

australian



wildlife
conservancy

wildlife matters

Issue 37

AWC partnering to save
Australia's endangered wildlife

Contents

4	Indigenous partnership model extended to Wilinggin country
10	AWC uncovering wildlife at Bullo River Station
14	Fighting fire with fire to protect the central Kimberley
18	Investing in science to inform conservation
22	Vital research extended to two new sites
24	Last post for last cat
28	Endangered species find refuge in Wet Tropics
32	Iconic Bilbies back in NSW national parks
34	Contract extended at Sydney landmark
38	Translocation program set to secure 21 threatened species
42	AWC launches \$2 million matching challenge

Cover image:

The complex rugged landscape of Wilinggin country. The view from the 100 meter drop of Donkins Hill Falls *Brad Leue/AWC*

Australian Wildlife Conservancy

PO Box 8070
Subiaco East WA 6008
Ph: +61 8 9380 9633
www.australianwildlife.org



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 29 sanctuaries covering more than 6.5 million hectares (16.1 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 purposes of education and promoting awareness of the plight of Australia's wildlife.

About AWC

AWC is an independent, not-for-profit organisation based in Perth, Western Australia. Donations to AWC are tax deductible.

Over the last 10 years, around 87 per cent of AWC's total expenditure was incurred on conservation programs, including land acquisition, while only 13 per cent was allocated to development (fundraising) and administration.



It's time to reverse the tide of extinctions

The recently published United Nations Global Assessment report painted a stark picture into the global biodiversity crisis – nearly one million species are at risk of extinction unless radical action is taken. In Australia, we are world leaders in mammal extinctions; 31 species have gone extinct since European settlement, and a further 56 mammal species are threatened with extinction.

This is an appalling record and is simply unacceptable – we are putting at risk our natural capital, what makes Australia unique. We know that the main drivers of this extinction crisis in Australia include invasive species (particularly feral cats and foxes), inappropriate fire regimes and feral herbivores.

We cannot wait – the time to act is now.

The AWC team is reversing the tide of extinctions. Our innovative model has allowed us to secure populations of iconic endangered species including the Purple-crowned Fairy-wren, Bilbies, Numbats and the Bridled Nailtail Wallaby.

AWC leads the way in new models for conservation. I am very pleased to announce the partnership between the Wilinggin Aboriginal Corporation and AWC across more than 1.7 million hectares of Wilinggin country in the Kimberley. Wilinggin Rangers and AWC Ecologists and Land Managers will work together to help care for the country. This, along with the land protected through the Dambimangari partnership, spans one of the only areas of Australia to have not suffered any mammal extinctions, protecting rare and endangered species such as the Golden-backed Tree-rat, Northern Quoll and the Black-footed Tree-rat.

Significantly, AWC's model, skills and influence now extends across more than 4.3 million hectares of the Kimberley region, working with Indigenous groups, pastoralists, and governments to deliver effective conservation.

This follows the announcement of the innovative partnership between AWC and Bullo River Station in the Northern Territory. AWC is delivering science and land management programs to protect the extraordinary conservation values of the property (including the Gouldian Finch and Wyulda) while Bullo River Station continues to operate as a pastoral business.

We have also recently announced that the Newhaven Stage 1 fenced area is now feral predator and herbivore free, triggering the finalisation of plans for translocations of threatened species into the largest feral-free area on mainland Australia.

These successes have been achieved through the dedication of AWC's team of Ecologists and Land Managers, delivering practical land management programs informed by good science.

Our strategy is clear:

- Deliver science-informed land management;
- Construct a network of large-scale fenced areas to secure the future of threatened species;
- Invest in strategic research; and
- Pursue long-term solutions to control key threats to wildlife, such as gene drive technology (in partnership with CSIRO).

We continue to do this in a cost-effective manner: 87 per cent of your investment is spent where it counts – in the field. We continue to focus on accountability and measuring the results of your investment with the continued development of performance scorecards that allow us to monitor and report on the ecological health of our sanctuaries.

The UN Global Assessment is clear – we must act and we must act now. We can make a difference. With your generous support, we can continue to reverse the tide of extinctions, and restore Australia's biodiversity for future generations.

Tim Allard



Chief Executive

PS: Your ongoing support is invaluable. As June 30 approaches please consider making a tax-deductible donation to AWC as part of the \$2 million Matching Challenge. All eligible donations will be doubled, helping AWC accelerate its work to secure the future of Australia's endangered wildlife.





Ground-breaking Indigenous partnership model extended to help manage Wiltinggin country

*By Peter McKay, Northwest Regional Operations Manager
Photographer Brad Leue*



Australian Wildlife Conservancy (AWC) and the Wilinggin Aboriginal Corporation (WAC) have entered into an innovative and ambitious partnership to work collaboratively across 1.73 million hectares of the northwest Kimberley, enhancing conservation science and land management across a massive 4.3 million hectare conservation corridor.

In June 2004, following a struggle of over two decades, the High Court of Australia recognised the Wanjin-Wungurr Community as the Traditional Owners of the Wanjin-Wungurr Wilinggin Native Title Determination Area.

Ngarinyin Traditional Owners maintain a strong connection to Wilinggin country and continue to care for it. Wilinggin Rangers have been working with Ngarinyin Traditional Owners for over a decade to look after the natural and cultural values of the Wilinggin Indigenous Protected Area (IPA).

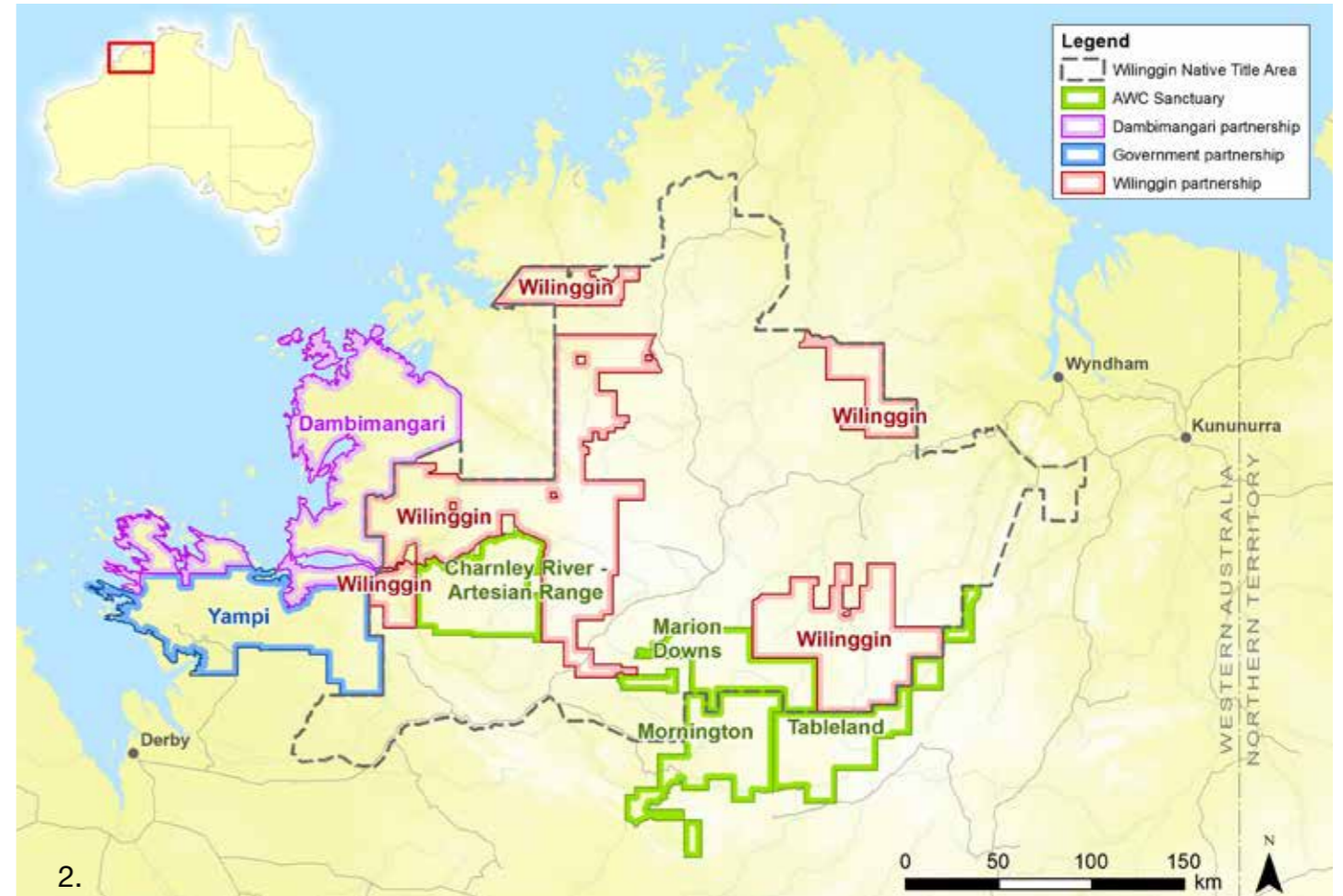
AWC and WAC will now collaborate in the management of this country, improving protection of an array of threatened species while generating sustainable income for WAC and important socio-economic benefits for Wilinggin Traditional Owners.

Wilinggin country dominates the central Kimberley plateau. The rugged and expansive sandstone and basalt ranges stand resolute against time – an example of the magnificent landscape cared for by the Ngarinyin people for around 50,000 years.

The major waterways of the Drysdale, Hann, King Edward, Durack, Moran, Roe, Mitchell, Calder, Isdell, Charnley and Chamberlain rivers carve through the sandstone, revealing the iconic rocky gorges and waterways that are such a prominent feature of the northwest Kimberley. The sandy banks lined with Melaleuca paperbarks, Freshwater Pandanus, Ficus and

Images

1. WAC Project Officer Lloyd Nulgit (far left), Wungurr Rangers and Traditional Owners Kane Nenowatt and Robin Dann together with Traditional Owners and Incendiary Machine Operators Cassidy Charles, Michael Nulgit, Tyron Burgu and AWC Regional Fire Coordinator Toby Barton prior to the joint prescribed burning operation Brad Leue/AWC



2.

Grevillea form discrete riparian areas that typify the central plateaus of Wilinggin country.

This awe-inspiring country protects some of Australia's rarest mammals, including the Black-footed Tree-rat (*Mesembriomys gouldii*), Monjon (*Petrogale burbidgei*), Scaly-tailed Possum (*Wyulda squamicaudata*), Golden-backed Tree-rat (*Mesembriomys macrurus*) and the Northern Quoll (*Dasyurus hallucatus*). For many of these species, whose range once extended across northern Australia, this part of the Kimberley is their last remaining refuge.

Remnant populations of threatened and endemic birds that are known from, or could potentially occur on Wilinggin country include the Black Grasswren (*Amytornis housei*), Gouldian Finch (*Erythrura gouldiae*), Northern Crested Shrike-tit (*Falculcus frontatus whitei*), Red Goshawk (*Erythrotriorchis radiates*) and the

Purple-crowned Fairy-wren (*Malurus coronatus coronatus*).

The Ngarinyin people are also custodians of two nationally significant fish species – the Barnett River Gudgeon (*Hypseleotris kimberleyensis*) that is only found in the Barnett River system and the critically endangered Freshwater Sawfish (*Pristis microdon*).

The WAC-AWC partnership

AWC is now working hand-in-hand with Wilinggin to deliver a science and land management program across the 1.73 million hectare collaboration area, consistent with the Wilinggin Healthy Country Plan. The WAC-AWC partnership was itself inspired by the successful partnership between AWC and the Dambimangari Aboriginal Corporation (DAC) to help manage 800,000 hectares of Dambimangari land, adjacent to the Kimberley coast – an area of international significance for conservation.

