommends that, in developing action plans, and allocating program funding, the Department of Sustainability, Environment, Water, Population and Communities consider greater use of predator exclusion fences and other forms of 'mainland island sanctuaries' for threatened species.*

- In 2015, the NSW Government announced a major new initiative to develop three large feral predator-free areas in NSW national parks.

- The *National Feral Cat Threat Abatement Plan* contains the following action:

*Action 3.3 Establish and maintain further fenced reserves ("mainland islands") for threatened species where it is identified cats cannot be controlled to the level required for threatened species recovery.*

- The *Mammal Action Plan* (Woinarski et al. 2014) also cites the remarkable success of mainland islands in Australia.

Recognition of the need for additional feral predator-free areas is based on the outstanding conservation outcomes delivered by existing feral predator-free areas:

- There are six threatened mammal species which are now found only in feral predator-free areas. In other words, feral predator-free areas have already prevented the extinction of at least six mammals (eg, the Banded Hare-wallaby, the Mala).
- Feral predator-free areas protect the largest remaining populations of some threatened mammal species (eg, Bridled Nailtail Wallaby, Gilberts Potoroo).
- Feral predator-free areas protect the only secure populations (ie, populations which are not in decline) for many other species (eg, Woylie, Numbat).
- Feral predator-free areas provide the only viable option for re-establishing populations of many threatened mammal species in regions from which they have become extinct.
- Feral predator-free areas are also the only option for re-establishing populations of many threatened mammal species in densities similar to that which existed prior to European settlement.

# Scotia: major research project informs “beyond the fence” strategy



AWC ecologists use radio-telemetry to track the collared foxes and cats



A fox that has been fitted with a GPS collar caught on camera trap

AWC is recognised as the leader in establishing large feral cat and fox-free areas for the conservation of Australia’s most endangered mammals. We are also leading the way in the long-term quest to develop an effective “beyond the fence” strategy – a strategy that, if successful, will allow land managers to reduce the density of feral predators in an open landscape to a point where our most vulnerable native animals can recover.

Currently, there is no effective “beyond the fence” control strategy. One of the barriers to the development of such a strategy is the lack of information about the ecology and behaviour of feral cats and foxes. AWC has now commenced a project at Scotia which, along with our feral cat research in northern Australia, is set to provide crucial data to inform the design of feral predator control measures in open (unfenced) landscapes.

## Integrated feral predator research at Scotia

Scotia contains the largest fox and cat-free area in Australia – an area of 8,000 hectares that sits within the 64,000 hectare property site. Endangered mammals such as the Bilby have been successfully reintroduced into the feral predator-free area and the exclusion of foxes and cats has delivered significant biodiversity benefits for in-situ native species. For nearly 10 years, AWC has been measuring these benefits through rigorous biodiversity monitoring at sites within and outside the fenced area. For example, during the 2015 biodiversity survey, AWC ecologists captured **58 small mammals** (such as, Southern Ningauai, Bolam’s Mouse and Common Dunnart) inside the feral-free area while only **six small mammals** were captured in matching sites outside the fenced area where foxes and cats are present.

