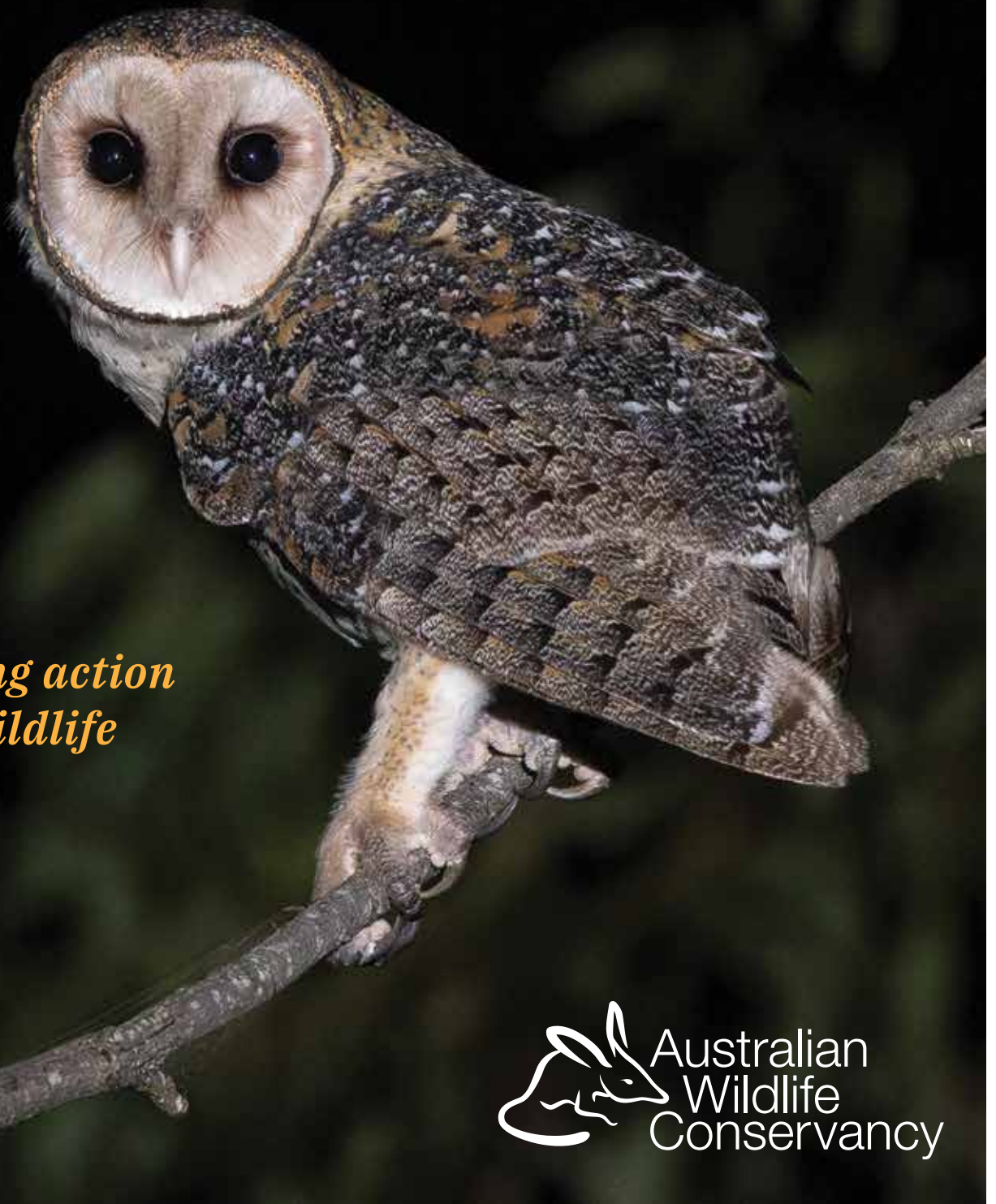


wildlife matters

Issue 47 | May 2024



*Taking action
for wildlife*

 Australian
Wildlife
Conservancy

Contents

- 04 Waulinbakh Wildlife Sanctuary
- 10 A bird in the hand
- 16 The feral catastrophe
- 18 Partners in conservation
- 24 Spotlight on bandicoots
- 26 Training the next generation of conservation leaders
- 28 Care and commitment to Country
- 32 From bytes to biodiversity
- 34 A joey in the pouch



Australian Wildlife Conservancy (AWC) is a global leader in conservation, providing hope for Australia's wildlife with a science-informed, land management partnership model that delivers high impact results.

The mission of 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 owns sanctuaries, manages land or works in partnership to deliver conservation across Australia's vast landscape.
- Implementing practical, on-ground conservation programs to protect wildlife. These programs include feral animal control, fire management, weed eradication and the translocation of threatened species.
- Conducting (either alone or in collaboration with other organisations) scientific research that will help address the key threats to native wildlife.
- Hosting visitor programs at our sanctuaries for the purposes of education and promoting awareness about the plight of Australia's wildlife.

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

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

Explore these stories and more
by watching our regular



Scan the QR code
to watch previous episodes
and subscribe for more



Cover image:
An otherworldly Masked Owl at Waulinbakh Wildlife Sanctuary in New South Wales.
Brad Leue/AWC

For references see online articles
www.australianwildlife.org

Copyright © Australian Wildlife Conservancy, 2024





CEO MESSAGE

Australian Wildlife Conservancy's mission is the effective conservation of all Australian wildlife and habitats.

This is ambitious, but as a nation ambition is what we need with our conservation goals. Every new species added to AWC's sanctuary inventory lists is important and I'm thrilled to share the animals we've encountered at Waulinbakh Wildlife Sanctuary – newly renamed from Gorton Forest – just north of Sydney, including the Superb Lyrebird and shy Parma Wallaby (page 4). Waulinbakh is located in a biodiversity hotspot of international significance, making conservation here a critical contribution to global biodiversity.

Although these new records are positive, as a country the situation is grim. We are witnessing an unrelenting decline; over the last two decades, populations of threatened bird, mammal and plant species have declined by 3% each year on average – an overall decline of 61%. In 2023, a record 130 species were added to the national Threatened Species List and 33 species were uplisted to a higher threat category. Clearly, urgent action is needed to protect threatened wildlife and wild places, and chart a course to recovery.

Feral cats (and their interactions with inappropriate fire and feral herbivores) are the primary driver of the decline of small mammals in Australia. There are anywhere between 2.1 to 6.3 million feral cats across the continent, depending on conditions and time of the year, and each of those cats is eating around five native animals every night. The scale of their impact is mindboggling. This is why a core focus of AWC's operational strategy of conservation management is mitigating the impacts of feral cats (page 16).

AWC's safe havens, such as those established in NSW national parks (page 18), are up to ~10,000 hectares (for

reference, that's twice the size of Manhattan, NY). The fences you help build and maintain stand at 1.8 metres tall, are fitted with a skirt along the bottom to prevent feral animals from digging in, two electrified hotwires and an unsteady floppy top to prevent feral predators from climbing in. With your support, AWC eradicates threats within these fenced areas and reintroduces animals that typically can't withstand the pressure of feral cats, like bandicoots, bilbies and bettongs.

Your support also enables us to look ahead to a future beyond fences, by increasing our understanding to establish populations of native mammals outside of fenced areas, with new technologies improving our capacity to suppress feral predators (page 32).

Our best hope for effective conservation is to nurture the knowledge and skills of young conservation leaders, uniting broad experiences and cross-cultural perspectives (page 26). The climate and biodiversity crises are linked, and it is impossible to solve one without the other. The next decade will be a critical time for restoring wildlife and habitats, both in Australia and around the world.

AWC's practical model and the high impact results we are delivering demonstrate that we know what to do and how to do it. Your support is needed to accelerate our tried and tested action plan for wildlife before it's too late.

Together we can stand between threatened species and extinction.

Tim Allard
Chief Executive



Waulinbakh Wildlife Sanctuary, just north of Sydney, is home to threatened species like the endangered Greater Glider. Brad Leue/AWC



Waulinbakh Wildlife Sanctuary

Exciting progress one year on at Gorton Forest

ALANA BURTON, AWC SCIENCE COMMUNICATOR

Less than three hours from Sydney, amongst an endless canopy of green, Waulinbakh Wildlife Sanctuary protects 3,970 hectares on the Traditional Land of the Worimi People.

The new sanctuary name was chosen after consultation with representatives from Gloucester Worimi First Peoples Aboriginal Corporation and Cook Family of Barrington Aboriginal Corporation. Waulinbakh translates to 'Grey Gum Place' in Gathang, the language spoken by Birrbay (Biripi), Guringay (Gringai) and Warrimay (Worimi) people.

Over the past 12 months, AWC has kickstarted the delivery of foundational conservation science and land management programs on sanctuary, with operations led by Senior Land Management Officer – and Waulinbakh's newest resident – Josh Guthrie.

PRELIMINARY SURVEY FINDINGS

Perhaps the most exciting achievement at Waulinbakh to date has been the extensive biodiversity monitoring conducted as part of the sanctuary's inaugural Ecohealth program, utilising traditional observational methods together with remote-monitoring survey methods (camera traps and bioacoustic monitors) and trialling the cutting-edge technique of airborne DNA sampling. The monitoring is providing crucial baseline data against which the impacts of our work can be quantified over time, guiding management activities and informing ongoing conservation objectives to maximise outcomes for biodiversity.

While data from these inventory surveys is still being analysed, preliminary results are extremely encouraging, with more than 160 species already confirmed on sanctuary. Bioacoustic recordings have captured a symphony of bird calls, from the familiar cackle of the Laughing Kookaburra to the wailing call of the Green Catbird and melodic whistle of the Yellow-throated Scrubwren. New Holland Honeyeaters have been detected darting between blooming native flowers, while intricately patterned Brown Quails and aptly named Superb Fairy-wrens have been spotted foraging in the leaf litter below. The forest floor is also confirmed to be home to snuffling Short-beaked Echidnas, Long-nosed Bandicoots, antechinus (notorious for 'mating to death') and multiple wallaby species, such as the Red-necked Pademelon and the Swamp Wallaby, while velvety Greater Gliders feed quietly in the treetops.

AWC is thrilled to share some truly special wildlife encounters. We can now confirm that Waulinbakh is home to the Parma Wallaby (a small wallaby once thought to be extinct, and listed as Vulnerable nationally), Superb Lyrebird (adding this iconic Australian species to the percentage of birds AWC protects nationally), and Koala (listed as Endangered in the ACT, NSW and QLD). The sanctuary is located in an Area of Regional Koala Significance recognised by the NSW Government.

DELIVERING SCIENCE-INFORMED CONSERVATION LAND MANAGEMENT

In order to maintain critical habitat and refuges for this incredible suite of species, early conservation activities have focused immediately on reducing threats in the landscape.

A core component has been extensive weed control efforts, delivered through painstaking manual removal and the targeted use of herbicides. To date, the removal of lantana has been a particular focus – left uncontrolled, this Weed of National Significance forms dense, impenetrable thickets, reducing soil animal and plant diversity and the availability of native habitat. AWC is utilising the knowledge and experience gained from successfully controlling similar lantana infestations at other sanctuaries in eastern Australia to improve habitat quality at Waulinbakh and support the regeneration of

native vegetation such as spotted gum, grey ironbark, and tallowwood.