Images

1. The AWC/WAC partnership adds 1.73 million hectares to AWC's conservation portfolio AWC



Images

1. Regional Fire Coordinator Toby Barton and Wilinggin Ranger Cassidy Charles checking equipment for the planned burn Brad Leue/AWC

2. Gouldian Finch Wayne Lawler/AWC

3. Purple-crowned Fairy-wren Wayne Lawler/AWC

4. Black-footed Tree-rat Eridani Mulder/AWC

5. Monjon Brad Leue/AWC

The partnership is the largest science and land management program AWC is undertaking, and brings AWC's model of management, partnership and collaboration in the Kimberley to 4.3 million hectares. It also expands the delivery of AWC's prescribed burning program to 6.3 million hectares, the biggest non-government fire management program in the country.

AWC and Wilinggin Rangers will collaborate on the development and implementation of annual activity plans for 'right way' burning, biological surveys, and feral animal and weed control. Periodic reporting will track key metrics, such as the density of feral herbivores, the extent of weed infestations, and the success of prescribed burning regimes.

Fire management is a critical element of the partnership. Effective prescribed burning (which aims to replicate Ngarinyin people's traditional burning practises and limit the scale of late season wildfires) protects wildlife habitat and cultural sites, and generates carbon credits which can be sold annually by WAC.

In addition to carbon income, the project will deliver a range of other socio-economic and conservation outcomes:

- AWC will make an annual contribution to WAC to help strengthen its organisational and governance capacity in order to ensure that Traditional Owners remain strong custodians of the natural and cultural values of their native title land, which are important to all Australians, recognising that Wilinggin Traditional Owners are choosing to manage their land in a way that protects and enhances conservation values;

- On-the-job training will continue to be delivered to help build the capacity and expertise of Wilinggin Rangers and Traditional Owners. In turn, AWC staff will learn traditional knowledge from Wilinggin Rangers;

- AWC and WAC will work together to develop culturally-appropriate and environmentally-sustainable business opportunities, and to leverage Government investment in Wilinggin activities;

- The project will support Wilinggin in protecting cultural heritage (especially sacred sites and rock art) by aligning visits to remote areas for land management/science operations with cultural visits involving Traditional Owners when operationally feasible to do so;

- The project aims to maintain/increase populations of threatened species that are known to be on or could potentially occur on Wilinggin land, (e.g., Northern Quoll, Gouldian Finch, Kimberley Brush-tailed Phascogale, Brush-tailed Rabbit-rat and Black-footed Tree-rat);

- The project aims to reduce the frequency and extent of late-season wildfires, to increase the amount and dispersal of long, unburnt vegetation (critical for wildlife in need of food and shelter); and,

- The project will remove feral animals and invasive weeds.



AWC CEO Tim Allard and WAC Deputy Chair Robin Dann

The WAC-AWC partnership is vitally important. It will help protect a further 1.73 million hectares of the northwest Kimberley, enhancing conservation science and land management across 4.3 million hectares of priority land for conservation in an area that has suffered no animal extinctions since European settlement.

It costs AWC just \$1 per hectare per annum to protect Wilinggin country.

Please consider making a tax-deductible gift to AWC in support of this landmark partnership.



Bullo River Station, Crater Lake Falls Brad Leue/AWC

AWC partners with pastoralists to protect threatened wildlife

By Dr Eridani Mulder, Senior Wildlife Ecologist

In the Northern Territory's remote north-west, embraced by millennia-old sandstone ranges, Australian Wildlife Conservancy has entered into a major new partnership to deliver conservation on pastoral land to help protect the region's threatened wildlife and habitats.

AWC, in partnership with long-term AWC supporters, Julian and Alexandra Burt, are developing and implementing an exciting new model to deliver land management and science across one of the country's most iconic commercial pastoral stations.

Located 360 kilometres south-west of Darwin, Bullo River Station covers more than 160,000 hectares of the NT that has exceptional conservation value. Dissected sandstone plateaux, sweeping eucalypt savannah woodlands, open grasslands and the rich alluvial floodplains of the Victoria and Bullo rivers provide vital refuge for threatened wildlife. Like most of northern Australia, the region is under threat from wildfires, feral animals and weeds. Now under the ownership of the Burt family, the property is an important site for conservation.

Under the 10-year partnership agreement, AWC is contracted to protect wildlife and improve the ecological health of Bullo River Station through the delivery of land management and conservation science. In other words, no donation dollars are needed for AWC to manage Bullo River Station for conservation. The Burt family continue

to run the property as a commercial cattle station alongside a sustainable eco-tourism operation. The partnership model has the potential to catalyse wider application on commercial pastoral land.

Uncovering Bullo River's natural treasures

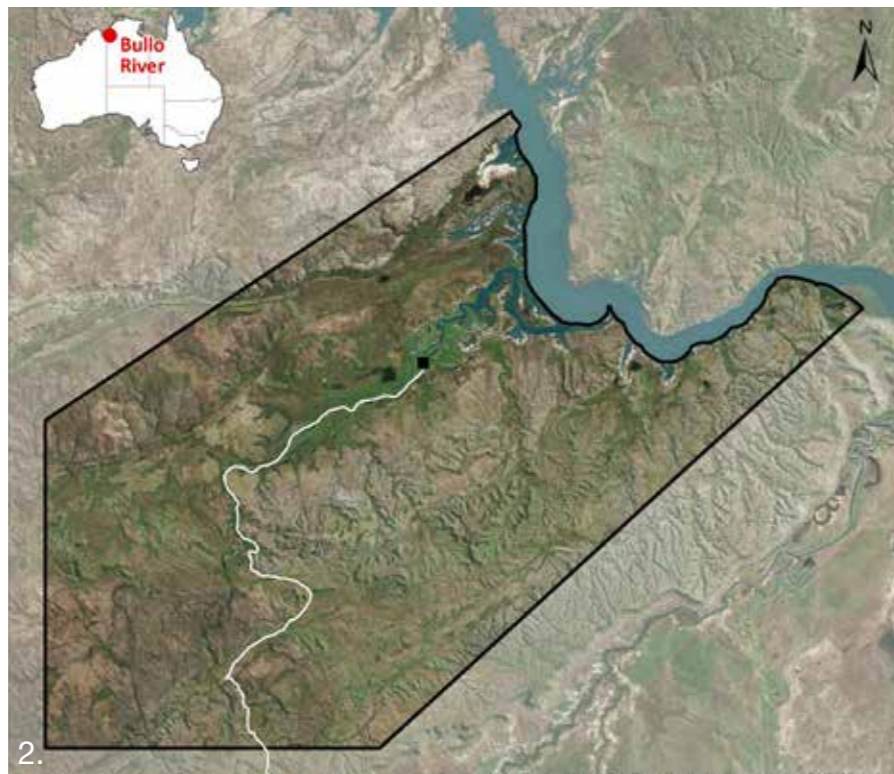
In the late dry season of 2018, AWC ecologists set to work on a major, multi-year, biological exploration to uncover the secrets Bullo River Station has been keeping. Equipped with remote camera traps, the AWC team completed the first round of systematic scientific surveys at Bullo River. Based on their extensive knowledge of similar ecosystems across northern Australia, the ecologists set cameras deep within gorge systems, across refugial paperbark-lined sand seep habitat at the base of ranges, and in protected patches of long, unburnt vegetation. The initial camera trap surveys involved more than 1,000 trap nights over two short visits.

Sorting through thousands of images captured during the survey, AWC ecologists were astonished to discover an exceptionally rare Wyulda (Scaly-tailed Possum). This record is significant as it represents a momentous range extension for this species. Until AWC discovered the possum living in the upper tributary of Bullo River gorge, Wyulda had only ever been recorded in Western Australia, more than 150 kilometres away.



The possums are consummate rock-dwellers, easily navigating the rock ledges, vines and vegetation of vertical cliff walls, using their bare, prehensile tail to hang from branches to feed on young leaves, flowers and fruit. Although superficially similar to the more common Rock Ringtail Possum, which may also occur at Bullo (and is found sharing habitat with Wyulda at AWC's Artesian Range Sanctuary), Wyulda are more closely related to the group of possums which includes the Common Brushtail and the Spotted Cuscus. Despite a history of hot, late dry season wildfire in recent years, the detection of Wyulda provides encouragement that other remnant populations of declining mammal fauna, such as Golden Bandicoots and Black-footed Tree Rats, might be holding on at Bullo River.

Setting up this year's biological survey across the property has been sweaty work with AWC's ecologists establishing 36 permanent monitoring sites in 33 degrees celsius. AWC's trapping program



Images

1. Bullo River Station owner Julian Burt with AWC Senior Wildlife Ecologist Eridani Mulder, and Ecologist Stella Shipway *Brad Leue/AWC*
2. Bullo River Station is in the remote northwest of the Northern Territory.



Images

1. Bullo River runs through the heart of the property *Brad Leue/AWC*
2. The first image of a nationally endangered Gouldian Finch captured on Bullo River Station *Brad Leue/AWC*
3. This camera trap image is the first evidence of Wyulda in the NT *AWC*
4. A Black-headed Python found in the woodlands of Bullo River Station *Brad Leue/AWC*

will be reinforced by spotlighting surveys and remotely triggered camera traps. Around 2,000 trap-nights are planned at Bullo River this year. There has never been a comprehensive ecological audit of the property, making AWC's biological exploration of Bullo River even more important. The data we collect will enhance our knowledge of the property's spectacular biodiversity values and help inform the ongoing design and delivery of our land management activities to control feral animals, fire and weeds.

Delivering effective fire management

Like the rest of northern Australia, wildfire is a key threat to biodiversity and pastoral productivity in this region. AWC's Wongalara Wildlife Sanctuary manager Chris Whatley has been delivering fire management at Bullo River Station since 2017 with the objective of limiting the frequency and extent of late season wildfires. Now that the 2019 wet season in the north-west has ended, Chris is busy implementing

prescribed burns at Bullo River. After just two years, the successful exclusion of late dry season wildfires from the station's open savannahs is already making a positive impact by increasing the age classes of vegetation across the landscape. This is generating positive benefits for wildlife dependent on cover and seed resources at specific times of the year, such as the nationally endangered Gouldian Finch, small mammals and reptiles. The program is also boosting pastoral productivity and protecting infrastructure.

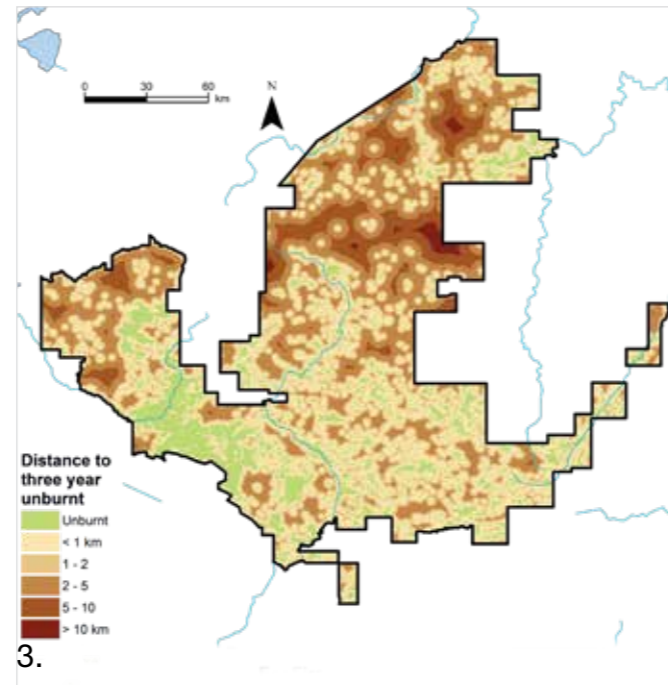
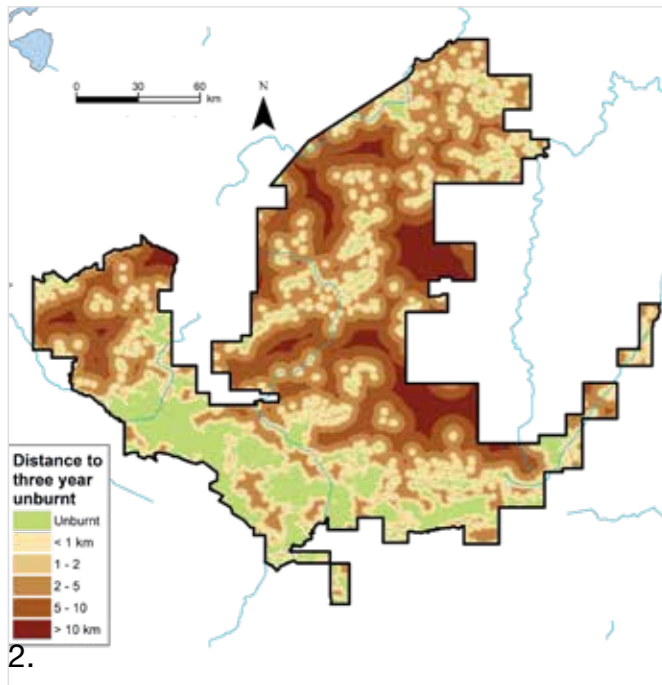
Under this innovative business model, AWC and the Burt family are building a new template for the delivery of conservation on commercial pastoral land. It is here that AWC has an opportunity to demonstrate that conservation partnerships can work to successfully deliver a positive return on investment for both commercial pastoralists and Australia's natural capital.