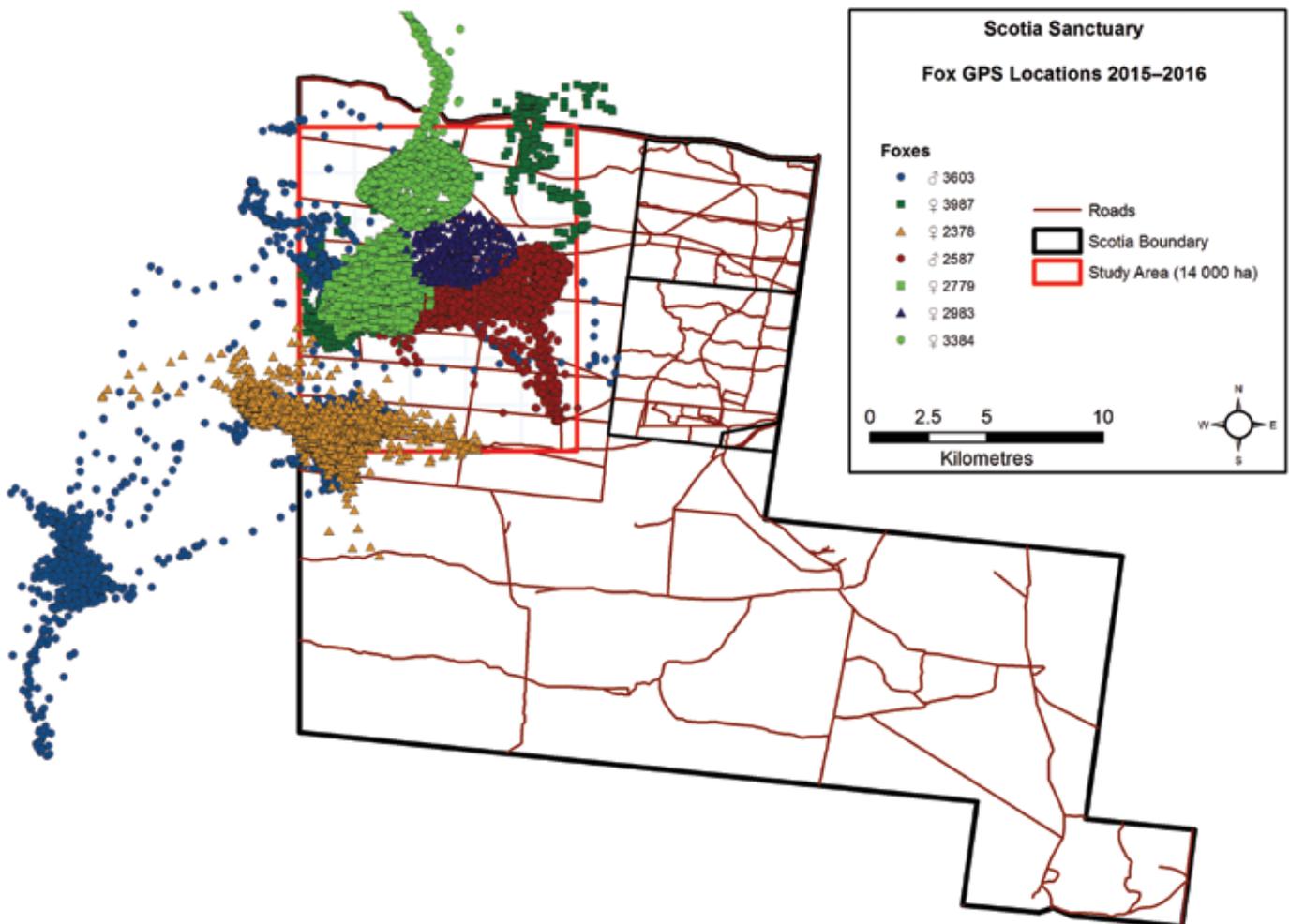
This highlights the critical question – is it possible to reduce the density of foxes and cats in an unfenced landscape to such an extent that populations of small native mammals

(eg, Southern Ningauai) will increase? And to such an extent that regionally extinct species such as the Bilby can be reintroduced?

To answer this question, AWC ecologists have set up a ground-breaking, landscape-scale five year research project, which involves deploying 70 infrared camera traps across a 14,000 hectare study area. Sand plots have also been established across the area. Resident foxes and cats are now being fitted with telemetry collars. Seven foxes and three cats were fitted with telemetry collars in 2015 (this involved luring animals to trap sites with the help of parmesan cheese, feathers and bacon fat!). A further 10 foxes and 10 cats will be fitted with GPS collars in 2016. 16 long-term biodiversity monitoring sites are located in the study area.

## The density and movement patterns of foxes and cats

The first goal of our research is to measure the density of foxes and cats and obtain a better understanding of how they use the landscape. This fills a critical information gap – for most of Australia, we do not know the density of foxes and cats or how their densities respond to different seasonal conditions and other variables. At Scotia, we can now calculate densities by combining movement data from collared animals with photographs from the 70 camera traps. Preliminary data from GPS collared foxes suggests they occupy largely exclusive territories ranging from 900 – 1,500 hectares (see map). In summer, some foxes made long



(8.5 km) trips outside of their home range to drink from dams holding water. Preliminary data on cats suggests a home range in excess of 500 hectares.

A crucial element of the first stage of our research involves evaluating whether activity indices (from sand plots or camera data) provide an accurate measure of density and/or changes in density. We can correlate accurate density measures (from GPS collars combined with camera trap data) with the results derived from sand plots across the study area. Our preliminary results suggest that activity indices from sand plot data are unreliable. Such a finding, if confirmed by further data, will be highly significant as many land managers rely on activity indices to measure the effectiveness of fox and cat control.