Another initial priority has been the development of a bespoke burn plan, ready for implementation in the cooler months of 2024. AWC's Peter Stanton – one of Australia's most experienced forest fire experts – will provide strategic advice as a long-term fire management plan is developed. Given the sanctuary acts as an important wildlife corridor, surrounded on three sides by significant natural forest and sharing a boundary with Ghin-Doo-Ee National Park and Myall River State Forest, South-east Regional Operations Manager Aled Hoggett has been liaising with neighbouring landholders, NSW National Parks and Wildlife Service and NSW Rural Fire Service to ensure that fire management activities at Waulinbakh are implemented in a way that can deliver ecological benefits for the broader region.

“I was already excited by the conservation potential of Waulinbakh. After spending more time on sanctuary, I am frankly astounded. The forest across the sanctuary is as diverse, and in as good an ecological condition, as any I have seen on the mid-north coast. As conservation activities are delivered, it will only become more impressive over time.”

Aled Hoggett, AWC Regional Operations Manager (South-east)

NEXT STEPS FOR WAULINBAKH

Thanks to the generosity of Andrew and Jane Clifford, Richard Harding and all of AWC's incredible supporters, Waulinbakh has made remarkable progress over the past year. Key priorities over the next 12 months include:

- continuing to develop relationships with Traditional Owners
- delivering ongoing fire management in line with the sanctuary's annual burn plan
- expanding weed control efforts
- commencing feral animal management (with a focus on areas where cats and foxes have been identified as present in recent surveys)
- conducting detailed ecological surveys
- developing key infrastructure (including staff accommodation and establishing an operations base)
- hosting volunteer programs and sanctuary events.

We look forward to providing you with the opportunity to experience this stunning sanctuary first-hand.

Your donation can support the removal of invasive weeds that suffocate native plants and limit food resources for wildlife.



[Above] The New England Leaf-tailed Gecko is a master of camouflage. *Brad Leue/AWC*

[Below] The wailing song and mechanical clicks of the Green Catbird can be heard in rainforest habitat at Waulinbakh Wildlife Sanctuary. *Brad Leue/AWC*

Brad Leue/AWC



Superb Lyrebird

Menura novaehollandiae

The Superb Lyrebird is famously an expert imitator. Along with their own territorial calls and whistles, the species is capable of mimicking almost any noise in their environment, particularly the sounds of other native birds. Superb Lyrebirds have powerful legs and long toes and claws that rake through soil and leaf litter to feed on insects, worms, spiders, seeds and other small invertebrates. The male has an ornate tail of spectacular curved feathers. Possessing short, rounded wings, the Superb Lyrebird is a predominantly ground-dwelling species but will take to trees at night to roost. This is the only AWC sanctuary or partnership area that Superb Lyrebirds occur on and confirming their presence adds the species to the percentage of birds AWC protects nationally.

wildlife matters

8

Glossy Black-Cockatoo

Calyptorhynchus lathami

The smallest of the black-cockatoos, Glossy Black-Cockatoos feed exclusively on the seeds of she-oaks (*Allocasuarina*). Perched quietly in groups of two or three, the first sign these birds are near is often the click-click sound of their beaks as they crack open the woody seed cones and drop discarded debris to the ground. Adults are brownish-black, males with a flash of red in the tail feathers, while females have irregular blotches of yellow on their head and bars of orange-red in their tail. Like many Australian birds, Glossy Black-Cockatoos require forest with large, mature trees with hollows to use as nesting sites – like the habitat found at Waulinbakh. Around 38% of the range of Glossy Blacks in south-eastern Australia was burnt in the 2019–20 Black Summer fires, which destroyed and damaged nest hollows and killed fire-sensitive she-oaks on which they depend for food.

Joey Clarke/AWC



Brad Leue/AWC



Masked Owl

Tyto novaehollandiae

The Masked Owl is a nocturnal hunter which preys mostly on small mammals like mice, rats, bandicoots, and antechinus; supplemented occasionally with possums, gliders and birds. They hunt mainly by sound, their impressive facial disc functioning like a satellite dish to pick up and focus on the faintest rustles in the undergrowth. Masked Owls are among the largest in the barn owl family. They can be distinguished by their thickset feathered legs; bulky, hunched posture; and dark, mottled and speckled plumage. They depend on large hollows in which to nest, and prefer to hunt along the gradient between closed and more open forest habitats. The presence of this species at Waulinbakh is likely a reflection of a high density of terrestrial mammals.

Brad Leve/AWC



New England Leaf-tailed Gecko

Saltuarius moritzi

At up to 20 centimetres long, leaf-tailed geckos are some of the largest Australian geckos. These nocturnal lizards are masters of camouflage. Their roughly textured skin perfectly matches the lichen-covered boulders and tree trunks where they cling, face-down, waiting in ambush for unsuspecting crickets or arthropods to eat. This species was only described in 2008, and lives in forest habitats in New South Wales between the Hunter River and the Clarence River. Large, old trees and fallen hollow logs form important habitat for this gecko. At the time of writing, the New England Leaf-tailed Gecko is under assessment to be listed as Endangered; approximately 44% of its range was burnt in the 2019–20 Black Summer fires, and it is also likely threatened by feral predators.

Parma Wallaby

Notamacropus parma

The Parma Wallaby is a generally solitary marsupial and the smallest known member of the *Notamacropus* genus, with grey-brown fur, a dark dorsal stripe and a light grey belly and chest. A rare and highly cryptic species endemic to New South Wales, the Parma Wallaby is patchily distributed and was once believed to be extinct until being rediscovered in the late 1960s. The species prefers to live in wet sclerophyll forest with dense understorey and nearby grassy areas. Parma Wallabies are largely nocturnal, spending their days resting amongst shrubby vegetation before emerging in the evening through worn runways to feed near the edge of clearings. The detection of the Parma Wallaby on sanctuary is major news for the species, which was recently listed as Vulnerable. AWC's core conservation land management activities will deliver critical recovery actions to support the persistence of this threatened marsupial.

AWC



Land Mullet

Bellatorias major

The Land Mullet takes home the trophy as Australia's largest skink. This robust reptile can grow up to 60 centimetres in length, making it one of the largest skink species in the world. Elusive and shy, the Land Mullet is notoriously difficult to spot, seeking shelter in fallen logs or in burrows amongst fallen tree root systems. The species is omnivorous, feeding on berries, fungi, seeds, fruits and insects. Land Mulletts are live-bearing reptiles with prolonged parent-offspring association, often living in small family groups. With glossy black scales, these skinks are diurnal heliotherms, spending long periods of the day basking in patches of sunlight to achieve a body temperature of around 30°C. Given the skink's potential vulnerability to predation from feral cats and foxes, the management of invasive predators at Waulinbakh will be essential to safeguarding the species here.

Craig Robbins/iNaturalist





A bird in the hand

*DR HELENA STOKES, AWC WILDLIFE ECOLOGIST
DR JON COLEMAN, QUEENSLAND BIRD RESEARCH AND BANDING GROUP*



A beautiful Blue-winged Parrot at AWC's Bowra Wildlife Sanctuary in Queensland is an unusual capture near the edge of its distribution.
Jon Coleman/Queensland Bird Research and Banding group



From the rainforest-cloaked peaks of North Queensland to the arid mulga woodland in the south-west of the state, scientists have embarked on long-term monitoring of bird populations by catching birds and fitting them with metal leg bands. The technique yields rich information about the birds that live in these places. Bird banding offers answers to questions such as: how long do individual birds live for? Which species are likely to stay in one place their whole lives, and which ones move around? And, is the composition of bird species shifting over time? These studies make an important contribution to AWC's efforts to understand the ecosystems we manage and to monitor their health through time.

WHY BAND BIRDS?

Bird banding (or bird ringing) has been used for many decades; it was one of the earliest scientific methods used to track migrating birds. With continued advances in technology and so many monitoring methods available nowadays for scientists to use, a question often asked is whether there is still a need for the direct capture, handling and banding of birds. The short answer is yes. While technological advances are rapidly changing the way AWC and other researchers monitor wildlife populations, there are some questions we can't answer at present without capturing and handling birds. Bird banding enables us to individually identify birds, which helps us to investigate longevity, movement, health and body condition, behaviour and social structure, breeding success and productivity. Bird banding in Australia is overseen by the Australian Bird and Bat Banding Scheme, who license banders, coordinate the distribution of bands and collate data on when and where birds are banded. Bands are usually fitted around the bird's lower leg (or tarsus), with the size and shape of bands widely varying according to different bird species.

Most bird banders are dedicated volunteers, and this includes Dr Jon Coleman and the Queensland Bird Research and Banding Group who have established projects on two of AWC's Queensland wildlife sanctuaries – Bowra and Brooklyn. Jon has established multiple permanent catching sites on each sanctuary, which are visited annually or seasonally, where he and his team set up 'mist nets' to capture birds in the area. Here we delve into these projects, and explore how these findings help contribute to our knowledge of these species and AWC's Ecohealth monitoring program.

LIFE IN THE SEMI-ARID ZONE

Whilst the population ecology or life history characteristics of many Australian birds of the temperate zone are now well known, such information is sadly lacking for birds inhabiting the arid zone (which covers over half of the continent). Longevity or survivorship, productivity, territory size, local movements, breeding seasonality and moult strategies are known for only a handful of arid-adapted species.

Since 2013, every year a dedicated team of citizen scientists and volunteers has visited Bowra, near Cunnamulla in south-west Queensland on Kunja Country, to investigate the population and life history of birds inhabiting the semi-arid zone. To date, the Queensland Bird Banding and Research Group has banded a total of 10,328 individuals of 98 bird species at Bowra, with 617 birds from 37 different species having been recaptured. Analysis of results shows that rainfall is a major driver of many of the trends observed. Zebra Finches and Budgerigars are two of the first species to explode in number after rainfall. Both are well-documented boom-and-bust species of the arid and semi-arid zone, and make a large contribution to the high numbers of birds caught in 'wet' years (indeed, many of the team reminisce on a particularly busy morning in 2022, when a whole flock of budgies flew into a mist net). High numbers of these granivorous species following high rainfall may not be surprising. However, after 10 years of mist netting surveys, we are starting to see more subtle changes in the trends of other bird species, some of which we know far less about.

White-plumed Honeyeaters, for instance, also increase in number in response to rainfall, but more gradually compared to granivorous species; suggesting that partially nectivorous birds such as these likely take longer to rebound from drought conditions, like those experienced at Bowra from 2017 to 2019. On the other hand, we're seeing that for some of the insectivorous birds, including the Chestnut-rumped and Inland Thornbills, capture rates appear to remain relatively stable; they appear to be more resilient to the fluctuating rainfall and often harsh conditions of the arid zone, being less reliant on the availability of seed and flowering plants.