Fighting fire with fire to protect the central Kimberley's threatened wildlife

By Andrew Morton, Senior Field Ecologist



Ben Woollorton lights up a backburn at Mornington Wildlife Sanctuary. *Melissa Bruton/AWC*



Images

1. Cool and patchy early season burns like this minimise vast and destructive wildfires in the Kimberley. *Nick Rains/AWC*
2. EcoFire distance to vegetation unburnt for three years in 2006 (Fire scar data supplied by North Australian Fire Information)
3. EcoFire distance to vegetation unburnt for three years in 2018 (Fire scar data supplied by North Australian Fire Information)

Please support Ecofire and help save the Kimberley's threatened wildlife.

\$20 will support the delivery of fire management across 100 hectares of the central Kimberley (20 cents per hectare).

AWC is committed to implementing its award-winning EcoFire program across millions of hectares of the Kimberley despite government funding being withdrawn.

This innovative fire management program was the first collaborative effort to control wildfires and limit the damage caused on a landscape scale in the Kimberley. AWC's neighbours around Mornington came on board in 2007. The program rapidly grew into the largest and most successful non-government fire management program in the country.

Initially funded in part by a West Australian Government and Rangelands NRM grant, this vital program is now wholly funded by AWC through donations after the government withdrew its funding in 2019.

Implementing Australia's largest non-government fire management program

The central tenet behind EcoFire is to incorporate Indigenous land management practices with modern science and technology to deliver large-scale fire management that generates positive outcomes for threatened wildlife.

Historically, northern Australia's Indigenous people would light fires throughout the year for various purposes, such as hunting (to flush game and provide fresh growth to attract grazing animals), clearing areas to allow transit, and burning to promote desirable plants or protect important cultural sites. Moving across the landscape, they created a mosaic of burnt and unburnt patches.

The onset of pastoralism in the 1880s, however, resulted in the dispossession of Aboriginal people from their traditional lands. By the mid-1970s, many Indigenous land management practices had ceased.

Without people in the landscape intentionally managing fire, the patterns quickly changed. The lack of traditional burning across the Kimberley resulted in the accumulation of fuel loads across much of the landscape. During the build-up season (typically October to December), ignitions such as lightning strikes, caused intense, large-scale wildfires to occur under hot, dry conditions. These high-intensity fires burnt vast areas (in the order of millions of hectares) every one to three years, killing trees and changing the composition of vegetation communities. The restructuring of the landscape in this way, coupled with introduced herbivores and the invasion of feral cats, have driven the decline of many small native animals. The changed fire regime has also reduced pastoral productivity.

EcoFire aims to reduce the size, intensity and frequency of fire by shifting its seasonality from the late dry season – when it is most damaging – to the cooler, early dry season when fire is mostly benign. This way, unburnt vegetation, especially long unburnt vegetation, is more accessible to the native animals that depend upon it for food and shelter. It helps small mammals to hide from feral cats and ensures that seeds from a range of grasses are available for animals, such as the nationally-threatened Gouldian Finch, that depend on that diversity.

This cross-tenure project incorporates AWC-managed sanctuaries, pastoral stations and Indigenous freehold land. All stakeholders are closely involved in the design and delivery of the prescribed burning program, which is massive. For example, throughout March and April 2019, AWC staff flew 26,052 kilometres in light aircraft and dropped 70,709 incendiaries.

AWC's team of land managers and field ecologists have been delivering EcoFire for 12 years across more than three million hectares of the central Kimberley. (AWC also delivers ecologically friendly fire management across a further three million hectares of the Kimberley, including at Yampi, and together with Dambimangari and Wilinggin Aboriginal Corporations).

Measuring success

The success of the project is measured against key fire metrics, such as the percentage of each property burnt in controlled burns compared to late season wildfires, and the distance between burnt and unburnt patches of vegetation. By applying objective metrics to measure the success of EcoFire, AWC can determine whether we are delivering a positive return on investment. The results are exceptional and show that since the inception of EcoFire there has been a clear shift in the seasonality of fires from the late dry season to the early dry season. Wildfires in the central Kimberley have been reduced by more than 50 per cent, delivering benefits for wildlife, for climate change and for pastoral productivity.

The distance between burnt and unburnt vegetation has also been reduced, making the latter more accessible to species like the endangered Northern Quoll and Gouldian Finch, improving their chances of survival. The impacts of managing fire are multiplied when feral herbivores are also removed, with the abundance of small mammal populations doubling in just a few years after destocking.

Catalytic impact

The catalytic impact of EcoFire, the first and largest collaborative aerial burning program in the Kimberley, has also been significant. Several programs now use methodologies informed by EcoFire, and it has evolved from individuals managing fire on their own property – or not managing fires at all – to virtually the entire Kimberley implementing some sort of early dry-season fire management program.

EcoFire is strengthening the central Kimberley community, facilitating cooperation between land managers to tackle any wildfires that do start, and inspiring the inaugural *Kimberley Regional Fire Training and Knowledge Exchange* hosted by AWC at Mornington Wildlife Sanctuary in 2018.

For more than a decade, EcoFire has helped to change fire patterns and restore biodiversity across a vast area of the central Kimberley. With your support, AWC will continue to deliver EcoFire and build on the exceptional returns that this program is generating for the central Kimberley's threatened wildlife.



Senior Field Ecologist Chantelle Jackson checking traps Brad Leue/AWC

Investing in science to inform conservation management

By Dr John Kanowski, Chief Science Officer, and Dr Liana Joseph, National Science Manager

Our world is precious. Nature is under threat. Species are disappearing, along with their intricate interactions. We must do something! What can we do?

These are the thoughts, feelings and sense of connection that motivate us to conserve wildlife. But what should we do? Where should we start? Which species most need our assistance? These questions go to the role of science in conservation. Our heads, as well as our hearts, must be engaged for conservation to be effective.

One of the distinguishing features of AWC is the scale of our investment in science. AWC currently employs more than 50 professional field ecologists, including 24 with PhDs. Across the continent, we undertake the most extensive biodiversity survey program in Australia, involving more than 220,000 trap nights every year. Our internship program provides intensive training in fieldwork for eight to 10 ecology honours graduates every year. We collaborate with external researchers from most Australian universities, CSIRO and some international research groups.

The purpose of AWC's science program is fundamentally simple – to provide information to make our conservation activities more effective.

Monitoring for EcoHealth

On new properties, our ecologists conduct inventories to find out what species are present. This is the fun stuff, choosing a promising-looking location on Google Earth, and dropping in by foot, 4WD, boat or helicopter to conduct a survey. As we go to press, we are conducting inventories on Bullo River Station, where our ecologists have recorded the Wyulda (Scaly-tailed Possum) for the first time ever in the Northern Territory. Other inventory work is being conducted on our new partnership programs in the Kimberley: Dambimangari and Wilinggin lands.

Once we have established a reasonable inventory of species present on a property, we implement EcoHealth monitoring to track the status and trend of key species, as well as threats to those species. Where feasible,

baseline data are collected to enable us to measure the impact of our actions over time.

A great deal of thought goes into the development of the plans that underpin this work. Ecologists draw on conceptual models of interactions between species, their habitats and threatening processes to determine which species, habitats and threats should be the focus of monitoring activity [Fig. 1]. Surveys are then designed to obtain the required information – considerations include the number of sites and their distribution (by habitat and space) across a property, the intensity of surveys at a site, the frequency of surveys, and what sort of methods and equipment should be used. Ecologists draw on their experience, analysis of existing data, the literature and discussions with peers to determine optimal survey design and allocation of effort. Over time, as data is accumulated, the optimal design is refined. Technological advancements also change the equation. The development of remotely-triggered cameras has allowed AWC to greatly increase survey effort for small-medium sized mammals across remote landscapes whereas such surveys once relied on live-trapping, which is labour-intensive and limited to a few sites at any time.

The primary purpose of EcoHealth monitoring is to provide AWC ecologists and managers with information on the status and trends of key species and threats. Armed with this knowledge, managers can make informed decisions about whether to intervene in a system and how best to direct resources, such as to increase predator control if populations of threatened mammals are in decline. Determining whether changes observed in monitoring programs are of conservation concern however, can be challenging – particularly in the boom-bust conditions that prevail over much of Australia where species undergo large variations in abundance in response to environmental conditions.

At AWC's Mornington Wildlife Sanctuary, in the Kimberley, populations of small mammals have gone through two cycles of boom and bust in the past 15 years [Fig. 2]. With such large natural variations in abundance, it is difficult

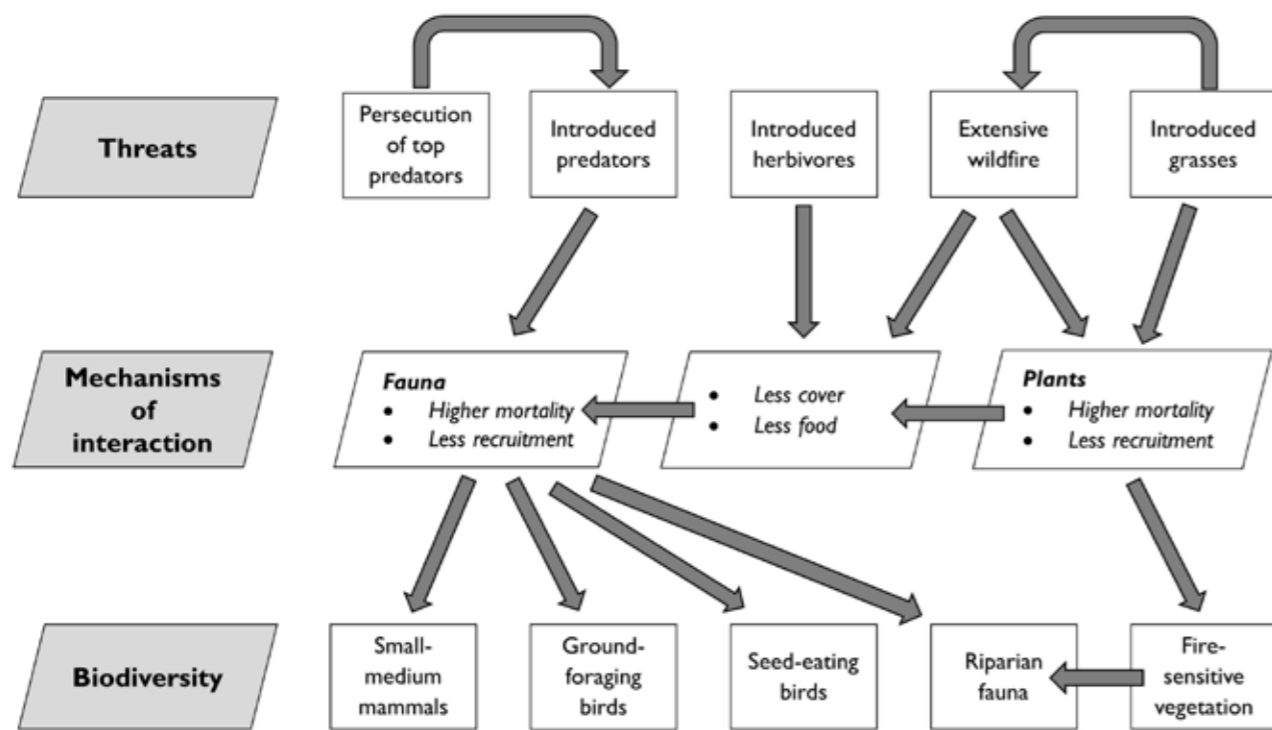


Figure 1. Conceptual model of interactions between conservation assets (species, guilds, ecosystems) and threats in Australia's northern savannas. Source: Kanowski et al. (2018).

