

Implementing Australia's most comprehensive wildlife reintroduction program

Dr John Kanowski, Chief Science Officer

Imagine being a little bush animal – a native mouse, or an antechinus. You are sniffing around, digging up seeds or grubs for a meal, when suddenly you are in the grip of a massive predator – a feral cat, or fox – 100 times your size. That's like a human in the jaws of *Tyrannosaurus rex*. What's the likely outcome?

Sadly, the outcome for Australian mammals has been wholesale extinction and decline of species in the 'critical weight-range' – anything from the size of a native mouse to a rock-wallaby. Most of the vulnerable species – bettongs, bandicoots, bilbies, quolls, small wallabies and native rodents – have been eaten out of extensive tracts of the country, with declines especially acute in the arid zone, where options for hiding from predators are limited. The species that survived the onslaught were lucky enough to have natural protection, such as the Echidna, or to be living on islands, or in parts of the country where the 'poison pea' *Gastrolobium* was common such that they were afforded some protection by the naturally occurring '1080'. Mammals occupying the tropics have escaped the fox, but their decline at the claws of the cat – aided by the removal of ground cover by wildfires and introduced herbivores – continues apace.

So, how do we protect the remnants of our natural heritage, our precious remaining native mammals, from introduced predators? Clearly, one option is to build a fence to the specifications required to keep cats and foxes away from our wildlife. Another is to acquire an island and eradicate any feral predators from it. AWC has embraced both these approaches to protecting critical weight-range mammals. To date, we have established feral cat- and fox-free areas on Faure Island (4,600 hectares) and within eight fenced areas, ranging in size from 252 hectares at Karakamia to 9,570 hectares at Mallee Cliffs National Park.

A national network of feral-free safe havens

AWC's safe havens currently protect a total of 15 nationally threatened mammal species, as well as a number of locally extinct mammals. The removal of foxes and cats from AWC's fenced areas and Faure Island has also benefited a range of birds, reptiles and mammals that are vulnerable to fox or cat predation on these properties, such as the ground-active, nationally

threatened, Malleefowl (*Leipoa ocellata*). For some species, such as the Numbat (*Myrmecobius fasciatus*), Bilby (Greater Bilby; *Macrotis lagotis*) and Burrowing Bettong (*Bettongia lesueur*), AWC's reintroduction program makes a major contribution to their conservation, with multiple secure populations comprising a substantial proportion of the global population. For example, the Numbat has been successfully reintroduced to AWC's fenced areas at Mt Gibson, Scotia, Yookamurra and most recently Mallee Cliffs. These sites collectively support several hundred individual Numbats, while remnant populations in south-west Western Australia are thought to number fewer than 1000 individuals.

At present, AWC is in the middle of a major burst of activity in our reintroduction program. At Mt Gibson, south-west WA, we are in the final stages of the most comprehensive rewilding project yet attempted in Australia. To date, we have released eight species of nationally threatened mammals to the 7,838-hectare fenced feral predator-free area, with follow-up translocations of one species, and reintroductions of a further two species, proposed for 2021 and following years. Importantly, the two last reintroductions – of the Brushtail Possum (*Trichosurus vulpecula*) and Chuditch (Western Quoll, *Dasyurus geoffroii*) – will involve attempts to establish populations outside the fence, in conjunction with a sustained feral predator control program.

At Newhaven in Central Australia, we are in the early stages of the reintroduction program, having reintroduced two species to date, with another eight to come. Like other recent AWC projects, the fenced feral predator-free area at Newhaven is sufficiently large (nearly 9,450 hectares) that we anticipate the reintroduced species will be able to establish populations in the hundreds to thousands of individuals. These large populations are more resilient to the boom-and-bust conditions characteristic of arid Australia, facilitating persistence and the maintenance of genetic variation. Our team of ecologists are currently planning reintroductions of the Burrowing Bettong and Golden Bandicoot (*Isoodon auratus*) to Newhaven. Both species were formerly abundant in the arid zone – in fact, remnant warrens made by the Burrowing Bettong can still be found on Newhaven.



Images

Ecosystem engineers such as Bilbies and Burrowing Bettongs (3. *Brad Leue/AWC*) create a landscape pitted with holes (1. *Wayne Lawler/AWC*). Their digging and burrowing plays a crucial role in ecosystem processes, even impacting the retention of surface water and nutrients in semi-arid ecosystems.

2. In partnership with the NSW Government, AWC restored Numbats to NSW national parks at the end of 2020, after an absence of more than 100 years. *Wayne Lawler/AWC*



Bettong warrens also provide important habitat and thermal refuge for a range of other species in the desert, including several mammals we hope to reintroduce to Newhaven in coming years. The burrows and diggings made by small mammals are a fundamental component of the ecology of arid Australia, trapping water and nutrients, and facilitating plant regeneration. This highlights the fact that rewilding projects, while important for species conservation, actually involve the restoration of entire ecosystems.

Partnership projects

Our two projects conducted in partnership with the NSW Government, in the Pilliga and at Mallee Cliffs National Park, are also still in the early phases of reintroductions. To date, four of a total of 11 regionally extinct mammal species have been reintroduced to these sites, as part of the *Saving our Species* program. Another four or five reintroductions are planned for 2021, depending on the availability of founders (an unpredictable element of these programs, influenced by factors ranging from environmental conditions at source sites to the granting of regulatory approvals). As at Newhaven, the reintroduction of 'ecosystem engineers' such as the Bilby has important consequences for the restoration of ecosystems in the Pilliga and Mallee Cliffs, with diggings and burrows now starting to pit the soil surface.