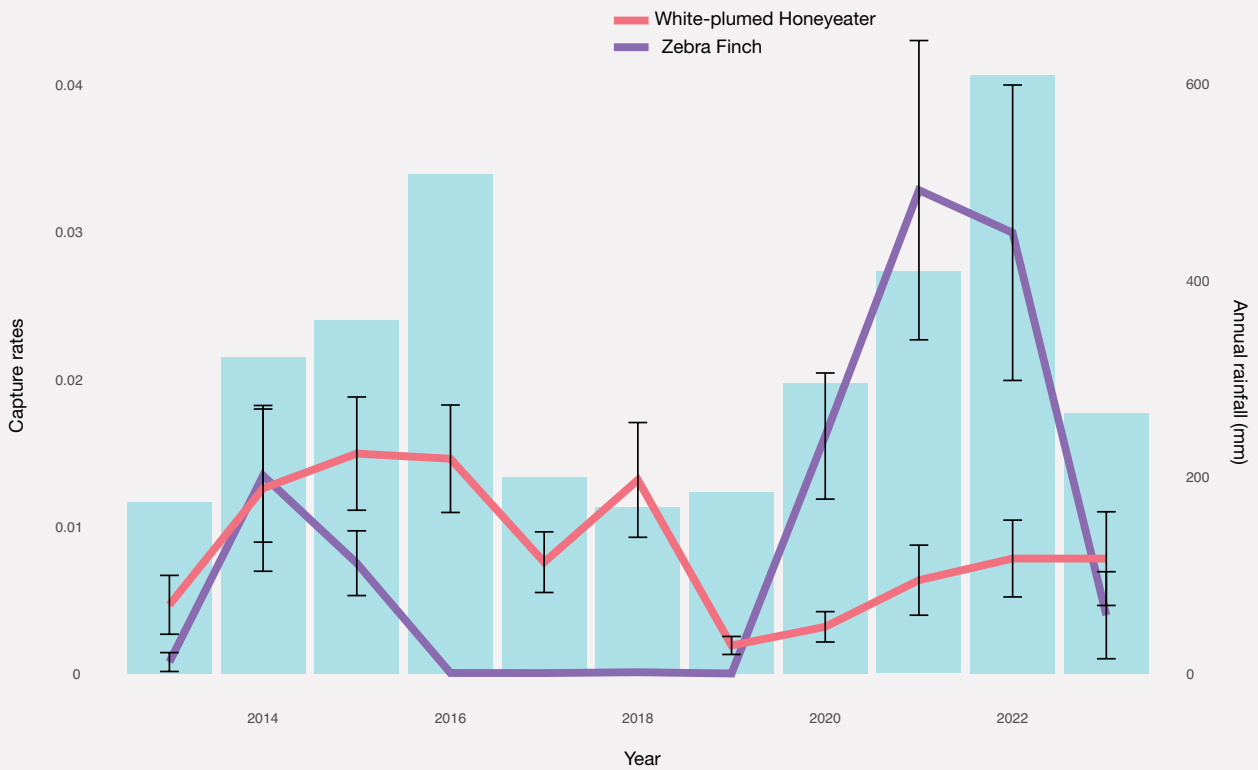
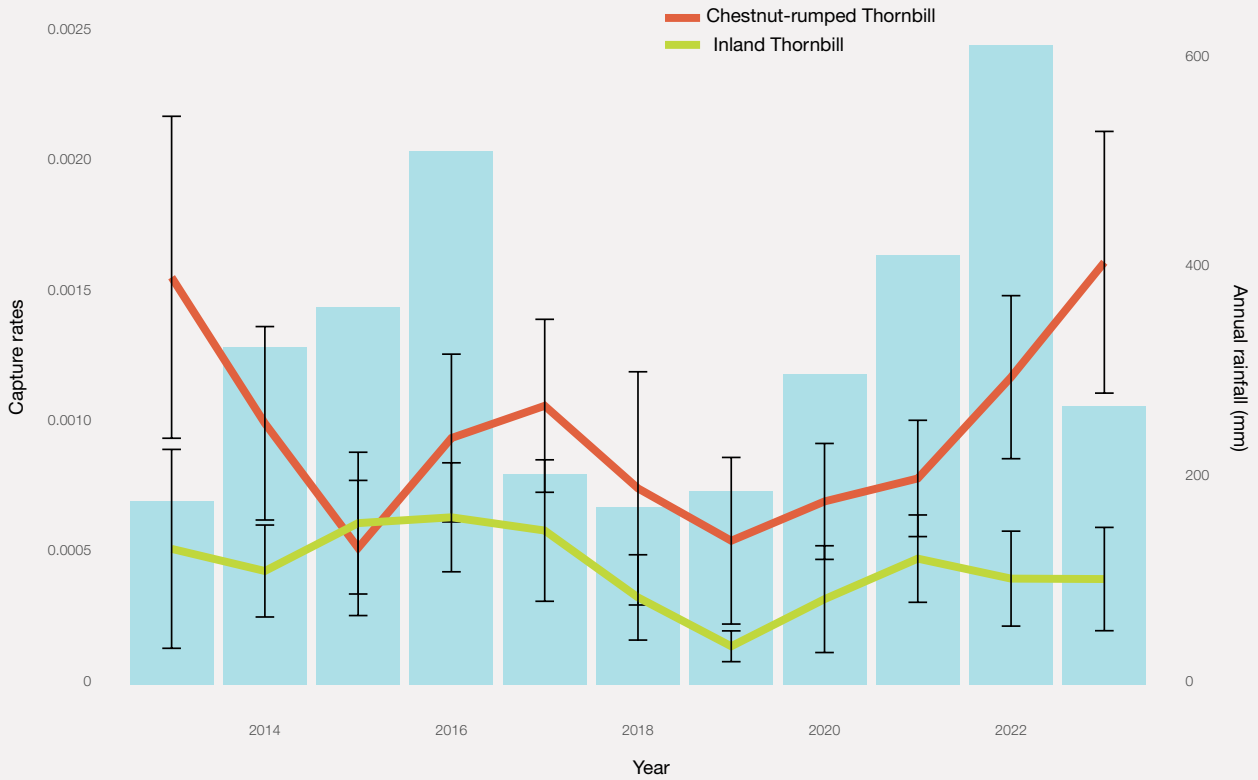
We're also discovering some interesting life history information. Take Hall's Babbler, for instance. These chattering, sociable birds are a mulga specialist of inland Queensland and northern New South Wales, about which little is known. Last year a recaptured individual

“This very informative article covers my two favourite birdwatching places in Queensland: Bowra and Mt Lewis on the eastern boundary of Brooklyn. I haven't seen the elusive Blue-faced Parrotfinch at Brooklyn but have spent many hours looking (like many birdos). I have seen a Redthroat at Bowra. Research and fact finding are crucial for the wise management of important conservation properties like these.”

Brian Snape,
former President of BirdLife Australia
and long-time AWC supporter



The Grey-headed Robin is an indicator species in AWC's Ecohealth program at Brooklyn Wildlife Sanctuary in Queensland. *Mel Christl/AWC*



Banding is revealing subtle trends in bird populations at AWC's Bowra Wildlife Sanctuary. Populations of insectivorous birds, including the Chestnut-rumped and Inland Thornbills, appear to remain relatively stable over time. Granivorous birds like the Zebra Finch explode in numbers during wet years, while populations of the nectivorous White-plumed Honeyeater gradually increase in response to rainfall. Capture rates (number of captures per mist net hours) are means \pm standard error. Rainfall data for Bowra from Cunnamulla Post Office (station number: 044026), Bureau of Meteorology (2024).

[Right] Fieldwork in the Wet Tropics can present some unexpectedly large challenges. *Helena Stokes/AWC*

was confirmed to be at least eight years old: a longevity record for this species. Bowra is a well-known location for this species.

All this information helps us track fluctuations in these species in response to changes in climatic conditions, and can help us determine the efficacy of our land management. Wildlife at Bowra, like many places, is threatened by introduced predators and grazing pressure. Monitoring the trajectories of avian communities and individual species can help alert us to any sudden, unprecedented declines, which helps us to track how species and populations are responding to threats and threat management.

LIFE IN THE HIGH-ALTITUDE TROPICS

Since 2019, banding has also been conducted in a wildly different environment: the high-altitude tropical rainforest of Brooklyn, north-west of Cairns, on Eastern and Western Yalanji Country in Far North Queensland. Researchers and volunteers brave the unpredictable weather conditions and leeches four times a year to set mist nets in the montane rainforest, an area of incredible biodiversity with several endemic bird species. This area is also a hotspot for the iconic Blue-faced Parrotfinch, which draws in bird watchers from all over Australia and overseas. Since 2019, the team have banded 974 birds of 33 species. We hope to discover more about the survival rates, movement and productivity of birds in this area, about which little is known, with this information being particularly important given the vulnerability of upland rainforests to climate change.

A variety of species have been caught so far, ranging from the Grey-headed Robin, one of our main indicator species, to the iconic Golden Bowerbird and feisty Spotted Catbird. There have been some surprising insights into the longevity of some of the bird species calling the montane rainforests home. Small birds such



as the Atherton Scrubwren and Mountain Thornbill have been determined to be at least 14 and 15 years old, respectively, and have each been caught at the same location they were originally caught, indicating high site fidelity. Being long-lived and sedentary, these birds are likely to be vulnerable to any habitat or environmental changes. Higher elevation birds captured at these sites, such as the Fernwren and Golden Bowerbird, are also likely to be highly susceptible to climate change, and likely to become more range restricted, being forced to move to increasingly higher elevations as temperatures rise. Monitoring these species is crucial in helping to determine how they respond to environmental changes, and their resilience.

Banding data also helps to inform modifications to our land management strategies. For example, the Blue-faced Parrotfinch is well known to utilise a unique patch of open grassy habitat on Brooklyn, surrounded by the rainforest (this patch was actually cleared for forestry operations many decades ago, and long-serving AWC ecologist, Peter Stanton, spent time working at the site early in his career). A recent decline in the sightings and capture rates of the parrotfinch prompted an investigation into weed and vegetation management in this area, helping us to tailor our management strategies to promote the persistence of food resources for the parrotfinches.

Long-term monitoring through projects such as those at Bowra and Brooklyn is essential. Population changes occur due to a combination of environmental and climatic variables, management changes and of course threats. It's not always straightforward to identify cause and effect for fluctuations in these avian communities, but the more we learn about the ecology of these species and identify these patterns, the better we can determine how to manage our sanctuaries into the future.

Your donation can help to maintain wild places by funding Ecohealth surveys.

The feral catastrophe

DR JOHN KANOWSKI, AWC CHIEF SCIENCE OFFICER

Australia has been an island for tens of millions of years. As a result, our country supports globally distinctive biota. The arrival of people at least 50,000 years ago resulted in substantial changes to the ecology of the continent; however, over time, a human-natural order was established, and a multitude of native species flourished.

The arrival of Europeans and other settlers in the last few centuries has resulted in a profound set of changes to the prevailing order, through the dispossession of the Traditional Owners, the conversion of native ecosystems to agriculture or their modification through pastoralism, and the introduction of species from other parts of the world.

Two of the most destructive introductions were the cat and fox. Cats arrived with the First Fleet and within a century had spread across the entire continent and most large islands. The fox was introduced 150 years ago; it spread throughout southern and central Australia, and to many islands. Both species are highly effective predators of native vertebrates. They are the primary cause of extinctions of native mammals, and of their continuing decline, and a major cause of decline of other vertebrate groups. Cat predation alone is a factor in the decline of 85% of Australia's threatened mammals, over 50% of Australia's threatened birds and reptiles, and 40% of Australia's threatened frogs.

Recent papers have estimated that feral cats and foxes kill around 1.5 billion native vertebrate animals a year in Australia, with another 250 million native animals killed by domestic cats. This is higher than the number of animals killed annually by land clearing, or by the 2019–20 'megafires' in south-east Australia. The 'average' feral cat is reported to eat over 600 native vertebrate animals a year, as well as a large number of insects.

WHAT IS AWC DOING?

For more than 30 years, AWC has been leading efforts to conserve native wildlife threatened by feral cats and foxes.

Safe havens

AWC has established the largest network of fenced feral predator-free areas on mainland Australia – which, together with a fenced area on Kangaroo Island, and the entirety of Faure Island in Shark Bay, Western Australia – comprise 10 cat- and fox-free sites, with a total area of just under 50,000 hectares.