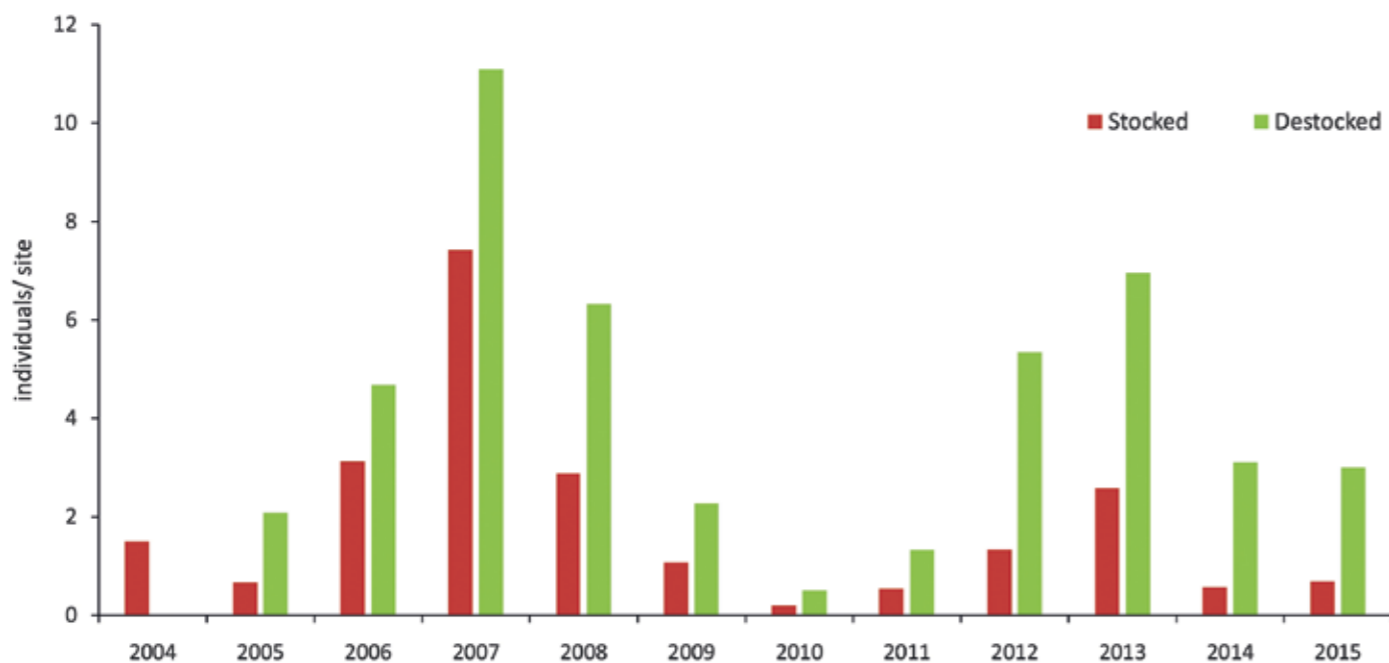


Figure 2. Small mammal abundance on Mornington, 2004-15, at sites stratified by grazing. Native mammals varied widely in abundance on a multi-year cycle, but were more abundant on destocked sites at all times. AWC unpublished data.



to discern any underlying signal. AWC's monitoring program in the Kimberley has been designed to tease out the impacts of AWC's conservation management from underlying natural cycles. Survey sites have been stratified by grazing history, among other factors; our survey data shows that small mammals on Mornington have responded positively to destocking across all phases of the cycle. This information, coupled with targeted research on the ecology of small mammals, feral cats and fire, has led to a deeper understanding of the factors driving mammal decline in northern Australia. As a result, AWC has sharpened its focus on the effective management of introduced herbivores and fire, to better conserve mammal populations.

A third major area of activity for AWC's science program is applied conservation research. At present, AWC staff are participating in 40 active research projects. Major research themes include the ecology of threatened wildlife, and how to best implement management to improve the conservation of threatened wildlife. Some current projects include;

- studies of the response of native plants and animals, and ecological processes, to the reintroduction of locally-extinct mammals to fenced areas on AWC's sanctuaries;
- research on the ecology of feral cats and foxes, and their response to control, aimed ultimately at facilitating the safe release of threatened mammals outside fenced areas; and

Image
1. Nicole Palmer, Senior Field Ecologist, setting traps during a translocation AWC

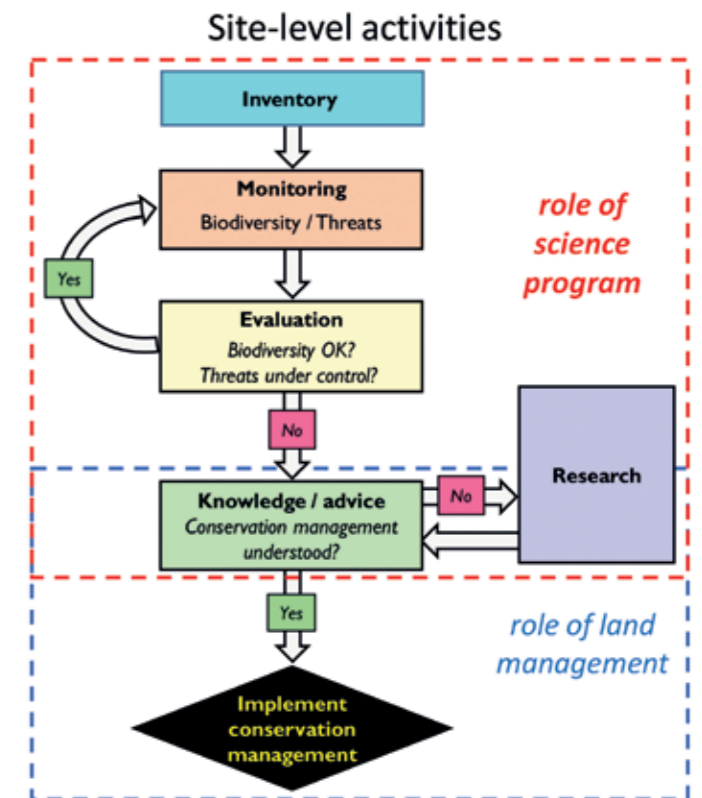


Fig. 3. Overview of AWC's science program

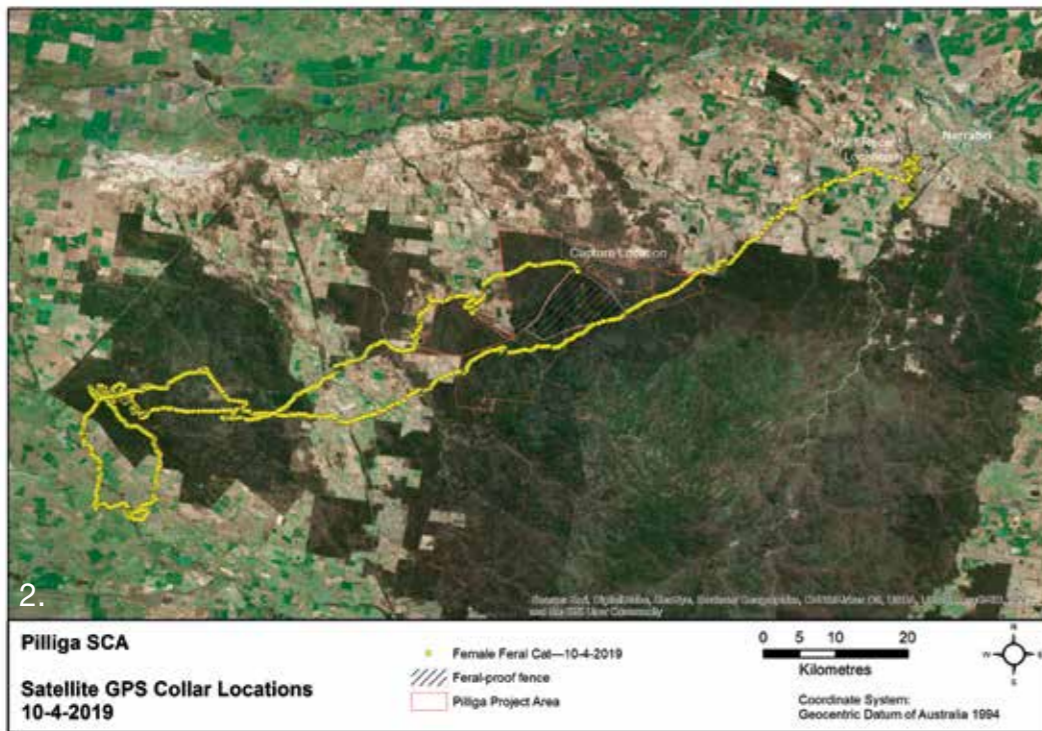
- research attempting to train Northern Quolls to avoid eating cane toads currently invading the Kimberley, using the concept of 'conditioned taste aversion'.

All AWC's research projects are aimed at improving the conservation of our wildlife and their habitats. One of AWC's strengths is our capacity to integrate science and land management – for example, in the feral predator ecology project, AWC's land managers conduct fox baiting, while AWC ecologists monitor the density and movements of feral cats and foxes. The diagram above illustrates the main components of AWC's science program, and the links between them [Fig. 3]. Importantly, as shown in the diagram, expertise in conservation management is held by both ecologists and land management staff, who work together to devise conservation strategies on AWC properties. Land management staff generally implement fire, weed and feral animal control, while the ecologists are tasked with conducting inventory, monitoring and research, as described above.

The purpose of our work is to improve our knowledge of the remarkable biodiversity we protect and ensure we are efficiently and effectively protecting the native species and the natural world that we are a part of, have responsibility for, and care about. The integration of science with land management at AWC means that science informs our on-ground actions, enables us to measure our progress, continuously refine our approach and direct resources to where we can generate the most positive conservation outcomes.

Innovative feral cat and fox research extended to two new sites

By Dr Andrew Carter, Wildlife Ecologist, and Dr David Roshier, Regional Senior Ecologist (Research)



Images

1. Collaring feral cats allows Dr Andrew Carter and the AWC team to learn more about the animals' behaviours and range AWC

2. The yellow line is made up of dots that show where a female cat travelled in the Pilliga, covering hundreds of kilometres AWC

Since 2015, AWC ecologists at Scotia Wildlife Sanctuary have been undertaking one of the most important research projects in Australia on the ecology of feral cats and foxes 'beyond the fence'. Now this research is being extended to the Pilliga and Mt Gibson Wildlife Sanctuary.

For three years the AWC team at Scotia has been undertaking this research in a bid to help us manage foxes and feral cats more effectively in open (unfenced) landscapes. These predators kill more than 2,000 animals every minute in Australia. While there is no existing strategy or technology that can provide an effective control nationwide, fenced predator-free areas, like at Scotia Wildlife Sanctuary, offer an immediate and permanent refuge for threatened wildlife. AWC manages the largest cat and fox-free areas on mainland Australia, but even at the scale built by AWC, these fenced safe-havens still only cover a small proportion of Australia's landscape.