AWC's newest fenced area project, the Western River Refuge on Kangaroo Island (KI), is helping protect the threatened KI Dunnart (*Sminthopsis aitkeni*) and other

locally endemic species, in the face of severe predation by feral cats after the 2019-20 bushfires burnt 93 per cent of the Dunnart's known range.

Looking to the future

AWC is in the final stages of preparing for the on-ground work required to establish a 900-hectare fenced area at Mount Zero-Taravale Wildlife Sanctuary, in north Queensland. This work is being done to facilitate the reintroduction of the endangered Northern Bettong (*Bettongia tropica*), which has declined to just two populations. We expect the safe haven on Mount Zero-Taravale to support a population of around 500 bettongs – the habitat within the fence includes locations where the species was last recorded in the area, some 20 years ago.

AWC's network of feral predator-free areas is a nationally significant piece of conservation infrastructure that makes a major contribution to the protection of Australia's critical weight-range mammals. Reintroductions to these and other predator-free areas were called out as rare examples of positive outcomes for our native mammals in the Action Plan for Australian Mammals (Woinarski et al. 2014), in the Threatened Mammal Index (developed by the Threatened Species Recovery Hub of the Australian Government's National Environmental Science Program) and by a recent House of Representatives Inquiry into tackling the feral cat pandemic. In fact, the Inquiry called for an expansion of feral predator-free areas, and AWC was specifically commended for our work addressing the problem of feral cats.



Images

1. AWC is establishing the first feral predator-free fenced area in northern Australia, to reintroduce and protect the endangered Northern Bettong. This population is forecast to provide a 50 per cent increase to the global population. *Wayne Lawler/AWC*
2. Gugu Badhun Traditional Owners are key partners in the creation of the feral-proof fence and the reintroduction of Northern Bettongs. Recently, Gugu Badhun cultural heritage Elders (Derek Hoolihan and Narda Kennedy) and cultural heritage monitors (Clinton Hoolihan and Allira Kennedy), and AWC staff (Catherine Hayes) were involved in the cultural heritage assessment of the proposed fence line. From left to right: Derek Hoolihan, Clinton Hoolihan, Allira Kennedy, Narda Kennedy, Catherine Hayes. *Felicity L'Hotellier/AWC*

The Northern Bettong: a future in the balance

Felicity L'Hotellier, Senior Field Ecologist and Josh McAllister, Sanctuary Manager

Listed among the 20 Australian mammal species at greatest risk of extinction (Geyle et al. 2018), the future of the Northern Bettong (*Bettongia tropica*) hangs in the balance. With a range once extending from the Wet Tropics to central Queensland, predation by feral cats, wildfire and habitat loss has seen the species restricted to the tall, open eucalypt forests and woodlands adjacent to the rainforests of North Queensland. Only two unsecure populations remain – one, on the Lamb Range, estimated at fewer than 1,000 individuals, and a second smaller population on the Mount Carbine Tableland thought to support fewer than 100 individuals.

The establishment of a third, secure population at AWC's Mount Zero-Taravale Wildlife Sanctuary, a landscape once home to the Northern Bettong, is a critical step in safeguarding the future of this species.

Building a secure future

Throughout an unpredictable 2020, AWC continued to advance the Northern Bettong reintroduction plans. The alignment of the Mount Zero-Taravale feral predator-free exclosure was finalised, with the team walking, revising (and re-walking) the proposed lines. Gugu Badhun Traditional Owners, key partners in the reintroduction project, also completed a cultural heritage assessment of the proposed fence line to ensure the alignment would not adversely affect any culturally significant objects or sites.

Creeks and drainage lines were paid particular attention throughout the planning process, with the monsoonal climate of North Queensland presenting unique design challenges. Along the length of the 13-kilometre fence line, 25 creek crossings will be required; 12 of these are significant. While normally just a trickle during the dry season, some of these creeks can become a torrent of water up to 2 metres deep in the wet season. Engineers were engaged to advise on these crossings, and surveyors will undertake further assessment of two major crossings when the current wet season recedes.

Fencing materials have been acquired, with feral eradication and earthworks due to start in coming months. Fence construction will commence shortly after, with eradication and intensive monitoring continuing until there is no evidence of feral predators detected for a consecutive 3-month period. At this point the area will be declared feral predator-free, which will allow us to proceed with the ultimate step: returning Northern Bettongs to Mount Zero-Taravale.

A much-anticipated return

AWC has been working closely with the Northern Bettong Recovery Team, Traditional Owners and key stakeholders to finalise translocation plans and monitor the two remaining Northern Bettong populations. The Department of Environment and Science and other regulatory bodies have also been widely consulted to progress the approval of on-ground plans.

During 2020, AWC ecologists undertook cage- and camera-trapping efforts across three key subpopulations in the Lamb Range. These populations have been variably monitored for more than two decades. Founding individuals for the Mount Zero-Taravale population will be sourced from across these populations; monitoring both prior to and following the removal of founders is an important component of our reintroduction plans.

All going to plan, AWC is scheduled to translocate Northern Bettongs back to Mount Zero-Taravale following next wet season.

Wet Tropics Northern Bettong research project continues

AWC, in partnership with the Western Yalanji Aboriginal Corporation and Queensland Parks and Wildlife Service (QPWS), has also been conducting research on the Northern Bettong population on the Mount Carbine Tableland over the last four years. This work is currently funded through the Queensland Department of Environment and Science Community Sustainability Action grant scheme. A key objective of the research is to develop non-invasive methods to monitor this small and isolated population, as well as monitor feral cats and the impacts of cattle mitigation efforts.

This year the team are repeating the monitoring effort undertaken in 2020, including cage- and camera-trapping surveys, and fitting a subset of captured individuals with GPS-tracking radio collars. Filling knowledge gaps surrounding this population is critical for its ongoing persistence and will be central to the development of a population management plan currently being drafted by QPWS.