We have reintroduced a total of 23 locally extinct mammal species (including 19 nationally threatened species) to these feral predator-free areas, increasing the number of secure populations and their global population size. These reintroductions have ensured species are exposed to selective pressures across the extent of their range (in particular, returning species to semi-arid environments), and have helped restore ecological processes at reintroduction sites. The establishment of feral predator-free areas also benefits populations of resident animals, especially terrestrial mammals, ground-active birds such as Malleefowl, and larger reptiles such as the Great Desert Skink, which are preyed-upon by cats and foxes.

'Outside the fence' projects

In the last few years, we have increased efforts to establish populations of native mammals susceptible to cats and foxes outside fenced areas. While this has long been part of AWC's practice, technological developments – such as cat-baits, grooming traps and canid pest-ejectors – have improved our capacity to suppress densities of feral predators to levels where some vulnerable native mammals can persist. 'Outside the fence' reintroductions are currently active at Mt Gibson, Western Australia. Here, we have successfully re-established populations of the Brushtail Possum and Chuditch (Western Quoll) in a circa 70,000-hectare predator-suppression area, and will attempt releases of the more predator-susceptible Woylie in 2024. The project is underpinned by a research program looking at: the response of cats and foxes to baiting; the survival, movements and habitat preferences of reintroduced mammals; and behaviours associated with the survival or mortality of reintroduced mammals.

Landscape-scale management

In northern Australia, AWC's fire management program – delivered over more than 7.5 million hectares – coupled with the ongoing control of feral herbivores, helps to reduce the intensity of cat predation over the vast areas of savannas and spinifex ecosystems we manage alone and with our partners in the Kimberley, Northern Territory and North Queensland. Research by AWC and collaborators has shown that cats prefer to hunt in open habitats, such as areas burnt by wildfire or grazed heavily by cattle. Our land management aims to maintain areas of dense ground cover to provide refuge for cat-susceptible species across the sanctuaries we manage.



Feral cats and foxes are the primary driver of native mammal extinctions in Australia. AWC is tackling this pervasive threat through the establishment of safe havens, outside the fence projects, management at scale and research. AWC

PC800 HYPERFIRE PRO

SILVER BULLETS?

AWC continues to engage with researchers investigating the potential of ‘synthetic biology’ (gene-drives and related methods) to create continental-scale, humane and safe methods of feral predator control. Although this is a rapidly growing field of science, boosted (like many) by recent advances in Artificial Intelligence and machine learning, realistically we are still decades away from a technical, socially acceptable ‘silver bullet’ type of solution.

GOING FORWARD

For the foreseeable future, it is critical that AWC continues to implement its existing, proven methods of conserving threatened native animals, through establishing and maintaining feral predator-free areas, progressing work on ‘outside the fence’ reintroductions (coupled with improved methods of feral predator control), and landscape-scale management of fire and feral herbivores in northern and central Australia.

Beyond our own sanctuaries, AWC is contributing to the development of sensible, national- and state-level policy on the control of feral predators, for example, recently making a submission to a review of the Federal Government's Feral Cat Threat Abatement Plan.

AWC also regularly engages with state governments, conservation groups, Indigenous organisations and private individuals interested in establishing feral predator-free safe havens, providing advice based on our experience on a pro-bono or ‘fee for service’ arrangement, depending on the means of the other party. We anticipate ongoing development of safe havens by this range of groups, and aim to improve conservation outcomes across Australia, regardless of tenure.

“With well over 2 million feral cats roaming every corner of Australia’s mainland, and with every cat predicted to kill over 1,000 animals each year, this adept predator continues to be an unrelenting ecological threat to native Australian fauna. Feral cats know no boundaries and they need to be managed over large areas and across landscapes. Effective, resource-efficient and humane management, like that carried out by AWC, is critical in tackling this pervasive problem.”

Susan Hunt AM PSM

Chair, WA Feral Cat Working Group and
AWC supporter

Your donation can help to maintain feral predator-proof fencing to keep wildlife safe.



The vast fenced feral predator-free safe haven at Mallee Cliffs National Park in New South Wales is twice the size of Manhattan (NY) and has seen seven locally extinct mammal species restored. For scale, note the person centre left. *Wayne Lawler/AWC*



Partners in conservation
Eight years in NSW national parks

NAHRAIN JOHN, AWC COMMUNICATIONS ASSOCIATE



The partnership has seen the endangered Shark Bay Bandicoot, a species extremely vulnerable to feral cats and foxes, reintroduced to the Pilliga safe haven. *Brad Leue/AWC*

Eight years ago, AWC and NSW National Parks and Wildlife Service (NPWS) signed a ground-breaking agreement that would become a blueprint for partnerships within Australia's wider conservation community. The terms of the collaboration were centred around the reintroduction of up to 11 locally extinct mammal species to feral predator-free fenced areas in Mallee Cliffs National Park (in south-west New South Wales) and the Pilliga State Conservation Area (in north-central New South Wales). To date, the partnership has seen 10 of the 11 planned species restored to the two safe havens, including the iconic Greater Bilby and Numbat.

"The partnership has offered a pathway to conserving threatened species and landscapes in public protected area estates that AWC wouldn't traditionally be able to access.

"The success demonstrates what can be achieved when state government and private conservation organisations come together," says Tim Allard, AWC Chief Executive.

David Kelly of NPWS adds: "This partnership provides a long-term commitment to the conservation of threatened species and aims to turn back the tide of extinctions and restore populations of our most vulnerable species."

A FIGHT AGAINST FERALS

The partnership kicked off with the construction of two specially designed feral-proof fences.

Construction of Mallee Cliffs' 9,750-hectare fenced area commenced in February 2020 and was completed in just 12 weeks. By September 2020, only six months later, the fenced area was declared Australia's largest mainland

feral predator-free haven and was ready for native wildlife reintroductions. Although construction went just as smoothly at Pilliga, with the 5,800-hectare fence being completed within three months from May 2017, the feral predator eradication took a little longer – 4.5 years to be exact.

The cause of this was an elusive fox, the chase for which would attract media notoriety. AWC dedicated over 10,400 trap nights, 73 shoot nights, 3,500 baits and more than 55 days with scent-tracking dogs trying to hunt the individual that evaded baits, traps and motion-sensor cameras. The fox has ultimately been confirmed as no longer in the feral predator-free fenced area by the absence of any records since flooding occurred in October 2022. The assumption is that the fox naturally succumbed to the influence of the weather or escaped the fenced area before repairs were affected to the flood-damaged fence.

Pilliga was officially declared feral predator-free in March 2023, a joyous month for all at AWC but more-so for Wayne Sparrow, AWC Regional Operations Manager (North-east) who led the exhaustive hunt.

"We knew when we locked up the fence that we had six cats and six foxes to remove and we were able to track them down and slowly count them down to the last fox," Wayne explained. "The fox was a little shy and he would go AWOL at times, but we were always able to keep tabs on him.

"After the floods that ability to detect the fox suddenly stopped and he was never recorded again. We spent 80% of our control efforts and used around 150 motion-sensor cameras trying to find evidence of the fox's



presence but were unable to detect him. This made us very confident that he had met his match.”

With the final predator removed from inside the fence, how did Wayne and the field team celebrate?

“It was a big milestone for us and certainly the longest I found myself working on tracking a single animal. We had a few relaxing hours to savour the moment but were quick to move on because the eradication process was only intended to be a small part of the project and we didn’t want it to continue overshadowing the reintroduction project.”

Outside the Mallee Cliffs and Pilliga fenced areas, AWC has implemented intensive baiting programs to manage feral predators and is continually removing feral herbivores including goats. The feral predator control program uses a mix of ground baiting and canid pest-ejectors. At Mallee Cliffs, AWC is also currently trialling technology for feral pig control that allows traps to be remotely monitored using a mix of camera surveillance and instant messaging. Daniel Burton, AWC Operations Manager, believes the technology could eventually be used to control other feral animals including cats.

“It’s still early days but the technology could have the potential to help us in trapping cats or assist in remotely monitoring the fence and water levels in tanks which are being deployed for the Bridled Nailtail Wallaby reintroduction taking place later this year,” Daniel said.

In the future, Daniel is also hoping to utilise thermal drones to assist with monitoring fences for damage caused by kangaroos fighting from both sides of the fence.

INFRASTRUCTURE IN PLACE

With fences up at both sites, AWC began work on the next phase of infrastructure, developing liveable quarters and working facilities. At both Mallee Cliffs and Pilliga, AWC has installed ensuite accommodation for eight people, a purpose-built science laboratory and full workshop and vehicle servicing facilities. Also installed are large rainwater tanks for both consumption and firefighting, wastewater treatment systems and basic power systems sufficient to run the facilities at full occupancy. Equipment storage containers and dedicated fuel and chemical storage facilities have also been completed.

Dr Vicki Stokes, AWC Senior Wildlife Ecologist who heads up AWC’s science program in the Pilliga, said the single person quarters and science lab have made a significant difference for the team, particularly in the way wildlife is handled and processed during translocations.

“For the Brush-tailed Bettong reintroduction in 2022, we had to create a makeshift lab by removing all the equipment from a storage container and bringing in folding tables,” Dr Stokes explained. “The team was cramped around these tables fitting the bettongs with transmitters and conduct health checks. We got the job done well but it wasn’t ideal.

“The science lab has been great in terms of facilitating translocations and reintroductions. Quite a lot of our animals have travelled big distances and it’s logistically impossible for us to get transmitters on them at the other end for a variety of reasons. The science lab has been critical for us to have that infrastructure and to allow us to do health checks on animals before they get released.”

PUBLIC VISITATION

Curiosity around AWC and NPWS’ partnership and the reintroduction programs at both Mallee Cliffs and Pilliga has grown in recent years. AWC developed a Visitor Engagement Strategy and, in 2022, the public were invited inside the feral predator-free fenced areas to experience the results of the successful partnership first-hand via hosted visits.

Two hosted visits were implemented at each site in 2022 and again in 2023, all of which were completely booked out. This year, hosted visits took place in April.

Dr Rachel Ladd, AWC Wildlife Ecologist at Mallee Cliffs, said the hosted visits are an opportunity to see the work from an outside perspective.

“The hosted visits are a really important part of the job, it’s great exposure for the reintroduction program inside the feral predator-free area,” Dr Ladd explained. “It’s also nice to be reminded of how special the work is. Sometimes, when you’re in the thick of it, you can lose sight of how unique it is to see certain species every day.”

REINTRODUCING LOCALLY EXTINCT SPECIES

And finally, wildlife reintroductions – a key reason for the partnership. The agreement between AWC and NPWS revolves around the reintroduction of at least 11 locally extinct mammals to New South Wales.

“Between Mallee Cliffs and Pilliga, we have now returned 10 species to their former range,” said Dr Greg Holland, AWC Regional Ecologist (South-east). “It’s extraordinary seeing each species contribute to the restoration of healthy local ecosystems, particularly digging mammals such as the Burrowing Bettong and Shark Bay Bandicoot. They’re out there in western New South Wales right now turning over soil and dispersing fungi and seeds, as they did over a century ago.

“Beyond the environmental benefits, every reintroduction also plays an important role in restoring the historical mammal assemblage to New South Wales and provides additional insurance against collapse of populations elsewhere.”

Pilliga

Despite the delay with the feral predator eradication, AWC and NPWS have reintroduced five of the six planned species.