AWC's research project incorporates four linked phases, with the ultimate goal being 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 permit native mammals to increase, or in the case of regionally extinct species, to allow them to re-establish self-sustaining populations.

Phase 1: Developing reliable estimates of the density of foxes and feral cats

Since October 2015, AWC has fitted 28 foxes and 30 cats with GPS collars outside the conservation fence at Scotia. These collars have collectively yielded more than 200,000 location data points. The telemetry data have enabled estimation of home-range size,

encounter rates with cameras, and individual identity of photographed animals. When combined with analysis of images from monthly camera-trap surveys, these data have facilitated robust estimates of population density of foxes at Scotia (on average, eight foxes per 10,000 hectares). AWC's efforts are now focused on estimating the density of feral cats, although this is more challenging as cats have been more nomadic at Scotia than foxes during the period of the research project.

Phase 2: Examining the response of foxes and feral cats to fox control

In October 2017 fox control was implemented in the experimental study area at Scotia for the first time in more than five years. Nine foxes fitted with GPS collars were present in the study area when fox baiting commenced, and within one month, eight of those nine foxes were dead. As baiting removed all except one of the collared foxes, estimates of fox density, for this period, will need a different methodology that does not require individual foxes to be identified in photographs. Work is continuing on developing this method, with results likely to be available in the second half of 2019.

Phase 3: Examining the response of foxes and feral cats to integrated fox and cat control

Implementation of this phase of the project will be dependent on AWC obtaining regulatory approval for deployment of cat baits in NSW.

Phase 4: Reintroducing threatened mammals 'beyond the fence'

Progressing to this phase will be dependent on our ability to maintain fox and cat populations at low densities for an extended period of time, hence the importance of having an effective means of feral predator

control (for cats, these methods are still in development) and having reliable methods for estimating the population density of feral predators (the current focus of AWC's research at Scotia).

Expanding the research

The research at Scotia is now expanding in scope to include fieldwork on two other sites – at the Pilliga project site in New South Wales, and at AWC's Mt Gibson Wildlife Sanctuary in Western Australia.

The research at the Pilliga involves the deployment of an array of camera traps across 15,000 hectares. Feral cats and foxes will be caught in this area during winter 2019 and fitted with GPS collars to track their movements and monitor the effectiveness of predator control activities. One cat, trapped in late 2018, has already travelled more than 170 kilometres across the region. This research will provide crucial insights into how the findings from Scotia relate to other environments. Importantly, it will help to refine the methodology for calculating population density estimates of feral cats and foxes – something that, until now, has not been possible to achieve in Australia.

Ultimately, this research will enable AWC and others to measure and improve the effectiveness of feral predator control at a landscape scale for the benefit of Australia's native wildlife.

At Mt Gibson Wildlife Sanctuary, cameras will be deployed across 12,000 hectares to monitor changes in predator densities in response to control measures, with the aim of facilitating the reintroduction of the Western Quoll and Brushtail Possum.

Please support AWC's ground-breaking research for controlling feral predators 'beyond the fence.'

\$150 will purchase a cage trap for catching feral cats and foxes

\$500 will fund a scientist delivering research in the field for one day

\$4,000 will help purchase a GPS collar for essential scientific research



AWC Land Management Officer Duncan Jungala Gallagher and Newhaven Wildlife Sanctuary Manager Josef Schofield at one section of the 44km fence Wayne Lawler/AWC

Last post for last cat

By Dr Danae Moore, Wildlife Ecologist, Dr Rachael Collett, Wildlife Ecologist, and Josef Schofield, Newhaven Wildlife Sanctuary Manager

AWC's landmark project to restore threatened mammals at Newhaven Wildlife Sanctuary has reached a milestone, with the eradication of all feral predators from the Stage 1 fenced area. This major accomplishment paves the way for the first mammal reintroductions, scheduled to commence later in 2019.

It has taken a lot of work to get to this point. In March 2018, the main gate to the 9,400 hectare feral-proof area at Newhaven was closed, marking the completion of construction work on the 44 kilometre, feral predator-proof fence. At over 1.8 metres high – and consisting of 9,000 posts, 18,000 support rods and 135 kilometres of wire netting – this fence is a major piece of Australia's conservation infrastructure.

Next came the formidable task of eradicating feral animals – including feral cats, foxes and rabbits – from within the fenced area. The scale of the job called for an expert on-ground team, who between them brought a wealth of diverse trapping and tracking experience. Starting two months before construction on the fence was completed, our two professional feral animal control officers, Murray Schofield and Liam Orrock, worked in tandem with AWC's Newhaven Warlpiri Rangers – Christine Ellis, Alice Henwood and Benedict Mosquito – to clear the Stage 1 area of feral cats.

Benedict, Christine and Alice are exceptional trackers with decades of experience tracking cats in Newhaven and the surrounding region. Their approach is to follow fresh tracks, continuing their pursuit in some instances for many hours, until the cat tires and can be caught. Murray and Liam used complementary techniques, carefully setting soft-jaw and cage traps, and laying baits. Their efforts were strategically targeted, informed by the rangers' tracking work. Alice, Christine

and Benedict were able to build up a picture of individual cat movements and patterns of behavior, and this information was supplemented by a vast array of motion-sensor camera traps.

As the eradication progressed, this unique combination of skills was used to pinpoint the remaining cats. They worked consistently for 314 days and finally, on 4 December 2018, the last feral cat was caught: a female weighing more than 2 kilograms.

It was a remarkably effective operation which made use of traditional hunting techniques and the latest technology. Less than 12 months after the fence was completed, this mammoth undertaking has now created mainland Australia's largest feral predator-proof area.

January 2019 marked the beginning of an intensive monitoring period, designed to confirm the feral-free status of the Stage 1 area. Over the four months since, 100 kilometres of tracking on four consecutive mornings every two weeks has been conducted. Additionally, data from 139 infrared cameras has been collected and analysed. Intensive monitoring has shown no sign of any cats remaining within Stage 1 for several months, enabling us to declare the area feral predator-free.

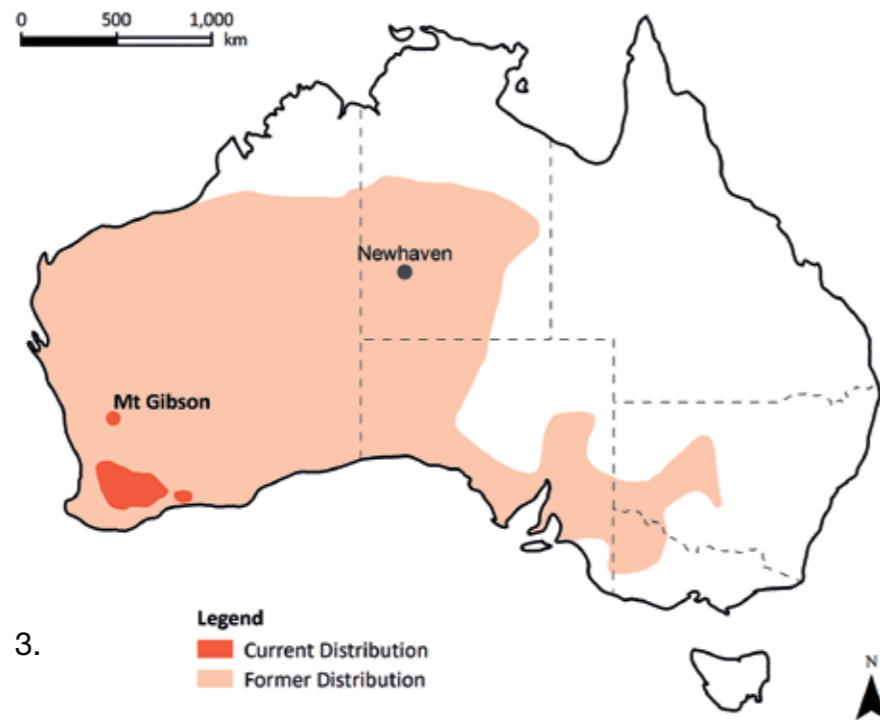
At 9,400 hectares, Newhaven is now the largest feral predator-free area on mainland Australia. AWC manages more cat and fox-free land on mainland Australia than any other organisation. This includes Scotia Wildlife Sanctuary, which until now, at 8,000 hectares, held the title of being the largest cat and fox-free area on mainland Australia. With Newhaven declared feral predator-free, AWC is now working on an ambitious program to restore at least ten threatened mammals that have been lost to central Australia back to Newhaven.



1.



2.



3.

Images

1. Red-tailed Phascogale Brad Leue/AWC

2. AWC Animal Control Officer Murray Schofield with the last cat that was inside the feral predator-proof fence David Fraser/AWC

3. Red-tailed Phascogales were once widespread throughout western and central Australia

Return Red-tailed Phascogales to central Australia | \$1,500 will pay for the return of 1 Red-tailed Phascogale to Newhaven

AWC will be translocating Red-tailed Phascogales to the newly constructed feral predator-free area in 2019. Your gift will return one Red-tailed Phascogale to Newhaven Wildlife Sanctuary, including captive breeding, veterinary services, transport and monitoring.

Three species are proposed for reintroduction to Newhaven in 2019 – Mala, Red-tailed Phascogale and Numbat. Mala are extinct outside fenced areas on the mainland, while both Red-tailed Phascogale and Numbat have been lost from more than 99 percent of their historic range and have completely disappeared from the Northern Territory.

A small population of Mala has already been established at Newhaven (within a smaller, purpose-built 150-hectare fenced area), following an emergency translocation from Watarrka in late 2017. This population was supplemented in 2018 with animals from an insurance population maintained at AWC's Scotia Wildlife Sanctuary. AWC plans to transfer the remaining Mala from Scotia in 2019, if conditions on Newhaven are considered adequate to support translocating animals (like much of Australia, the sanctuary is currently experiencing a drought).

Red-tailed Phascogales are a small, insectivorous partly arboreal marsupial that once occurred throughout most of arid and semi-arid Australia, including the deserts of Central Australia. Predation by feral cats and foxes, combined with loss of habitat, caused the species to contract to a few remnant woodlands in the West Australian wheatbelt.

AWC has conducted a series of successful translocations of Red-tailed Phascogales to Mt Gibson Wildlife Sanctuary in Western Australia, where the reintroduced population is becoming established. In May 2019, AWC ecologists translocated 20 Red-tailed Phascogales from wild populations in the WA wheatbelt to Mt Gibson. Another 20 phascogales were flown to Alice Springs, in the Northern Territory, to supplement a captive breeding program at Alice Springs Desert Park. The captive population will ultimately become a source for reintroductions into Newhaven when conditions are suitable.

Phascogales will be released into woodland habitat within the Stage 1 fenced area, in an area containing old, hollow-bearing bloodwoods. Across central Australia, many of these old trees have been lost due to changed fire regimes. The phascogales will also be provided with nest-boxes, to increase the number of available nesting sites and facilitate post-release monitoring.

AWC's current and upcoming work with the Red-tailed Phascogale represents a collaborative effort towards the conservation of the species, and involves the West Australian Government, New South Wales Government (through our

work at Mallee Cliffs National Park), Alice Springs Desert Park, and Zoos South Australia. As well as providing phascogales for the reintroduction project at Newhaven, animals from the captive breeding program may be used to further supplement Mt Gibson's Red-tailed Phascogale population; and to contribute to a second captive breeding program at Monarto Zoo, to help establish a population at Mallee Cliffs National Park in New South Wales.

The third species scheduled for reintroduction to Newhaven in 2019 is the Numbat. AWC already protects 50 per cent of the total population of this nationally endangered species within our existing network of predator-free havens.