#### What happens when we control foxes only?

The next stage of the project will involve the removal of foxes from the study area. Foxes are far easier to control than feral cats because foxes readily take bait. There is some evidence from elsewhere in Australia that fox baiting alone can lead to an increase in predation by feral cats. We will test this by measuring the response of feral cats – will the population of feral cats increase when the population of the larger predator is reduced (and what will be the impact on our small mammals)? We will monitor whether and how cats alter their use of the landscape and their hunting behaviour in response to lower fox densities. The results of our Scotia project will inform the design of integrated feral predator control measures targeting both foxes and cats.

#### Is there a threshold cat density below which mammals will recover?

The ultimate goal of our research is to identify whether the density of cats and foxes can be suppressed (in the absence of a fence) to levels that are low enough to allow native mammals to increase or, if they are regionally extinct, to allow them to be reintroduced. Our long-term monitoring sites will help identify any increase in small mammals and reptiles as the density of foxes and cats is reduced in the study site.

It is likely that different species of mammals will tolerate different levels of cat and fox densities. More significantly – given the limitations of baiting, trapping and other control measures - it remains unclear whether it is feasible to reduce cat densities across large unfenced areas to a level that will support an increase in small mammal populations, or the reintroduction of vulnerable species such as the Bilby or the Mala.



A feral cat in the Scotia study area

# Mt Gibson: historic return of regionally extinct mammals



AWC wildlife ecologist, Dr Laura Ruykys, releases a Numbat at Mt Gibson  
*E. Ellis*



Woylies caught on camera trap

Three of Australia's most endangered mammals have found a new home at Mt Gibson Wildlife Sanctuary, where the largest feral cat and fox-free area on mainland Western Australia is already playing a critical role in halting the catastrophic decline of Australia's mammal fauna. A fourth species – the Bilby – is set to join them before the end of 2016.

## Numbats

Earlier this year, AWC completed a 2,500 kilometre translocation of Numbats from Scotia Wildlife Sanctuary to Mt Gibson in what is an important step in preventing the extinction of this endangered species. The Numbat has an estimated population of less than 1,000 mature individuals.

Nine Numbats were airlifted from Scotia in western NSW and released within Mt Gibson's feral predator-free area. Six were females and five of those had young. Weekly radio-tracking by AWC field ecologists has revealed the Numbats wasted no time in exploring widely and have established relatively stable home ranges across two-thirds of the Mt Gibson fenced area.

Additional Numbat translocations are planned later in the year as AWC works with Perth Zoo to establish a genetically diverse founder population, which is expected to eventually increase the global Numbat population by almost 25%.

## Woylies

To date 59 Woylies have been released at Mt Gibson in four translocation events from Karakamia Wildlife Sanctuary. The survival rate has been unprecedented – there was not a single mortality from any of the 26 radio-collared animals (average duration of collar deployment was 148 days). As part of routine monitoring in April 2016, eight Woylies were caught and checked; all were in excellent health. Some females had recently-born young, suggesting that they have raised to independence the young that they were carrying

when they were first translocated to Mt Gibson. This is great news for a species, which has suffered a 90% decline in its overall population in the last 10-15 years.

As this edition of *Wildlife Matters* goes to print, another group of Woylies is making its way from the Department of Parks and Wildlife's Perup Sanctuary to Mt Gibson and Karakamia sanctuaries. The translocation will strengthen the genetic diversity of both the Mt Gibson and Karakamia populations and highlights the close collaboration between government and non-government organisations dedicated to the conservation of Australia's endangered mammals.

## Greater Stick-nest Rats

Greater Stick-nest Rats – a large, fluffy native rodent measuring up to 26 cm in body length, which is highly susceptible to introduced foxes and cats - have been reintroduced to Mt Gibson in two translocation events from different source populations over the past few years.

The animals were initially released into a soft-release area and have now been released into the broader feral predator-free area. Early monitoring suggests the Greater Stick-nest Rats are moving about and individuals from the two source populations are interacting with each other. Additional translocations are planned for 2017.