The reintroduction program launched in 2018, with the return of the beloved Greater Bilby. The long-eared mammal was released into a 680-hectare breeding area which was constructed within the larger safe haven. The Bilbies were joined by the Bridled Nailtail Wallaby in 2019, followed by the Brush-tailed Bettong in 2022. The three species remained in the breeding area until early 2023, when the entire fenced area was declared free of feral predators. AWC was then able to take down the dividing fence to enable dispersal across the entire fenced area and to reintroduce the threatened Plains Mouse in June 2023 and the endangered Shark Bay Bandicoot in September.

“All species released into the Pilliga so far are doing well, notably the Brush-tailed Bettongs which doubled in population within a 12-month period. They are dispersing across the fenced area, and over 70% of females that we’ve encountered have pouch young – that’s a really good sign that they’re continuing their population increase,” Dr Stokes said. “Similarly, the bandicoots are healthy and in good condition. Most females that we’ve encountered in breeding condition have had two pouch young. It’s all really positive signs so far.

“Before we started opening up the breeding area, we really started to notice a difference in the landscape between the breeding area and the wider fenced area. The

Bilbies and Brush-tailed Bettongs had really started digging lots of burrows for shelter and food.”

Last on the reintroduction list in the Pilliga (for now) is one of Australia’s threatened carnivores, the Western Quoll. This species will prey upon some of the other reintroduced species, so we need to wait until populations have built up sufficiently to handle the additional predation, or conduct the release ‘outside the fence’.

Mallee Cliffs

Reintroductions commenced in October 2019, with the return of the Greater Bilby. In 2020, the Bilby was joined by the Greater Stick-nest Rat, followed by the Numbat and then one year later, the Brush-tailed Bettong and Red-tailed Phascogale. In April 2022, the Mitchell’s Hopping Mouse became the sixth species restored to the national park, followed by Burrowing Bettongs in 2023.

This year, AWC plans to reintroduce the Shark Bay Bandicoot and Bridled Nailtail Wallaby to Mallee Cliffs, before reintroducing the Western Quoll once populations of the smaller species have built up in numbers – or releasing it ‘outside the fence’.

“After three years of planning around the reintroduction, the Bridled Nailtail Wallaby is finally scheduled for release at Mallee Cliffs in May 2024,” Dr Ladd said. “Once the wallabies are released within the fenced area, we’ll have reintroduced eight of the 10 species planned for the national park, which is really exciting.

“Everything seems to be going well with the species we’ve released so far. We see a lot of the reintroduced animals on motion-sensor cameras. The Greater Bilby and Greater Stick-nest Rat have made a few camera appearances along with the Red-tailed Phascogale. The Burrowing Bettongs, which were the last to go in, haven’t had any mortalities and during a survey late last year, every female captured had a pouch young.”

WHAT’S TO COME?

Over the next two years, AWC will complete reintroductions within the two feral predator-free fenced areas and will install solar power to the operations bases. The contract and any additional term with NPWS will be reviewed during this period, but AWC has plans for the long term. The next stage of infrastructure development could include buildings containing kitchen and dining facilities and a large social space to support staff and visitor activities. Excitingly, AWC is developing a ‘beyond the fence’ strategy – requiring escalated feral animal control and monitoring – drawing on AWC’s research and experience at Scotia (NSW) and Mt Gibson (WA) wildlife sanctuaries.

Your donation can support AWC's ambitious reintroduction program across the country.

"AWC has been setting the gold standard for conservation in Australia. I have been lucky enough to visit the Pilliga partnership at the start and more recently after the demise of the elusive fox and Bilbies being released into the larger area.

There is something deeply inspiring about land where species are being reintroduced and their presence is regenerating the landscape. In a land where we have lost so much, the work of AWC is bringing some of that back, and slowly but surely reweaving the wondrous web of biodiversity. Fenced conservation is absolutely critical for preserving species and genetic diversity while we work on landscape-scale solutions for invasive species management and, ultimately, eradication."

Senator David Pocock, AWC supporter



Golden Bandicoot

Status: *Vulnerable*

The Golden Bandicoot is the most colourful of the short-nosed bandicoots. Its underparts are pale honey, and above, its golden-brown fur is streaked with shiny black guard hairs.

Like many bandicoots, the Golden Bandicoot disappeared from most of its formerly extensive arid to semi-arid range following European colonisation, surviving only on some cat-free islands and in parts of the north Kimberley.

In August 2023, AWC facilitated the species' return to Central Australia, reintroducing the culturally significant bandicoot – known as pakuru in the local Warlpiri language – to Newhaven Wildlife Sanctuary in the Northern Territory after an almost 60-year absence.



Northern Brown Bandicoot

Status: *Not listed*

At 47 centimetres long, this species takes the crown for Australia's largest bandicoot. The Northern Brown Bandicoot is common in tropical and subtropical forest, woodland, scrub, grassland and gardens across much of north and eastern Australia, however, the species is declining across more arid parts of its range.

To conserve areas of dense low ground cover, which the bandicoot requires, and decrease predation pressure, AWC is implementing fire management, removing feral herbivores and reducing the activity of feral cats. The tangible impact of these activities has been visible in our Ecohealth metrics, with Northern Brown Bandicoot population increases in the Central Kimberley.



Shark Bay Bandicoot

Status: *Endangered*

Though Australia's smallest extant bandicoot, the Shark Bay Bandicoot has a big personality, hiding a sometimes-hostile temperament behind its delicate appearance. Despite this demeanour, feral predators are the primary cause of its disappearance from the mainland and wild populations remain only on Bernier and Dorre islands in Shark Bay.

AWC has successfully reintroduced Shark Bay Bandicoots to Faure Island and Mt Gibson Wildlife Sanctuary in Western Australia, and to the Pilliga Forest in New South Wales. AWC is planning a fourth reintroduction of this species this year, to Mallee Cliffs National Park in New South Wales. The populations in these fenced feral predator-free safe havens are projected to double the global population size of the species. AWC also contributes expert advice to the Shark Bay Mammals Recovery Team.



Spotlight on bandicoots

PEARL CARDIS, AWC SCIENCE WRITER

Some of Australia's best gardeners, bandicoots have been taking care of our soil for almost thirty million years. Like their Bilby cousins, these 'ecosystem engineers' increase the rate of leaf litter decomposition, soil production, fungi spore dispersal and nutrient cycling through their avid digging for food and shelter.

Though once widespread across mainland Australia, feral cats and foxes decimated bandicoot numbers, and modification of vegetation by land clearing, rabbits, stock and changed fire regimes compounded declines. Of the estimated 12 species of bandicoot in Australia, approximately half are now extinct, threatened with extinction or extremely rare.

AWC is protecting bandicoots by implementing fire management and removing feral predators, weeds and feral herbivores. We are also restoring species to their former ranges, with benefits for the ecosystems they once inhabited.

Key
● AWC sanctuaries and partnership areas

Long-nosed Bandicoot (Northern and Southern species)

Status: Not listed



These buff brown, barless species were previously categorised as subspecies of the Long-nosed Bandicoot but have since been recognised as distinct taxa with geographically distinct ranges.

AWC protects Northern Long-nosed Bandicoots (pictured) at Brooklyn and Mt Zero–Taravale wildlife sanctuaries in Queensland, and Southern Long-nosed Bandicoots at Curramore (QLD) and Waulinbakh (NSW) wildlife sanctuaries.

At Brooklyn, Northern Long-nosed Bandicoots were detected at six of eight sites surveyed in upland rainforests and tall eucalypt forests in 2022. These findings suggest that the population and the ecosystems they are a part of are healthy, a promising reflection of our best-practice land management work.

Southern Brown Bandicoot and Quenda

Status: Endangered (Southern Brown Bandicoot) and not listed (Quenda)

Like other bandicoots, Southern Brown Bandicoots and Quenda (pictured) dig resting holes and line them with litter, leaves, and debris to sleep in during the day. An individual can create around 45 foraging pits per night, displacing 3.9 tonnes of soil per year.

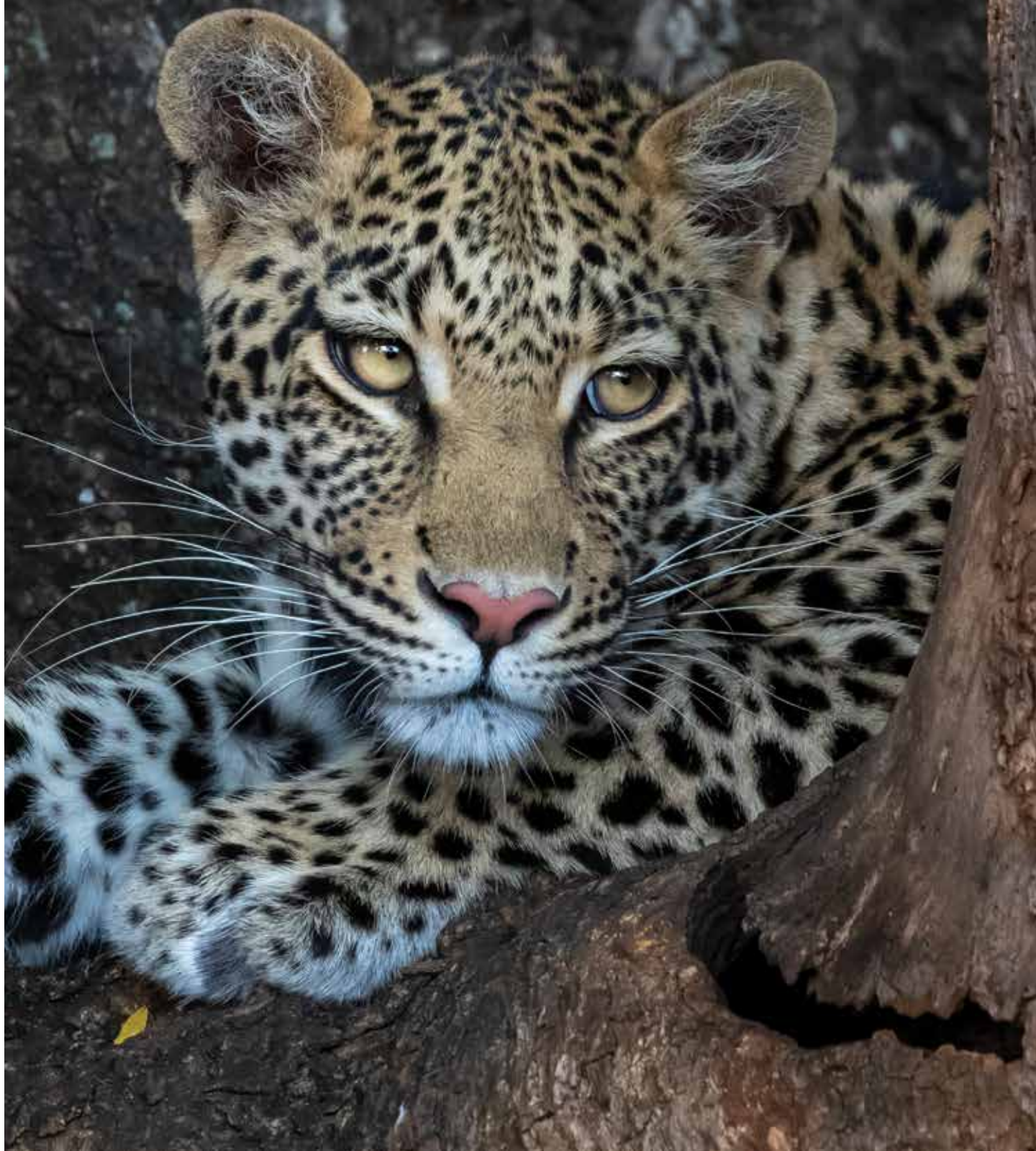
The endangered Southern Brown Bandicoot occurs in south-east Australia and is currently protected by AWC in the Western River Refuge on Kangaroo Island in South Australia. AWC hopes to establish a genetically diverse population within the fenced safe haven.