Newhaven represents the northern known limit of the Numbat's historical distribution, prior to the decimation wrought by feral predators. Numbats would be sourced initially from the captive population at Perth Zoo and from wild animals at AWC's Scotia Wildlife Sanctuary. Rigorous monitoring following the translocation will track survival, home range and habitat preferences of Numbats in this arid environment.

Reaching this important milestone means AWC is on track to restore some of Australia's most threatened mammals to central Australia. With the first translocations kicking off this year, Newhaven will soon be home to a diversity and abundance of wildlife approaching that which existed prior to the arrival of Europeans. As reintroductions into Stage 1 proceeds, AWC is beginning initial planning for Stage 2. Projected to encompass a massive 100,000 hectares, this ambitious project will be the largest feral cat eradication on the planet and is ultimately expected to see the populations of at least 5 threatened Australian animal species doubled.

Newhaven Feral Animal Eradication Report Card

Effort

- 5,338 soft-jaw trap nights
- 100 hours spent tracking cats
- 154 kilometres walked tracking cats
- 139 infra-red cameras deployed
- 10 x 1080 meat baits laid for foxes
- 120 kilograms of 1080 baited oats laid for rabbits

Results

- 46 cats removed
- All rabbits eradicated
- 2 foxes removed
- 9,400 hectares declared feral predator-free



Northern Bettong Wayne Lawler/AWC

Endangered Northern Bettongs find refuge in Wet Tropics

By Dr John Kanowski, Chief Science Officer,
and Jessica Koleck, Wildlife Ecologist

Australian Wildlife Conservancy together with Queensland Parks and Wildlife Service (QPWS) are forging an exciting alliance to implement a monitoring and research program aimed at protecting Australia's natural treasures across three national parks in north Queensland's Wet Tropics Heritage Area. Mt Windsor, Mt Spurgeon and Mt Lewis National Parks, and AWC's adjacent Brooklyn Wildlife Sanctuary, are known hotspots for biodiversity. The program, which commenced in 2017, is revealing crucial information about the survival of keystone species like the Northern Bettong (*Bettongia tropica*).

Priority species, which play a vital role in maintaining forest health, are the focus of particular attention for this innovative initiative between AWC and QPWS.

Northern Bettongs once ranged across a vast area, from central Queensland to the Wet Tropics of northern Queensland. Since European settlement, however, populations of this small marsupial have undergone a catastrophic decline and, in the last few decades, have disappeared from most of their former range. In fact, two of the last four remaining populations have vanished in the last 15 years.

Across the continent, predation by feral cats, changed fire regimes and habitat degradation caused by feral herbivores have driven bettongs to the brink of extinction. So much so that the Northern Bettong is now considered one of the 20 mammal species most likely to go extinct in the next 20 years. Recent surveys indicate the largest of the remaining populations, in the Lamb Range near Cairns, supports fewer than 1,000 individuals.

Northern Bettongs are a keystone species, delivering important ecosystem services in the forest and woodland habitats they occupy. Eating and dispersing a huge diversity of ectomycorrhizal fungi, they are essential for tree health. Their loss spells tragedy for conservation and imputes long-term negative consequences for the ecological communities of which they are part.

Almost all previous research on the Northern Bettong has focused on populations in the Lamb Range, with very little known about the other remaining population in Mt Lewis and Mt Spurgeon National Parks. Historically, Northern Bettongs also occurred on Mt Windsor National Park, but there have been no records since 2003. Extensive camera surveys of Mt



Senior Field Ecologist Andrew Howe measures the tail of a Northern Bettong AWC

Windsor, conducted by AWC and QPWS across 98 sites in 2018, did not detect a single Northern Bettong, suggesting that the Mt Windsor population is now locally extinct.

Fortunately, a population of the species has persisted across Mt Lewis and Mt Spurgeon National Parks. Camera trapping by AWC and QPWS has detected the Northern Bettong at 39 of 230 sites over only 1,500 hectares.

Trapping surveys conducted by AWC, with the assistance of QPWS and the Traditional Owners, Western Yalanji Aboriginal Cooperation, resulted in the capture of 13 individual Bettongs. Traps covered one third of the site and the results suggest the population is small, perhaps only 50 individuals. Genetic samples were collected to help determine whether the population is maintaining genetic diversity which risks being lost when populations are small due to genetic drift and in-breeding. Baseline health and body condition assessments were also conducted.

One of the known threats to the Northern Bettong is loss of habitat through inappropriate fire regimes. Fire suppression has led to an invasion of rainforest plants and weeds and the loss of a grassy understory. QPWS, which has been managing fire in the area, successfully burnt an area of forest that had been subject to thickening in December 2017. No Northern Bettongs were detected in this area before the fire. However, seven months afterwards, as small patches of grass began to reappear, AWC's surveys detected Northern Bettongs at a number of sites. These results show Northern Bettongs have recolonised these formerly degraded habitats – an essential step in conserving this small, restricted population.

AWC ecologists have deployed GPS collars on eight Northern Bettongs to track their movements and provide crucial data on home range and habitat use.

These collars recorded the location of bettongs every 20 minutes throughout the night for an entire month. Data collected from the collars is now being analysed.

AWC surveys in the Wet Tropics have also targeted the occurrence and behaviour of feral cats. Camera studies revealed feral cats frequented waterholes and utilised dry creek beds. They avoided roads, perhaps because of the large number of dingoes that seem to prefer using them. Surveys detected feral cats at a much higher frequency at Mt Windsor (where the population of Northern Bettongs appears to have gone locally extinct) than at Mt Lewis and Mt Spurgeon.

Feral herbivores, such as cattle, have adversely impacted Northern Bettong habitat on Mt Lewis and Mt Spurgeon. Cattle have trampled and eroded sensitive plants and heavily grazed the grassy understory. Northern Bettongs rest during the day in clumps of grass, mainly Kangaroo Grass (*Themeda triandra*), and they feed on the tubers of Cockatoo Grass (*Alloteropsis semialata*) during the dry season. Cattle reduce the availability of both food and shelter for bettongs. They also reduce grassy fuel loads, making it difficult for managers to successfully implement fire management. QPWS and Western Yalanji are installing a block fence to reduce the impact of grazing by cattle who wander over from neighbouring pastoral stations.

By joining forces, AWC and QPWS have successfully confirmed the presence of the Northern Bettong at Mt Lewis and Mt Spurgeon, and have improved our knowledge about the key threats to their survival. The data gathered from this project is providing crucial guidance about the land management actions that must be implemented in order to effectively secure the future of this keystone marsupial for all Australians.



This project is supported by the Australian Wildlife Conservancy, through funding from the Australian Government's National Landcare Program.

Iconic Bilbies return to New South Wales National Parks

By Dr Rod Kavanagh, Senior Ecologist



Bilbies were released into a feral predator-free area in the Pilliga in December 2018, more than a century after the species were last spotted in the wild in NSW Brad Leue/AWC

A remarkable milestone was reached in December 2018 when, as part of the NSW Government's *Saving Our Species* program, AWC restored Bilbies to a NSW National Park, more than a century after going locally extinct. Their return to the public estate is a powerful demonstration of our ability to turn back the tide of extinctions in Australia. Now, early monitoring results indicate that these iconic Australian mammals are adapting to their new environment.

The first ever translocation of locally extinct Greater Bilbies (*Macrotis lagotis*) to the Pilliga forests of NSW involved the release of sixty Bilbies (28 males, 32 females) into a specially-constructed fenced area, safely tucked into the 5,800 hectare feral predator-free zone. Half of the Bilbies were sourced from AWC's Scotia Wildlife Sanctuary with the remainder coming from Thistle Island, off the coast of South Australia. Geneticists from the University of Sydney confirmed this mix of source populations would deliver the best genetic diversity in the new Pilliga population.

All 60 Bilbies were fitted with uniquely numbered microchips to allow for individual identification and VHF radio-transmitters were attached to the tails of 35 animals (21 males, 14 females) so their survival, movements and behaviour could be monitored in the weeks immediately following release. A subset of Bilbies also received detailed health examinations by a veterinary team from Sydney's Taronga Zoo.

As dusk fell, each Bilby was safely released into the fenced predator-free area. AWC ecologists have since been monitoring their progress through a combination of spotlighting, trapping and remote cameras. Seven Bilbies were recently detected by spotlighting, and a further four were trapped over four nights. Despite prevailing hot and dry conditions, all the recaptured animals had put on weight and were in good condition.

Among the animals trapped during the survey was a new female Bilby that was possibly a pouch young at time of release, the first recorded in a NSW national park in more than 100 years.

The Bilbies have settled well into their new environment, within days each digging a burrow (up to three metres deep) in the sandy soil. Interestingly, most burrows were initially dug in open clearings similar to those used at the less-forested source locations (Scotia, Thistle Island). However, it became evident that the Bilbies soon became more selective with regard to where they dug burrows, choosing locations such as under large

logs and other fallen timber. The landscape has been quickly transformed by small foraging pits and burrows – the Bilbies living up to their moniker of 'ecological engineers.'

This frenetic activity by our native diggers has not been seen in a national park for more than 100 years. Bilbies were last seen in NSW in 1912. Once widespread across much of Australia, predation by feral cats and foxes and competition with feral herbivores, like rabbits, have seen Bilby populations collapse.

AWC's network of fenced safe-havens, now protect 15 per cent of the global population of Bilbies and are providing important source populations of Bilbies for rewilding efforts, like this one in the Pilliga. To highlight the significance of this initiative, the Bilby population in the Pilliga is projected to grow to an estimated 850 animals – equivalent to almost 10 per cent of the current Australian population.

Returning extinct mammals to NSW National Parks

Our historic partnership with the NSW Government will see at least five other regionally extinct mammals reintroduced to the Pilliga in the next two to three years, making it one of the nation's most important endangered species projects. The five animals are the Bridled Nailtail Wallaby, Brush-tailed Bettong, Western Barred Bandicoot, Plains Mouse and Western Quoll. The feral predator proof fence will also protect extant mammals including the Eastern Pygmy Possum and Pilliga Mouse, and threatened bird species including Bush Stone Curlew and Speckled Warbler.

Next steps: building a field-operations base

The NSW Government is investing over \$40 million as part of the *Saving our Species* program to establish three predator-proof fenced areas, two of which are being developed and managed by AWC. Under the partnership model, the Government is contracting AWC to establish large feral predator-free havens at Mallee Cliffs and the Pilliga, as well as to implement a framework for measuring ecological health and deliver conservation land management at each national park. As our contribution to the partnership, AWC is now focused on constructing a dedicated field-operations base for AWC staff working on-site. This on-ground infrastructure is critical for building on our capacity to deliver a world-class science program (AWC undertakes 15,000 trap nights every year in the Pilliga) and practical land management services, such as feral animal control, across 35,000 hectares of the Pilliga.

We need your help to construct a field-operations base for AWC staff in the Pilliga. \$500 will help purchase building supplies.

Please make a tax deductible donation to help save endangered mammals and roll out this exciting new model for conservation.



SAVING OUR SPECIES



North Head AWC

Strategic partnership at North Head extended to 2022

by Dr Viyanna Leo, Wildlife Ecologist

Located in Sydney Harbour, North Head is a site of high ecological value. It protects a range of threatened plant and animal species including an important population of the Long-nosed Bandicoot (*Perameles nasuta*) and a significant remnant of the critically endangered Eastern Suburbs Banksia Scrub.

At North Head, Australian Wildlife Conservancy works in partnership with Sydney Harbour Federation Trust (SHFT), which manages the area, to deliver a suite of science projects that protect and enhance conservation values. AWC has provided scientific services to SHFT since 2009 and, in 2013, agreed on a program of biodiversity conservation and restoration at North Head. In 2018, this agreement was extended to 2022, indicative of a successful and productive partnership.