Thank you to Lotterywest and our supporters for your significant support of the Mt Gibson Project



# Brooklyn: a stronghold for the Buff-breasted Button-quail, one of Australia's rarest birds



One of six Buff-breasted Button-quail nests discovered on Brooklyn *J Young*



AWC field ecologist John Young recording a nest

**A healthy population of one of Australia's rarest birds – the Buff-breasted Button-quail – has been discovered on Brooklyn Wildlife Sanctuary. The Buff-breasted Button-quail is so rare that (until now) no living member of this species has been photographed and only seven specimens occur in museum collections. The population on Brooklyn is the largest known population of this nationally endangered species.**

The Buff-breasted Button-quail is one of the country's least known and most endangered birds. It is restricted to north-east Queensland, with only a handful of sightings in a small number of locations from eastern Cape York to the area around Brooklyn. The estimated population of the Button-quail is only 500 mature individuals and is likely to be declining; the total area of occupancy may be as low as 5,000 hectares.

Against this background naturalist John Young, on his first day of employment with AWC, set out to search for the elusive Buff-breasted Button-quail across our 60,000 hectare Brooklyn Wildlife Sanctuary. John is the only living person to have discovered a population of the Night Parrot, another elusive Australian bird. After weeks of meticulous tracking (covering hundreds of kilometres on foot), John's exceptional birding skills delivered a stunning result – 17 sightings of Buff-breasted Button-quail (four females and 13 males) across five distinct locations on Brooklyn. Six active nests were found; three of these held a combined total of 11 eggs, while two nests were under construction. The remaining nest had remnants of body scales and egg shells - evidence that chicks had recently and successfully hatched and left the nest.

The discovery of six nests is particularly significant. In addition to confirming successful breeding on Brooklyn, only two other people have ever recorded a nest of the Buff-breasted Button-quail (William McLennan in 1922 and Lloyd Nielsen between 1990 and 2005). The observations on Brooklyn strongly suggest the Buff-breasted Button-quail is polyandrous, where one female owns a large territory with at least three males living in the area who are tasked with all nest duties including building, incubating the eggs and raising the young.

Typical breeding habitat on Brooklyn is sparsely timbered, mostly with Ironbark and Melaleuca, and very thinly covered with short grasses. It is likely that AWC's fire management program has played a critical role in maintaining suitable habitat on Brooklyn for the Buff-breasted Button-quail.

There is much still to learn about the Buff-breasted Button-quail. The call of the male was recorded for the first time ever at Brooklyn. Two females were also heard calling. John also took the first ever photograph of a Buff-breasted Button-quail, although unfortunately the image is not sharp enough for publication. However, watch this space as AWC sharpens our focus on protecting one of the last strongholds for one of Australia's rarest birds.



A female Buff-breasted Button-quail painting by Lloyd Nielsen. Special thanks to Lloyd Nielsen for his support during the search for this rare bird.

# Spectacular rains transform the desert on Kalamurina



The flooded desert on Kalamurina Wildlife Sanctuary *W Lawler*

Kalamurina protects 660,000 hectares of the Kati Thanda-Lake Eyre (Lake Eyre) catchment including most of the north shore of Lake Eyre and the lower reaches of the key rivers which carry water to the lake: the Warburton and Kallakoopah Creeks and the Macumba River. Three deserts also come together on this vast property - the Simpson Desert, the Tirari Desert and Sturt's Stony Desert. One of Australia's driest regions (with an average annual rainfall of 145 mm), an extraordinary 262 mm has fallen on Kalamurina in the first five months of 2016.

The rain started on New Year's Eve, delivering 182 mm over the first two days of the year. It was the largest rainfall event since AWC acquired Kalamurina in 2007 and possibly the largest since 1974. This once in a generation event flooded the Simpson and Tirari Deserts adjacent to Lake Eyre. The result was spectacular: magnificent parallel sand dunes divided by long pools of freshwater; vast areas of desert decorated by a network of shimmering lakes; and the rapid inundation of the Lake. The filling of Lake Eyre by local flooding is unusual and provided a stark contrast to the usual slow arrival of floodwaters from rain in the far-off channel country of Queensland. The desert around Lake Eyre may not flood like this again for decades.

The downpour is expected to deliver a boom season for our desert wildlife - such as the Crest-tailed Mulgara, the Dusky Hopping Mouse, and the Eyrean and Grey Grasswrens – and an important boost to the productivity of key habitats including habitats off the floodplain of the major rivers.