The Quenda occurs in south-west Western Australia. It is protected in the fenced area at AWC's Karakamia Wildlife Sanctuary and is also present in low numbers at Paruna Wildlife Sanctuary, both in the Perth Hills.



*"Wherever you are,
conservation is
all about people."*

Dr Pippa Kern,
AWC Senior Wildlife Ecologist



Training the next generation of conservation leaders

JOEY CLARKE, AWC SENIOR SCIENCE COMMUNICATOR

A group of AWC's leaders travelled to Zimbabwe to take part in a training initiative which is nurturing a generation of effective conservationists.

There are distinct echoes of the Kimberley in the vast landscape of Gonarezhou National Park in the south-east of Zimbabwe. With towering sandstone cliffs and arid bushland dotted with baobab trees, this is also a site of ambitious conservation partnerships. Unlike the Kimberley however, Gonarezhou is home to a booming population of 11,000 elephants, as well as leopards, zebras and monkeys.

It was in this landscape that a group of young leaders came together in October 2023 as part of a program to cultivate the next generation of conservationists. Supported by the Oak Foundation, the Effective Conservation Training Initiative was devised by Spanish expert Ignacio Jiménez, who has surveyed best-practice conservation programs around the world to pinpoint exactly what works. Jiménez quite literally wrote the book on effective conservation.

"Managing effective conservation programs is extremely challenging," he says. "Conservationists need to combine ecological science with psychological and organisational knowledge, and to manage people across different cultures while living in very remote areas. There is a real shortage of professionals who have that broad experience to be effective conservation leaders."

The program at Gonarezhou was designed to help address that shortage, and four of the world's leading conservation organisations were invited to nominate up-and-coming leaders to take part. AWC's Dr Pippa Kern,



[Above] Leaders in conservation. *Rafael Abujín/Oceano Estudio Creativo*

[Left] From bettongs and bandicoots to leopards (pictured) and elephants: young conservation leaders shared stories about the challenges they face and how to overcome them. *Elly Gearing/AWC*

Dr Rachel Ladd and Braden Riles represented AWC. They were joined by representatives from African Parks, Frankfurt Zoological Society, and Rewilding Argentina. After an initial period of online study and discussions, the group spent two weeks together on-site at the national park for leadership workshops and mentoring.

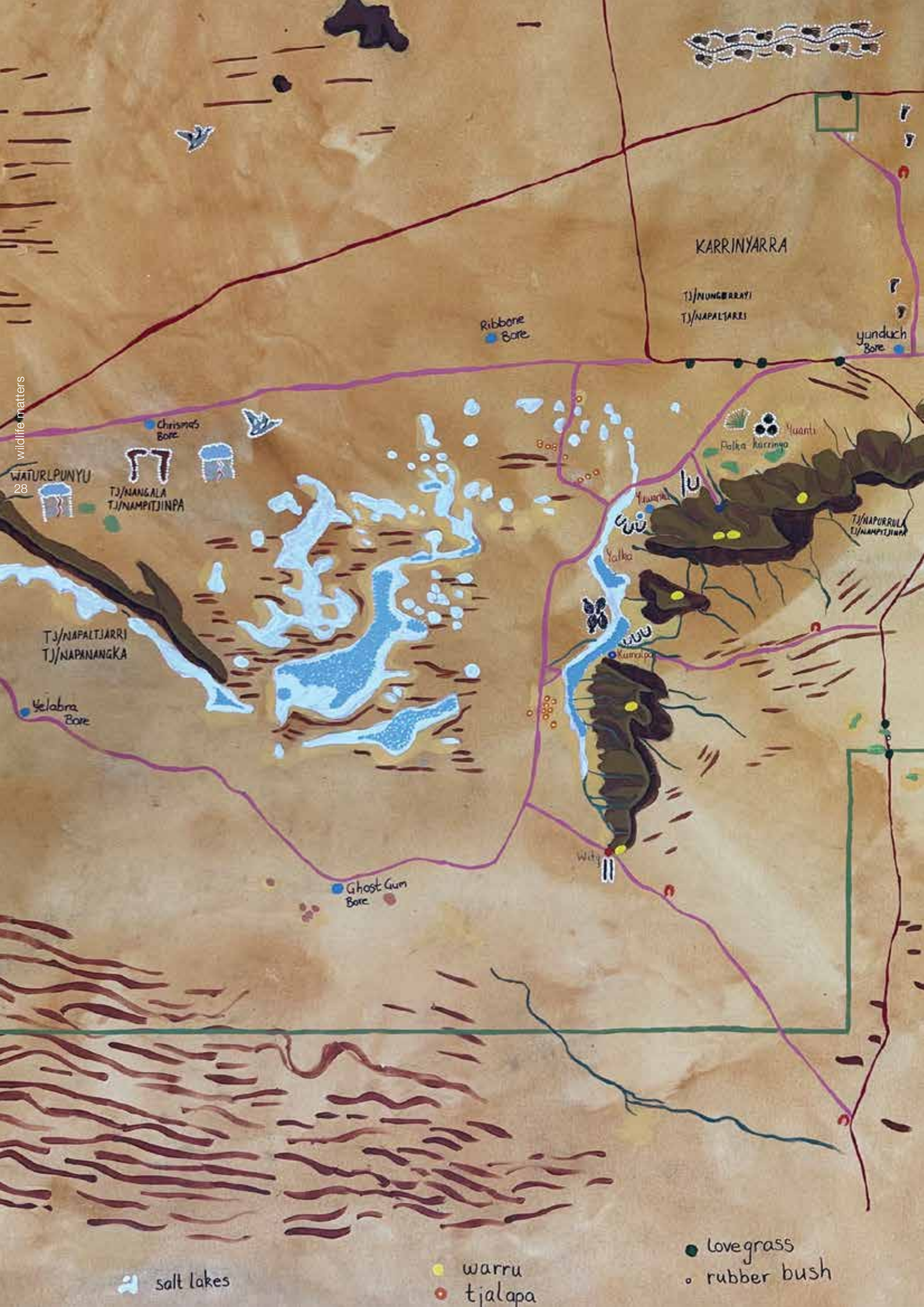
For Dr Rachel Ladd, this was her first trip to Africa. "I'll admit I occasionally got distracted by the antelope wandering past out the window," she said. In her role at AWC, Rachel leads a team of ecologists at Scotia Wildlife Sanctuary and Mallee Cliffs National Park in south-west New South Wales. "This is the first time I've had to manage a team, and there's a lot to learn. It was great to connect with people facing similar challenges and share some different methods." While Rachel normally oversees reintroductions of bettongs and bandicoots, at Gonarezhou she was swapping stories about translocating elephants, jaguars and giant anteaters.

For Dr Pippa Kern, who heads up AWC's science program at Yampi Sound Training Area in the Kimberley (where AWC works in partnership with Dambimangari People and the Department of Defence), the initiative inspired new ways of thinking about the value of conservation to communities and partners. "One of the ideas that I've been grappling with is pairing conservation outcomes with social development and community outcomes. We heard a lot about this from the people working in Africa and South America and it's helped me refocus on that aspect of our work in Australia. Wherever you are, conservation is all about the people."

The AWC trainees were also struck by some of the challenges faced by their counterparts in other countries. Poaching is a widespread concern, and some of the attendees must work simultaneously as both conservationists and law enforcement agencies.

Braden Riles, AWC Operations Manager at Yampi, said the initiative was invigorating. "One thing I've brought back is energy. It was so good to be reminded that we're not alone; I still keep in touch with some of the other participants. For me, the experience really topped up the tank."

Following the success of the training initiative, planning is underway for a second round later this year. AWC is proud to take part.



KARRINYARRA

TJ/NUNGBARRAYI
TJ/NAPALTARRI

Ribbone
Bore

Yunduch
Bore

Christmas
Bore

WATURLPUNYU

TJ/NANGALA
TJ/NAMPITJINPA

TJ/NAPALTJARRI
TJ/NAPANANGKA

Yelabra
Bore

Ghost Gum
Bore

Wityi

Kurrakoo

Muuwapa

Yalka

Muu

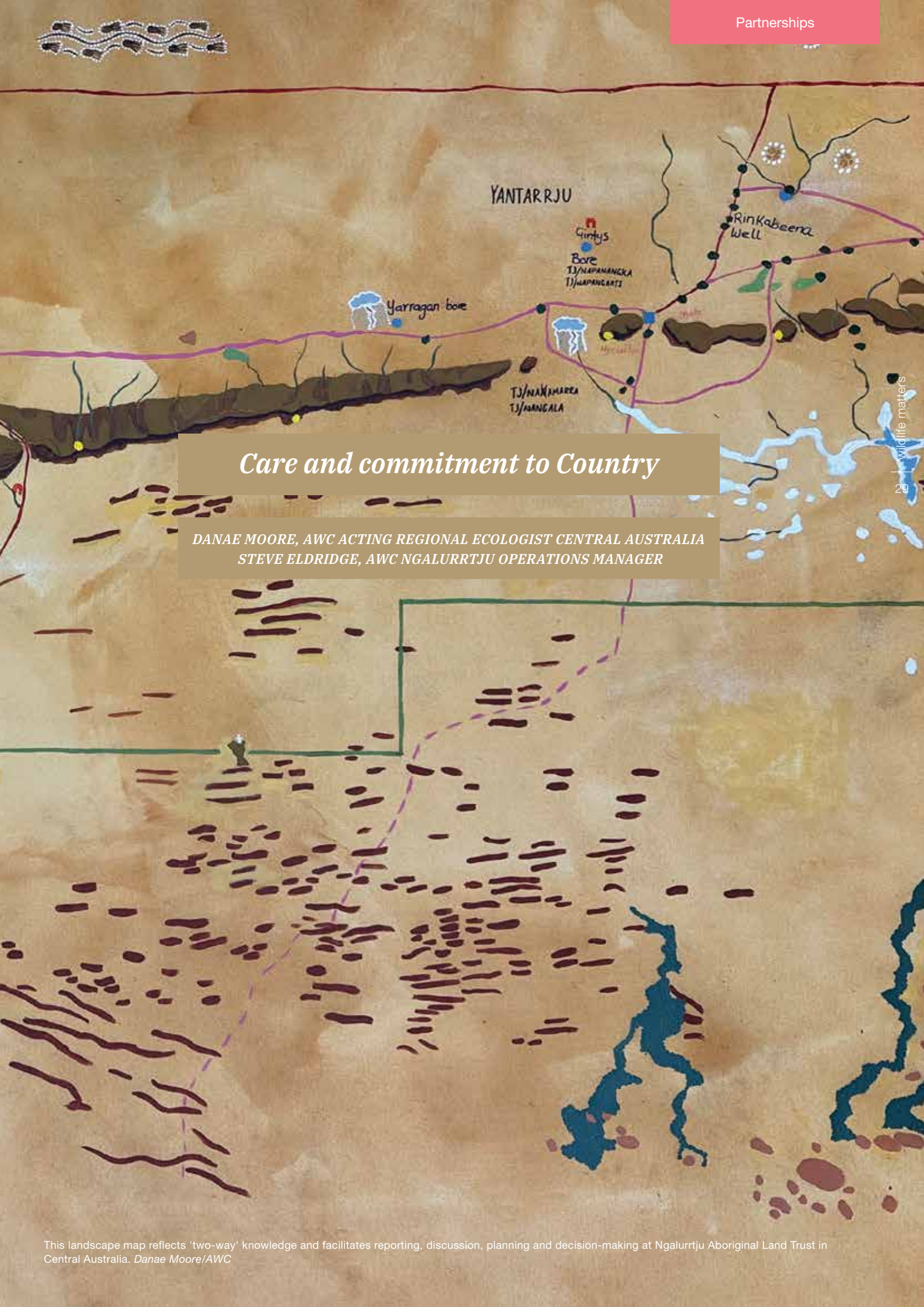
Falka Kairringo
Muanti

TJ/NAPURRULA
TJ/NAMPITJINPA

☁ salt lakes

● warru
● tjalapa

● lovegrass
○ rubber bush



Care and commitment to Country

DANAE MOORE, AWC ACTING REGIONAL ECOLOGIST CENTRAL AUSTRALIA
STEVE ELDRIDGE, AWC NGALURRTJU OPERATIONS MANAGER



AWC's inventory surveys have confirmed the presence of the threatened Grey Falcon (wiinywiinypa in the Pintupi/Luritja language) at Ngalurrjtju Aboriginal Land Trust. Brad Leue/AWC