Like much of Sydney, North Head has lost a suite of native species since European settlement. AWC's work at North Head focuses on the conservation of the extant native biota (plants and animals) as well as the reintroduction of locally extinct species. To date, three small native mammal species have been reintroduced to North Head: the Bush Rat (*Rattus fuscipes*), Eastern Pygmy Possum (*Cercartetus nanus*) and Brown Antechinus (*Antechinus stuartii*). The Bush Rat is an important part of the faunal

assemblage in forests of south-east and south-west Australia. Bush Rats were reintroduced to North Head in conjunction with the removal of black rats (*Rattus rattus*), an invasive species which has replaced native rodents in much of the remnant vegetation around Sydney. The successful establishment of Bush Rats will assist in reducing black rat numbers across the headland and benefit other small mammal species being reintroduced.

Results from AWC's monitoring program indicate that the reintroduction of Bush Rats has been very successful. At monitoring sites, Bush Rats now significantly outnumber black rats, indicating that Bush Rats can successfully defend territories and out compete the invasive species. In addition, Bush Rats are now detected across the headland, showing that the population has successfully expanded from the original release sites.

The Eastern Pygmy Possum is a tiny nocturnal marsupial that is an important pollinator of Banksias and other native flowering plants. It is listed as vulnerable in NSW due to habitat loss, predation by foxes and feral cats, and changing fire patterns. Due to these threats, the Eastern Pygmy Possum has become locally extinct from some areas, including North Head.



1.

From 2016 to 2018, AWC reintroduced 25 Eastern Pygmy Possums to North Head. Monitoring has shown that the species is becoming established at North Head with successful breeding and establishment of young. However, the number of recaptures is still very low and, for this reason, AWC plans to supplement the population until it is firmly established. AWC has proposed sourcing an additional 30 individuals of the species from a number of regional national parks and state forests. The proposed influx of new individuals sourced from different populations will contribute towards the establishment of a genetically diverse population on North Head.

The Brown Antechinus, a small dasyurid, is the third native mammal that AWC has reintroduced to North Head. This semi-arboreal, carnivorous marsupial feeds on invertebrates as well as being an important pollinator, and like other small mammals is vulnerable to feral predators. A total of 34 Brown Antechinus were reintroduced to the headland in 2017.



Images
 1. Native Bush Rats now outnumber invasive black rats at North Head *Charles Thomas/AWC*
 2. Wildlife ecologists measure the hind foot of the Bush Rat *Charles Thomas/AWC*



Images
 1. Dr. Viyanna Leo checks a funnel trap for reptiles *Charles Thomas/AWC*
 2. Viyanna Leo and AWC Intern Mareshell Wauchope place a funnel trap *Charles Thomas/AWC*

Radio-tracking showed high survival of reintroduced individuals, however, Brown Antechinus have been difficult to detect in subsequent monitoring surveys. Occasional records show the species is persisting and breeding on North Head. However, as the Brown Antechinus has a high annual mortality rate (all males die after the breeding season, and females are also relatively short-lived), AWC intends to continue supplementation of this species until establishment of the population on North Head can be demonstrated.

Through the reintroduction of these three species, AWC has increased the native mammal assemblage on the headland from five to eight species. These wildlife reintroductions are helping to restore the ecological role of pollination undertaken by small native mammals on North Head and in doing so, secure the future of the endangered Eastern Suburbs Banksia Scrub community as well as the native wildlife that find refuge there.



Mala is one of 10 species which will be translocated to Newhaven Wildlife Sanctuary Wayne Lawler/AWC

Translocation program set to secure the future of 21 threatened species

By Dr John Kanowski, Chief Science Officer

Australian Wildlife Conservancy is a leader in the reintroduction of threatened mammals to secure, feral predator-free areas. To date, AWC's reintroduction program has resulted in the establishment of secure populations of 11 species of threatened mammals across a total of five feral predator-free areas (Faure Island, WA, and four fenced areas – Karakamia, Mt Gibson, Yookamurra and Scotia). A further three fenced areas – at Newhaven, Pilliga and Mallee Cliffs – are on target to become fully operational in 2019. Together with the existing program, reintroductions of locally-extinct mammals to the new sites are expected to secure populations of 21 species of threatened mammals by 2023.

Predation by feral cats and foxes is the primary cause of extinction of small to medium-sized native mammals. Many mammal species in the 'critical weight range' – between 35 grams (the size of a native rodent) to 5.5 kilograms (the size of a small wallaby) – have been eliminated from large areas of their former ranges. As a consequence, much of southern and central Australia is devoid of most native terrestrial mammals between the size of a mouse and a kangaroo (Fig. 1 on page 40).

Some species, such as the Lesser Bilby (*Macrotis leucura*) which is AWC's emblem, the Pig-footed Bandicoot (*Chaeropus ecaudatus*) and Crescent Nailtail Wallaby (*Onychogalea lunata*), are completely extinct. Others, including the Greater

Bilby (*Macrotis lagotis*), Numbat (*Myrmecobius fasciatus*) and Bridled Nailtail Wallaby (*Onychogalea fraenata*), still persist in the wild, but in a fraction of their former range.

The extinction and decline of mammals within the critical weight range represents a shocking degradation of Australia's biological riches and has resulted in the decay of long-standing ecological processes. Many small to medium-sized native mammals are 'ecosystem engineers,' digging deep pits when foraging and burrows for resting. These diggings help retain precious surface water and nutrients in semi-arid ecosystems. In addition, the foraging activities of native mammals affects the abundance of soil and leaf litter invertebrates, the fate of seeds and the recruitment of plants. The loss of native mammals, such as the Bilby and Numbat, therefore constitutes a loss of ecosystem integrity. Trees and shrubs may persist in the landscape, but the processes that have been integral to the formation of the Australian bush have invisibly slipped away across much of the continent.

AWC's reintroduction programs

AWC has already undertaken the successful reintroduction of 11 threatened mammal species to five sites – more than any other organisation in Australia. Recent AWC projects have set new benchmarks in rewilding with, for example, eight threatened mammal species restored to Mt Gibson, and

similarly ambitious, multi-species projects planned for Pilliga, Mallee Cliffs and Newhaven.

Halting and restoring Australia's lost biodiversity

AWC's reintroduction programs are successfully restoring populations of native mammals that are most vulnerable to predation by feral cats and foxes. For example, AWC sanctuaries currently support secure populations of six of the 12 species of Australian mammals considered 'extremely vulnerable' to feral cats and foxes (Radford et al. 2018), with a seventh species – the Central Rock-rat (*Zyromys pedunculatus*) – proposed for reintroduction to AWC's Newhaven project. In addition, AWC's reintroduction program currently supports secure populations of nine of the 51 species of Australian mammals considered 'highly vulnerable' to feral cats and foxes, with another four species – Western Quoll (*Dasyurus geoffroi*), Golden Bandicoot (*Isodon auratus*), Northern Bettong (*Bettongia tropica*) and Plains Mouse (*Pseudomys australis*) – proposed for reintroduction to one or more of AWC's rewilding projects.

AWC's reintroduction program is one of Australia's few stand-out success stories in the conservation of native mammals. For example:

- The Greater Bilby has been reduced to fewer than 10,000 individuals in the wild (Woinarski et al. 2014). AWC has reintroduced the Bilby

Mammal Species Extinct or in Decline

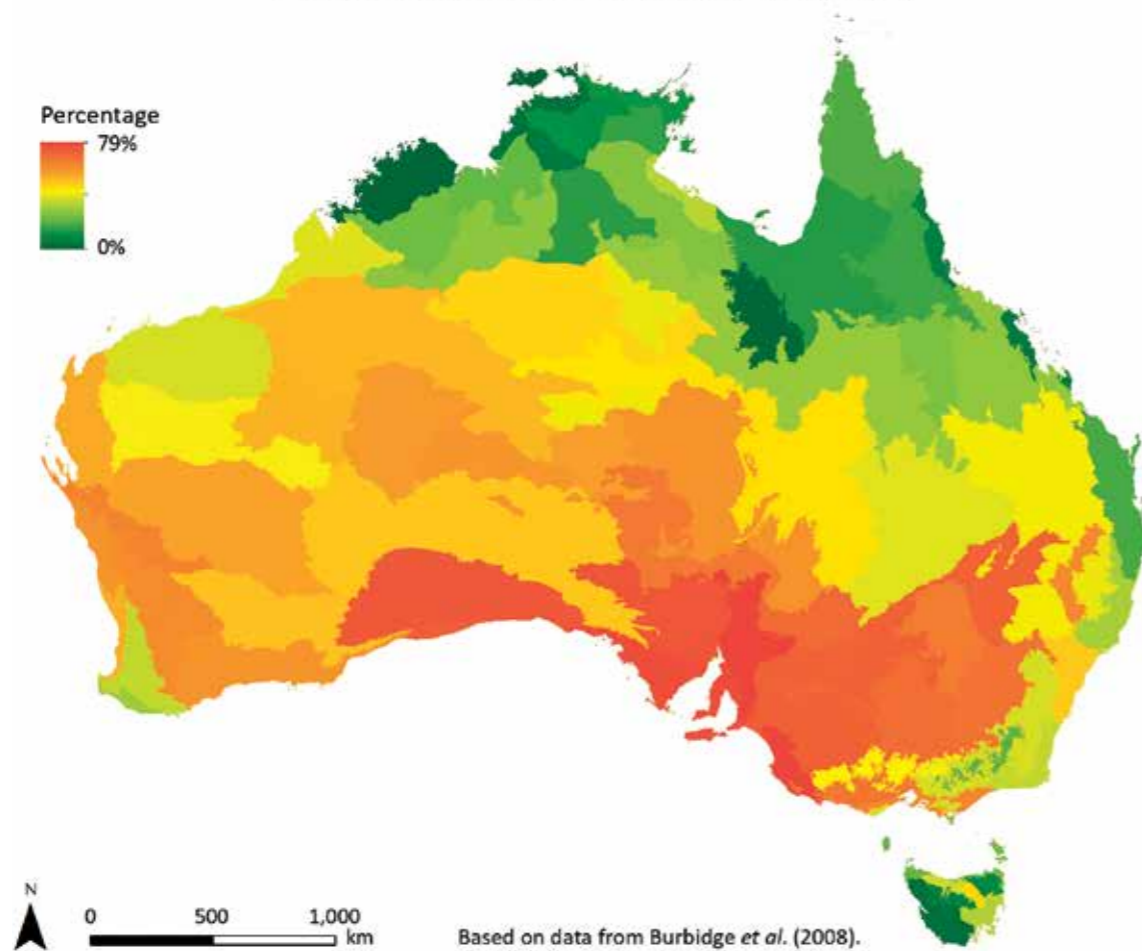


Figure 1. Map of the spatial pattern of the extinction and decline of Australian terrestrial mammals. Colours show the proportion of the fauna that has gone extinct or has declined by at least 50% in range by each bioregion. Data from Burbidge et al. (2008). Map ©Tani Cooper/ AWC.

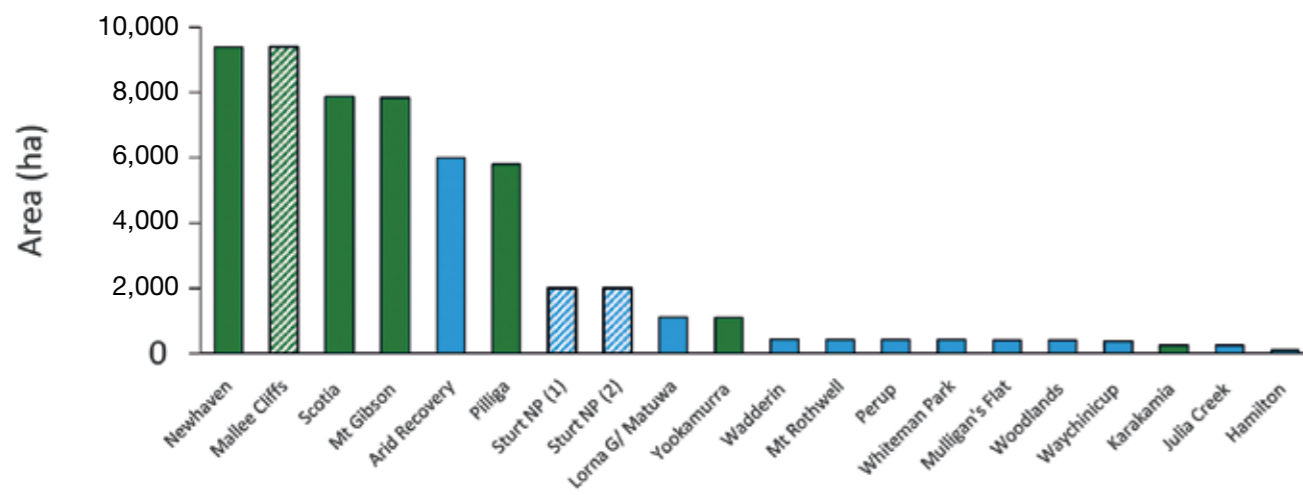


Figure 2. Graph showing the size of fenced feral predator-free areas currently operational in Australia. Green = AWC; Blue = other organisations. Hatched = projects still in development.