AWC has responded to the rain by launching a major biological survey effort in 2016, including a rapid assessment of the response to rain by insect life (refer page 13), and commencing an important new research project on the role of Dingoes.

## New research designed to unlock the ecological benefits of Dingoes

AWC ecologists, working in partnership with a PhD student (Jack Tatler) from the University of Adelaide, have started a major new research project at Kalamurina designed to fill critical gaps in our understanding of the ecological role of the Dingo.

The Dingo is an important apex predator with the potential to influence predation dynamics in Australia's arid zone because it exerts strong, top-down pressure on smaller predators (foxes and feral cats) as well as herbivores. In particular, it is possible that healthy Dingo populations can moderate the impact of feral cats and foxes by limiting their populations and/or the effectiveness of their hunting. We know from research elsewhere, including at AWC's Mornington Wildlife Sanctuary, that feral cats seek to avoid interactions with dogs.

The AWC project team kicked off the Kalamurina project in April by trapping and deploying telemetry on 10 Dingoes. Each Dingo was fitted with a GPS collar with inbuilt movement sensors. The collars record the location of each Dingo as frequently as every 20 minutes, as well as activity data every second, allowing us to capture fine scale quantitative data on their behaviour and habitat use through time.



A Dingo at Kalamurina, showcasing the response of desert vegetation to rain in 2016 *M McLaren*

The project builds on AWC's record of breaking new scientific ground in two key respects:

- This is the first Dingo project to deploy accelerometers - a sensor that detects the rate of acceleration and so allows us to remotely identify when a Dingo is hunting.
- It is the first major Dingo project to be conducted in a system that is largely devoid of key disturbance factors - in particular, Kalamurina is essentially free of large feral herbivores and there are no poison baits in the landscape.

Over an initial period of six months, the monitoring technology will track the movements and behaviour of the 10 Dingoes - where they go, what they are doing and how they interact with the landscape. Collars will be redeployed in 2017, giving us a detailed insight into when and where Dingoes hunt and how this changes over time, especially as the country dries out after the big rains in early 2016.

We expect this research will also help us identify which habitats are preferred by Dingoes and, given their effect on the abundance and activity of cats and foxes, which areas may be important refugial habitats for threatened mammals and other wildlife.



A Dingo being fitted with a GPS collar with a special accelerometer sensor that tracks and measures the velocity of its movements *M Fischer*

### CSIRO collaboration to document little known insect diversity

The massive rainfall event at Kalamurina provided a rare opportunity to inventory the little known insect life of Lake Eyre and its surrounds. The availability of water, plant growth and recent flowering generated an abundance of insect life which, in turn, helps drive the boom in native animals. In mid-March, researchers from CSIRO's Australian National Insect Collection (ANIC) visited Kalamurina, sampling thousands of specimens. Of particular focus for the visit were moths (Lepidoptera), beetles (Coleoptera) and grasshoppers (Orthoptera). A group found to be in abundance was the lacewings (Neuroptera), with their larvae (ant lions) thriving in the loose sand of the dunefields. This included members of the genus *Stilbopteryx* which are among the largest lacewings in the world. Larger numbers of Sphingidae (hawk moth), Geometridae (including an undescribed moth of the *Hypobapta* genus), oecophorid moths and a primitive braconid wasp of the genus *Megalohelcon* were among other highlights. The project adds to our biodiversity inventory and provides baseline data against which changes can be tracked over time (future rainfall events).

# Updates from the field



Shorebirds in breeding plumage on the coastline at Pungalina-Seven Emu  
Ecological Management Services Pty Ltd

## Pungalina-Seven Emu Wildlife Sanctuary a nationally significant area for shorebirds

The coastline at Pungalina-Seven Emu Wildlife Sanctuary in the Gulf of Carpentaria has been identified as a nationally significant area for migratory shorebirds, after a targeted aerial survey was carried out early in 2016. Shorebird specialists recorded birds in flight and on the ground across 32,000 hectares of coastal communities.

This was the first extensive survey of shorebirds on Pungalina. It confirmed the presence of the critically endangered Eastern Curlew and added 10 species of migratory shorebirds to the sanctuary's inventory, including threatened species like the Lesser Sand Plover and Great Knot, as well as the Marsh Sandpiper, Common Greenshank, Grey-tailed Tattler, Red-necked Stint and Sharp-tailed Sandpiper.