[Right] AWC is privileged to work in this two-way partnership to protect country and culture. Brad Leue/AWC

A bird's-eye view is the only way to comprehend the immensity of the ancient desert landscape of the Ngalurrjtju Aboriginal Land Trust in Central Australia. Approaching from the east, the country is a surprising oasis of vegetation and ephemeral salt lakes punctuated by Karryinyarra (Mt Wedge) that stands sentinel over dunes to the south and sparse plains to the west. Karryinyarra is the highest point on the Karryinyarra Range (Stuart Bluff Range), rising like a great spine across the property and providing high-quality habitat and hideaways for the threatened Central Australian Rock-wallaby (warru in the Pintupi/Luritja language). Simply put, it is breathtaking.

Over the past three years, the Ngalurrjtju partnership – a landmark collaboration for conservation between the Central Land Council on behalf of the Traditional Owners and AWC – has made remarkable progress, building a solid foundation from which to grow.

A strong team of land management officers, ecologists, and Ngalurrjtju Rangers has been established. This team implements large-scale land management and science programs across the partnership area.

PUTTING NGALURRTJU ON THE MAP

In May 2023, a 'two-way landscape mapping' workshop was held at Ngalurrjtju. This workshop produced an ongoing and interchangeable multi-purpose land management map that reflects the knowledge of Yapa and Ananagu – how Ngalia Warlpiri, Anmatyerr and Luritja Traditional Owners and local community members refer to themselves – and kardiya (white people) and will facilitate reporting, discussion, planning and decision-making at future Steering Committee meetings and for Ngalurrjtju Ranger work.

“Traditional and Western information is crucial for managing Ngalurrjtju. The two-way landscape map captures a knowledge exchange whereby Traditional Owners are sharing significant stories and land management information from their perspective, while we’re providing geological and ecological history and Western techniques for animal monitoring and weed/land management... It’s already proving to be valuable – we have recently updated the map with our survey results from 2023, for example adding confirmed locations of threatened species, warru and tjalapa [the Pintupi/Luritja name for the Great Desert Skink] and priority weeds such as hairy-flower love grass.”

Steve Eldridge, AWC Operations Manager at Ngalurrjtju Aboriginal Land Trust

BUILDING A BASE

After almost 30 years of the homestead lying vacant, significant effort has been made to refurbish the site. This work has already greatly improved the efficiency of the Ngalurrjtju partnership, providing a permanent boots-on-the-ground presence critical for delivering conservation science and land management programs in such a remote region.

Priorities over the next several years include constructing a communal amenities facility to support regular Traditional Owner visitation, increased on-site collaboration, and delivering Ngalurrjtju Ranger programs.



CARING FOR COUNTRY

Ngalurrjtju and AWC's adjoining Newhaven Wildlife Sanctuary protect arid zone species and habitats across more than 600,000 hectares. The Newhaven and Ngalurrjtju teams deliver fire management across both sanctuaries, aiming to re-establish appropriate fire regimes that conserve species and ecosystems and allow the restoration of ecological processes.

The full annual fire management program commenced at Ngalurrjtju in 2023. Over the year, 183 kilometres of ground-based fuel-reduction burns were implemented, burning a total of 9,767 hectares (around 3% of the property). In addition, 522 kilometres of burn lines were lit using 24,000 aerial incendiaries, resulting in 9,511 hectares burning in the cooler months of 2023.

These efforts will continue to expand and deliver significant ecological benefits for the broader region.

SCIENCE IN CENTRAL AUSTRALIA

Given that there were very few recent comprehensive plant or animal records for Ngalurrjtju, the first priority in delivering AWC's science program has been developing a species inventory. Excitingly, 114 animal species have been confirmed at Ngalurrjtju to date, including the threatened tjalapa, warru and Grey Falcon (wiinywiinypa in the Pintupi/Luritja language). Vegetation surveys have recorded around 460 plant species so far. These records will allow us to quantify the impacts of our work at Ngalurrjtju over time and inform ongoing conservation priorities.

FIGHTING FERAL ANIMALS

Traditional Owners have identified several culturally significant sites damaged by camels. Managing these large feral herbivores is a key priority in protecting Ngalurrjtju's biodiversity and cultural assets. Aerial culling is carried out in conjunction with Newhaven and other neighbouring properties.

AWC also monitors feral cat and fox activity across Ngalurrjtju to identify hotspots and focus areas for management. Surveys are planned to determine rabbit distribution and identify areas of high activity to focus trapping and control efforts. The team is preparing to re-establish boundary fencing adjacent to neighbouring properties to prevent cattle movement onto Ngalurrjtju.

WHERE TO NEXT

A five-year plan includes continuing to apply and assess annual burn programs, active weed management, and feral animal control. The science program will focus on establishing permanent monitoring sites, undertaking comprehensive bird surveys, and developing long-term action plans for significant species such as the tjalapa and warru. Data on the distribution and abundance of threatened animals will be collected using a combination of the ecological knowledge and expert tracking skills of Traditional Owners and contemporary scientific techniques such as live trapping and camera trapping.

AWC is privileged to work in this two-way partnership delivering critical conservation outcomes in Central Australia.

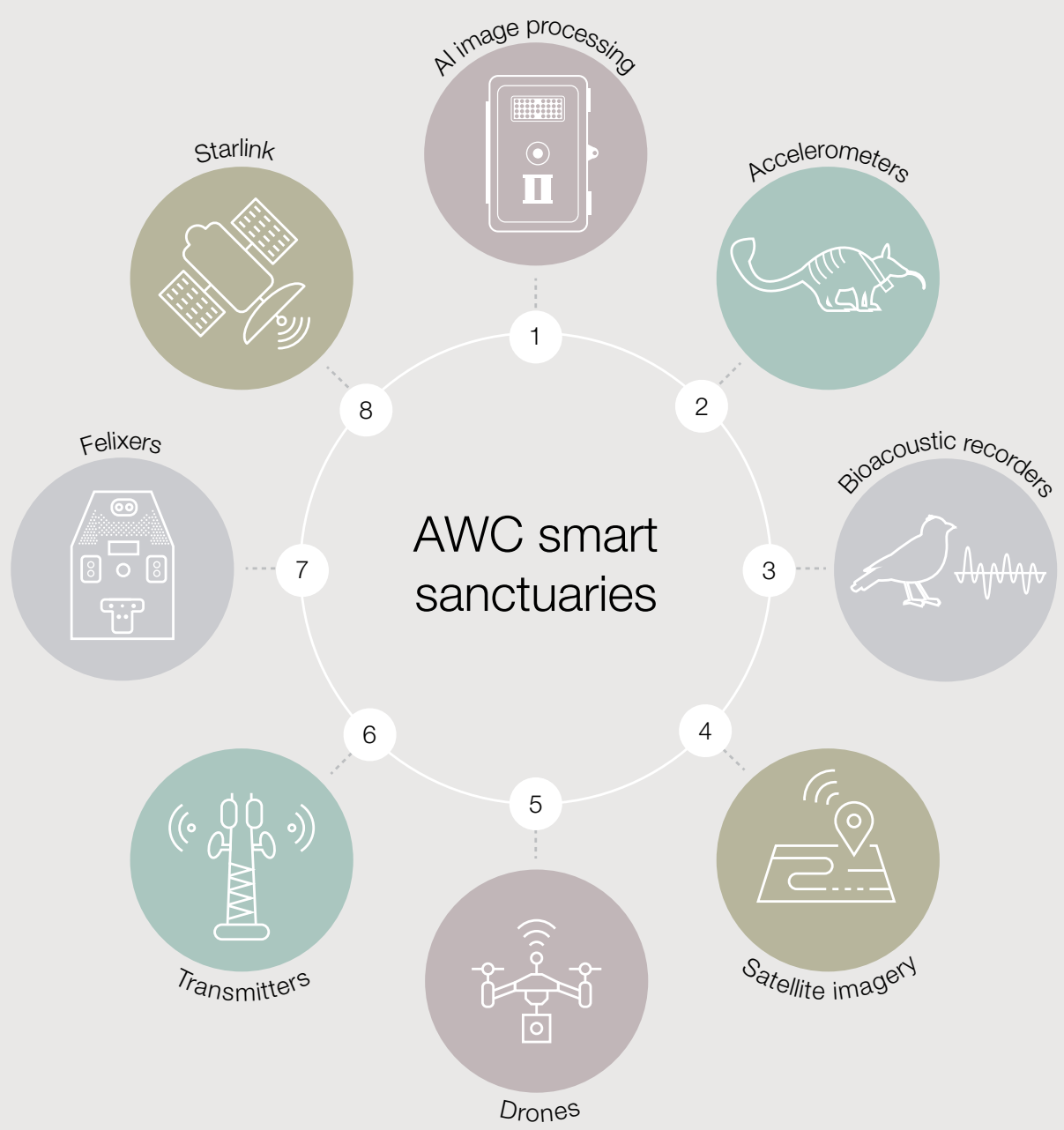
Your donation can support ecologists and rangers to access remote areas to monitor and survey threatened species.

From bytes to biodiversity

How the smart use of technology is helping to protect wildlife

JESS TEIDEMAN, AWC SCIENCE WRITER

When it comes to wildlife conservation, technology offers transformative ways to increase capacity, decrease manual data processing and support discussion and planning. This allows AWC ecologists and land managers to focus attention where it's needed, with benefits for biodiversity. As technology continues to evolve and advance, so too will our ability to protect Australia's most vulnerable species.