A juvenile Numbat Wayne Lawler/AWC

to four feral predator-free areas (including to the Pilliga where they have been absent for more than 100 years). Further reintroductions of Bilbies to two new sites are planned over the next two years. Collectively, AWC's fenced areas currently support around 1,500 Bilbies. This number is expected to double as new projects mature.

- The Numbat, reduced to fewer than 1,000 individuals in remnant populations in south-west Australia, has been reintroduced to three of AWC's feral predator-free areas (with another two planned); these populations currently support 300 to 500 Numbats (up to 50 per cent of the global population), with a similar number expected to be added in AWC's new projects.
- The Bridled Nailtail Wallaby has been reduced to one remnant population, of around 500 individuals, at Taunton National Park in Queensland. AWC's Scotia Wildlife Sanctuary supports around 1,000 individuals. Reintroductions planned to fenced areas at Pilliga and Mallee Cliffs in 2019 and 2020, respectively, are each expected to support populations of a similar size.

AWC's reintroduction program also contributes to the restoration of ecological processes at each site. At Scotia the many signs of animal activity within the fenced area can be clearly seen as the populations of Bilbies, Bettongs and Numbats dig burrows and excavate foraging pits. As AWC's reintroduction projects mature, we expect to see a similar restoration of the soils and ecosystem processes at other sites.

AWC ecologists are measuring key variables, including diggings, as part of our Ecohealth monitoring program. In addition, we are collaborating with a number of external researchers on the restoration of other components of the ecosystem, such as invertebrate assemblages.

A major contribution to biodiversity conservation

AWC's programs to reintroduce threatened mammals to feral predator-free areas are making a crucial contribution to conservation in Australia by:

- increasing the number of secure populations – and global population size – of threatened mammals;
- restoring regionally-extinct mammals to parts of their former range, thereby helping to maintain the long-term

adaptive potential of these species; and

- playing a crucial role in the restoration of Australian ecosystems, as threatened mammals participate in a number of important ecological processes including herbivory, seed and spore dispersal, soil engineering and predation.

The establishment of additional feral predator-free areas is a priority action in the Commonwealth Government's Threatened Species Strategy and an important component of the conservation strategies of a number of State Governments, including Western Australia and New South Wales.

AWC is by far the leading proponent of the establishment and rewilding of feral predator-free areas in Australia. With AWC's network of feral predator-free areas rapidly expanding, we have an ambitious plan to undertake 27 translocations of 15 species over the next 12 to 24 months – more translocations than we have previously undertaken in the history of AWC. Indeed, the scale of this translocation program is without parallel in Australia. The future of 21 threatened native mammal species is likely to be secured as a result, representing an astonishing return on investment.



AWC Ecologist Dympha Cullen with a Mulgara that was captured, assessed for condition and released during a fauna survey at Newhaven Wildlife Sanctuary Wayne Lawler/AWC

\$2 million Matching Challenge set to save Australia's endangered wildlife

By Shauna Chadlowe, Chief Development Officer

Inspired by the rapid progress we are making to bring significant, large scale projects to fruition, The JAAM Foundation and The Martin Copley Will Trust have made a stunning offer – to match eligible donations up to a total of \$2 million.

Australian Wildlife Conservancy (AWC) is driven by a strong sense of urgency; to halt the rapid decline of Australia's unique biodiversity and restore our natural capital before the nation's narrow window of opportunity closes.

Australia already has the worst rate of recent mammal extinctions in the world. Despite governments spending billions of dollars on conservation, the shocking, and irreplaceable loss of wildlife (around 10 per cent of Australia's mammal fauna is now extinct) continues unabated. This relentless decline of Australia's biodiversity, and the failure of governments to stem the tide of extinctions, is what inspired our founder, Martin Copley, to establish AWC in the first place. It is also what continues to motivate all of us – from our generous donors to AWC's dedicated team of staff, Board members and volunteers – to support AWC and carry out the work we do to protect Australia's wildlife and habitats.

"Extinction is not inevitable. It is a failure ... a theft from the future that is entirely preventable. We can and should prevent extinctions, and safeguard and celebrate the diversity of Australian life."

*Dr John Woinarski, Sarah Legge, Stephen Garnett,
The Conversation, 5 March 2019*

AWC is successfully delivering ground-breaking projects and partnerships set to make a game-changing difference to the future of Australia's threatened wildlife and the shape of conservation in Australia. The next two years in particular are crucial for AWC as we embed these partnerships, undertake the most ambitious endangered mammal translocation program in Australia's history and see major ongoing science and land management projects implemented.

"While the challenges ahead are significant, my father Martin Copley, would have been proud to see the progress AWC is making to save wildlife from extinction and restore Australia's amazing biodiversity."

*Sophie Chamberlain, Trustee,
The Martin Copley Will Trust and AWC Board Director*

Inspired by AWC's progress, and to help accelerate our work on some of the country's most important conservation projects, Sophie Chamberlain via The Martin Copley Will Trust has joined forces with Andrew and Jane Clifford via the The JAAM Foundation to put forward a remarkably generous offer to match donations up to a total of \$2 million.

Tax-deductible donations to AWC will be matched as follows:

- For new AWC donors, gifts greater than \$500 will be matched.
- For our existing AWC donors, all donations 10 per cent or greater than your gift in 2018 will be matched.

"AWC is pioneering a radical, science-based approach to conservation – one that delivers an exceptional ecological return on investment. The results are inspiring."

*Andrew Clifford,
The JAAM Foundation and AWC Board Director*

Empowered by your support, this inspirational gift from The JAAM Foundation and remarkable legacy gift by our late Founder, Martin Copley, AO, will enable AWC to implement ground-breaking projects that will generate outstanding outcomes for Australia's wildlife. Populations of threatened species like the Mala, Bilby, Purple-crowned Fairy-wren and Gouldian Finch will be secured – and their future safe-guarded for generations of Australians to celebrate. Please help AWC take advantage of this wonderful opportunity and help save Australia's threatened wildlife and habitats.

PLEASE HELP SAVE AUSTRALIA'S ENDANGERED WILDLIFE



\$2 Million Challenge: matching your donations to save endangered wildlife

The JAAM Foundation and The Martin Copley Will Trust will match eligible donations to help AWC save Australia's endangered wildlife up to a total of \$2 million.

To make a tax-deductible gift and have your donation doubled as part of the \$2 Million Challenge appeal, please donate below.



Please post this donation form/cheque/money order to:

Australian Wildlife Conservancy, Reply Paid 8070 Subiaco East WA 6008 | Phone: (08) 9380 9633 | Donate online: www.australianwildlife.org

Name: Dr/Mr/Mrs/Ms _____

Address: _____

Suburb: _____ State: _____ Postcode: _____

Telephone: W _____ H _____

Email: _____

CREDIT CARD DETAILS

MasterCard Visa AMEX Diners

_____/_____
Card Number Expiry Date

Cardholder name: _____

Signature: _____

MONTHLY PLEDGE

I wish to become a regular supporter and give a **tax deductible**

donation each month of: \$25 \$50 \$100 \$ _____
Other (minimum \$10)

I wish to pay by: **Direct debit from my bank account**

Please fill in Direct Debit Request (see opposite).

Credit card - Please fill in details or call (08) 9380 9633

DIRECT DEBIT REQUEST

I / We request that you draw by way of the Direct Debit System, \$ _____ per month, for the payment of a monthly donation to Australian Wildlife Conservancy Fund.

My / Our Account details are:

Institution: _____

Account Holder Name: _____

Account Number: _____ BSB: _____

I / We acknowledge that this Direct Debit Request is governed by the terms of the "Direct Debit Client Service Agreement" (set out below).

Signature: _____ Date: _____

Print Name: _____

DONATION

I would like to make a **single tax deductible donation** of:

\$100 \$300 \$500 \$1000 \$5000 \$ _____
Other (minimum \$10)

I wish to pay by: **Credit card** - Please fill in details or call (08) 9380 9633

Cheque/Money Order - (enclosed)
Payable to the **Australian Wildlife Conservancy Fund**.

BEQUESTS

I am interested in making a bequest in my Will. Please send me some information.

INFORMATION

Please tick this box if you do NOT wish to receive news and information on our latest initiatives and progress.

Please send any news or information by email only.

Our Commitment to You, Drawing Arrangements:

- We will advise you, in writing, the details of your monthly donation to Australian Wildlife Conservancy (amount, frequency, commencement date) at least 3 calendar days prior to the first drawing. Thereafter each drawing will be made on the 15th day of each month (or part thereof as specified).
- Where the due date falls on a non-business day, the drawing will be made on the next working day.
- We will not change the amount or frequency of drawings arrangements without your prior approval.
- We reserve the right to cancel your monthly donation to Australian Wildlife Conservancy if three or more drawings are returned unpaid by your nominated Financial Institution and to arrange with you an alternative payment method.
- We will keep all information pertaining to your nominated account at the Financial Institution, private and confidential.
- We will promptly respond to any concerns you may have about amounts debited to your account.
- We will send a receipt within 45 days of the conclusion of the financial year summarising your entire year's gifts for tax purposes.

Your Rights:

- You may terminate your monthly donation to Australian Wildlife Conservancy at any time by giving written notice directly to us (PO Box 8070 Subiaco East WA 6008), or through your nominated Financial Institution. Notice given to us should be received by us at least 5 business days prior to the due date.
- You may stop payment of a monthly donation by giving written notice directly to us (PO Box 8070 Subiaco East WA 6008), or through your nominated Financial Institution. Notice given to us should be received by us at least 5 business days prior to the due date.
- You may request a change to the donation amount and/or frequency of the monthly donations by contacting us on (08) 9380 9633 and advising your requirements no less than 5 business days prior to the due date.
- Where you consider that a drawing has been initiated incorrectly (outside the monthly donation to Australian Wildlife Conservancy arrangements) you may take the matter up directly with us on (08) 9380 9633, or lodge a Direct Debit Claim through your nominated Financial Institution.

Privacy

AWC collects personal information to process donations, issue tax deductible receipts and to contact you. AWC's full privacy policy is available at www.australianwildlife.org/privacy.

Your commitment to us, Your responsibilities:

- It is your responsibility to ensure that sufficient funds are available in the nominated account to meet a drawing on its due date. (You may be charged a fee by your Financial Institution if the account details are incorrect or there are insufficient funds in the nominated account when we attempt to deduct donations.)
- It is your responsibility to ensure that the authorisation given to draw on the nominated account, is identical to the account signing instruction held by the Financial Institution where your account is based.
- It is your responsibility to advise us if the account nominated for transactions with the Australian Wildlife Conservancy Fund is transferred or closed.
- It is your responsibility to arrange a suitable alternative payment method with us if the Australian Wildlife Conservancy Fund drawing arrangements are cancelled either by yourselves or by your nominated Financial Institution.
- Please enquire with your Financial Institution if you are uncertain whether direct debit functions are available on your account. (You may be charged a fee by your Financial Institution if the direct debit facility is not available on your account.)