AWC manages over 55 kilometres of the Carpentaria coast at Pungalina. Many of the shorebirds recorded are migratory species, travelling thousands of kilometres between breeding grounds in the northern hemisphere and winter feeding grounds in the southern hemisphere. Extensive areas of coastal wetlands are critical for the birds to gain condition before their arduous flight north. The interplay between saltwater and freshwater on Pungalina supports a rich diversity of coastal wetland habitats, from mangrove-lined channels to saltbush shrublands and tidal flats, making the sanctuary of extraordinary conservation significance.

## New freshwater fish species discovered on AWC properties in the Kimberley

The Kimberley harbours the highest number of endemic freshwater fish species in Australia but it is one of the least studied on the continent. Most of the endemic Kimberley species are highly range-restricted, with many species restricted to single river catchments.

A research team from the University of Melbourne recently conducted a Kimberley-wide survey of freshwater fish. Their work revealed new fish species for two AWC sanctuaries:

- Two new species of herbivorous "grunter" from the genus *Syncomistes*: *Syncomistes* sp.1 in Charnley River (Charnley River-Artesian Range Wildlife Sanctuary); and *Syncomistes* sp.2 in Teronis Gorge in the Chamberlain Valley on Tableland Wildlife Sanctuary.
- An insectivore from the genus *Amniataba* (*Amniataba* sp.1) and a new species of gudgeon from the genus *Hypseleotris* were found in the Charnley River.

The small distribution of these species makes them highly vulnerable. The herbivorous grunter discovered in Teronis Gorge is of particular relevance to AWC, as the entire global population may be on Tableland Wildlife Sanctuary.



PhD student Catherine Hayes releases a Sharman's Rock-wallaby at Mt Zero-Taravale *E Mulder*

### Ground-breaking research helps protect Sharman's Rock-wallaby

First described less than 25 years ago, Sharman's Rock-wallaby was added to the national threatened species list in May 2016. Around 80% of the known population is found on Mt Zero-Taravale in north Queensland, making AWC (and our supporters!) primarily responsible for the survival of this beautiful rock-wallaby. To help protect Sharman's Rock-wallaby, AWC is undertaking the first piece of research into key factors influencing the survival of the species.

The research is being carried out in partnership with University of Queensland (PhD student, Catherine Hayes) and the Queensland Department of Environment and Heritage. As part of the first stage of this research, five individuals - one male and four females (two with pouch young) - were recently captured. The animals were weighed, had their foot and head length measured, had an ear clip taken for future genetic analyses and were marked with a PIT tag so they can be recognised in future recapture studies.

Combined with AWC's regular monitoring of Sharman's Rock-wallaby populations using remote camera traps, the research project will contribute critical information about the distribution, population density, and behaviour of the species. It will help AWC land managers refine our approach to fire management by investigating how the rock-wallabies use habitats subject to different prescribed burning patterns.



AWC senior ecologist, Dr James Smith, with a marked Kimberley Crevice Skink *A Morton*

### Camera traps capture the Artesian Range's extraordinary biodiversity

Recent surveys in the Artesian Range have again highlighted the rich diversity and abundance of wildlife protected on the sanctuary, recording species like the Wyulda, Golden-backed Tree Rat, Kimberley Rock Rat, Northern Quoll, Sugar Glider and Kimberley Rock Monitor. These animals were recorded on camera traps deployed in an expanded fauna inventory survey program in the heart of one of Australia's most inaccessible regions, near the northwest Kimberley coast.

The survey recorded the first capture on the property of a Northern Blossom Bat, a miniature flying fox, which feeds on nectar and pollen. AWC ecologists also recorded a nesting Masked Owl, our first record in the Artesian Range.

The Artesian Range protects important populations of several reptile and amphibian species with very restricted geographical ranges in the northwest Kimberley, including the iconic Rough-scaled Python. The survey involved a localised trapping effort for one of the endemic Kimberley reptiles - the Kimberley Crevice Skink - which is known from just a handful of locations. 12 Crevice Skinks were captured, as well as four Giant Slender Blue Tongues, showcasing the significance of the Artesian Range for reptiles.

The diversity and abundance of wildlife at Artesian Range highlights its importance as a vital refuge for species that are declining across northern Australia. Species like the Golden-backed Tree Rat and Wyulda, which have all but disappeared outside this strip of the northwest Kimberley, flourish in the rugged dissected sandstone of the Artesian Range.

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