- 1 **Wildlife recognition technology:** Although camera traps have revolutionised biodiversity monitoring, a single camera can collect thousands of images and ecologists spend days, sometimes months, manually reviewing them. Artificial Intelligence is improving image processing speed and cost-effectiveness. Our system has processed ~23 million images since we launched, and staff are now regularly processing single camera trap surveys with more than 1.5 million images. The efficiency gains are huge: the AI system is saving two people at least three months' work each year, just from the AI filtering out images that have no animal in them. AWC aims to develop species recognisers for up to 120 mammals and reptiles.
- 2 **Accelerating beyond observational limits:** Observation of animal behaviour in the field can be a huge challenge for ecologists due to physical tracking limitations and the potential to influence animal response. Accelerometers are helping scientists overcome these challenges. Animal-attached accelerometers record fine-scale data on animal movements and behaviour that provide detailed information on activity budget. Accelerometers can collect data multiple times per second on multiple axes allowing scientists to determine if an animal is running, foraging or resting. This has recently allowed AWC ecologists to study how Numbat activity changes during different temperature conditions at Mt Gibson Wildlife Sanctuary in Western Australia.
- 3 **All ears for conservation:** Environmental sound, often referred to as eco- or bio-acoustics, is a powerful data source for investigating ecosystem health by captured sound. The non-intrusive technology is particularly useful for detecting animals that are hard to find, like Koalas, frogs, and some species of bird, and can help monitor the recovery of threatened species after events like bushfires, or map migratory patterns throughout a season. Current advancements have seen the development of solar-powered units capable of recording continuously (or scheduled) for years with only minimal service visits to change the memory cards. This is delivering efficiencies for staff and benefits for monitoring shy wildlife. AWC is now using such units to listen to arid-dwelling species such as the critically endangered Plains Wanderer.
- 4 **Satellites for fire management:** Designing where to conduct fire management is as complex as scheduling when. There are many factors to consider, and planning begins months in advance. Satellite imagery is critical to this process. "To start, we look at all the fire scars from the previous year using satellite data – which highlights all the fires that occurred in the landscape. From this data, we produce a map that highlights where all these fires occurred. We sift through this imagery with fuel ages, topographic features and a multitude of other layers layered on top and work out where best to carry out burning to keep the fires that we put into the landscape as small and as low intensity as possible" says AWC Kimberley Regional Fire Coordinator Dale Tucker.
- 5 **A bird's-eye view:** Efficiently tracking reintroduced species and producing reliable estimates of population trends over time is fundamental to the planning, delivery and ongoing evaluation of AWC's ambitious reintroduction program. Drones equipped with advanced radio-telemetry systems are now being piloted to monitor reintroduced species at Mt Gibson. These drones can detect multiple animals simultaneously, enabling ecologists to monitor movements across large areas. "In the past, tracking translocated animals has involved hours of walking and searching for collar signals," says AWC Senior Wildlife Ecologist Sophia Callander. "The drone, on the other hand, has proven to be a great tool for detecting multiple signals and finding animals in a much shorter time." Since first acquiring the drone in 2022, AWC has conducted nearly 200 flights to track radio-collared Brushtail Possums, Chuditch and Numbats at Mt Gibson.
- 6 **Towering over wildlife:** To assist with monitoring reintroduced species, AWC uses solar-powered VHF (Very High Frequency) systems that operate 24/7. Upon reintroduction, half of the animals are fitted with uniquely coded VHF transmitters. Antenna towers scan for these unique codes continuously and provide data on the whereabouts and survival of individuals. This technology delivers significant efficiencies by reducing the ecologist hours required for monitoring animal dispersal and narrows the search area when tracking animals on foot. Manual tracking is still critical for understanding how animals are using habitat. AWC uses these systems at Mallee Cliffs and Pilliga (NSW) and at Newhaven (NT) and Scotia (NSW) wildlife sanctuaries.
- 7 **Taking aim at feral cats:** Felixers are box-like units, which use LiDAR, cameras and AI to distinguish feral cats from native animals. Once a feral cat is recognised, a toxic gel is sprayed and ingested when the cat grooms itself, making the system a more humane and less time-consuming model for feral animal control. The units also act as a camera trap, collecting data on prey species and cat distribution across an area. Following the 2019–20 'megafires', Felixers were deployed on Kangaroo Island in South Australia to reduce the impact of cats on populations of displaced species such as the Kangaroo Island Dunnart. AWC is also trialling their use at Mt Gibson as part of an 'outside the fence' research project.
- 8 **Connection via the stars:** Starlink is the world's largest satellite constellation using a low Earth orbit (sixty-five times closer to Earth compared to traditional satellites) to deliver broadband internet. The system has provided high-speed internet connectivity to remote locations across our sanctuaries and partnership areas, enabling AWC staff in the field to upload and send vital research data, conduct meetings in real time, and host events to educate from locations previously unavailable. The network has made a huge difference in solving challenging connection issues.



A Northern Bettong joey is a velvet-covered miniature of an adult. Joeys and new recruits at Mt Zero–Taravale Wildlife Sanctuary in North Queensland indicate we are on our way to re-establishing a secure population of Northern Bettongs here. *Mel Christi/AWC*

A joey in the pouch

New recruits for the endangered Northern Bettong

FELICITY L'HOTELLIER, AWC SENIOR FIELD ECOLOGIST

The sun had not long set on our first night at camp, in Far North Queensland's Danbulla National Park. A brush-tailed, truffle-loving resident hopped out from the grassy understorey of its tropical home to inspect the sudden appearance of tarps, tents and tuckerboxes. It was my first (and in the casual form it took place, unexpected) encounter with a Northern Bettong. We were there to survey the population, in the last stronghold of the species, as part of a grand plan to reintroduce Northern Bettongs to AWC's Mt Zero–Taravale Wildlife Sanctuary.

Fast-forward three years. Project planning, consultation, design and approvals were behind us. Northern Australia's first feral predator-free enclosure had been constructed. Almost two decades of landscape restoration through effective land management at the sanctuary, readying the land for the return of a species absent for 20 years, was about to come to fruition.

At the Danbulla National Park trapping site, a devoted team (including Traditional Owners from across Northern Bettong country, AWC personnel, members of the Northern Bettong Recovery Team, Department of Environment, Science and Innovation staff, and volunteers) banded together over several long nights to capture what were soon to be the founding animals of a new population. Traps were set and checked, captured bettongs were assessed, and selected individuals were carefully transported to our temporary translocation HQ throughout the night. Safely stowed in pet packs and loaded into air-conditioned vans, 49 Northern Bettongs made the journey to their new home.

If that first encounter with a Northern Bettong was scored into my mind, it was the release of those founding bettongs to Mt Zero–Taravale that is scored into my heart. As cotton bags were opened and bettongs cautiously hopped off into the darkness, this was a time shared and celebrated; with the families of Gugu Badhun Traditional Owners, whose ancestors cared for and shared this same landscape with Northern Bettongs throughout history past, and with my own family alongside me. And with many others who had dedicated immeasurable effort to securing the future of a species which, without intervention, was at very real risk of extinction.

The coming months were a mixture of excitement and anticipation. With a proven history of reintroduction success, we were confident that the most recent in



AWC's reintroduction program would be a triumph – but this was the first major project of its kind for the species. How would the bettongs fare? A post-release monitoring program, combining intensive radio-tracking and both cage- and camera-trapping surveys into the future, was implemented to answer that very question.

For three months, we'd undertaken daily monitoring of 18 founders fitted with collar-mounted radio-trackers. Early indicators pointed to a fantastic outcome. While trapping to remove collars, we were greeted with even more success; captured animals were in good condition, and most of the females caught had joeys in their pouches – from furless jellybeans through to velvet-covered miniatures. But it was one capture that was the most exciting of all. Approaching the trap, it was clear that this animal was special, and on assessment it became evident that the young male which had found its way into our trap (lured by the irresistible scent of a truffle-infused bait ball) was the population's first new recruit! Having been translocated as a joey in its mother's pouch, it was now part of the independent population! The cool night air was warmed with celebration.

Similarly positive results were recorded three months later; this time, all females captured were carrying young – even more impressive given we were at the end of North Queensland's dry season, when resources would have been at their most lean. One female was carrying a joey on the verge of leaving its mother's pouch to carve a destiny of its own in the big, wide, feral predator-free world. Checking records from three months earlier, that same female had been carrying a very small young. With a pouch life of around 100 days, it is likely that this was the same joey that the trapping team had encountered those few months earlier.

While the newest Northern Bettong population is still in its establishment phase, and there is still much work to be done to secure the future of the species across its broader range (grave concerns are held for a much smaller remnant population located on the Carbine Tablelands), results to date indicate we are on our way to achieving the reintroduction project's aim; the re-establishment of a secure population of Northern Bettongs at Mt Zero–Taravale.

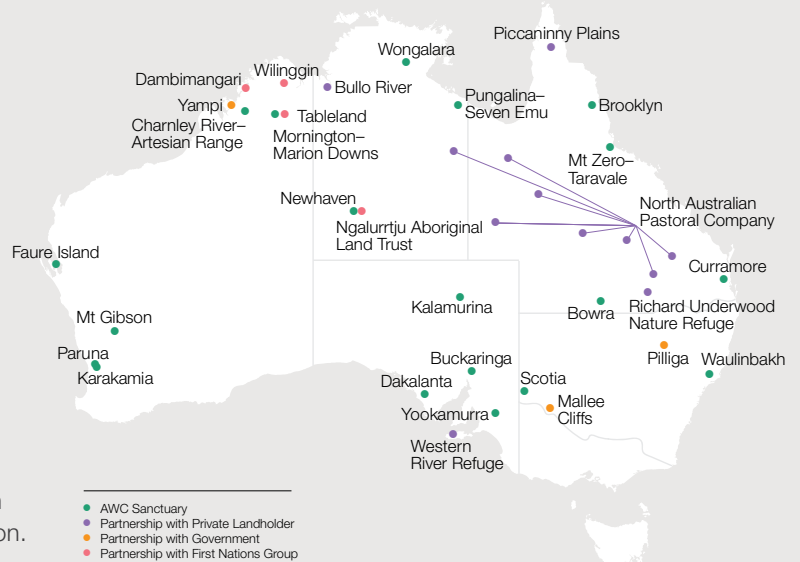
Your donation can help to monitor existing and reintroduced species populations by funding camera trap set up and equipment.

GIVE HOPE TO AUSTRALIA'S THREATENED WILDLIFE



Scan to donate online. Every donation matters.

Together we can stand between threatened species and extinction.



Our planet is in the midst of a biodiversity crisis.

A staggering 130 species were added to Australia's Threatened Species List in 2023.

We need your support to bring our threatened wildlife back from the brink of extinction, before it's too late.

We know what to do and how to do it. AWC's pragmatic and successful model includes:

> ***Practical, science-informed land management programs.***

- Establishing the largest network of fenced feral predator-free safe havens in Australia, protecting threatened wildlife from feral cats and foxes across 43,000 hectares.
- Implementing the largest non-government fire management program in Australia across more than 7.5 million hectares, restoring healthy fire regimes and providing benefits for biodiversity.

> ***A world-class science program to maximise outcomes for wildlife and wild places.***

- Conducting Australia's most ambitious reintroduction program, restoring locally extinct and threatened species such as the Numbat, Northern Bettong and Bilby. The program has seen the iconic Bilby reintroduced at six sanctuaries and partnership areas across the country.
- Delivering the most extensive biodiversity monitoring program (Ecohealth) in Australia to measure and report on the ecological health of our sanctuaries and partnership areas.
- Conducting ongoing scientific research to refine land management practices, measure ecological outcomes and understand the ecology of threatened species.

> ***Future-proofing activities to preserve biodiversity for future generations.***

- Running an annual internship program to train future conservationists.
- Developing a science-informed climate change strategy to ensure management practices will continue to protect wildlife and habitats.
- Delivering an active program of educational activities and events to foster community engagement and environmental stewardship.

This rigorous, science-informed approach is delivering extraordinary outcomes for wildlife and wild places across Australia; however, our efforts must be accelerated. With your support we can stand between threatened species and extinction.

"Preventing further [biodiversity] loss is increasingly urgent... AWC's reserves ... are looked after by teams of Australians who on occasion have to endure extremely harsh conditions... But they have shown us all, repeatedly and dramatically, that if we take care of nature, nature will take care of us."

David Attenborough