Science
for saving species

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Issue 5

Watching an island transform

Monitoring Macquarie Island after a massive intervention

Conserving Australia's least-known bird: the night parrot

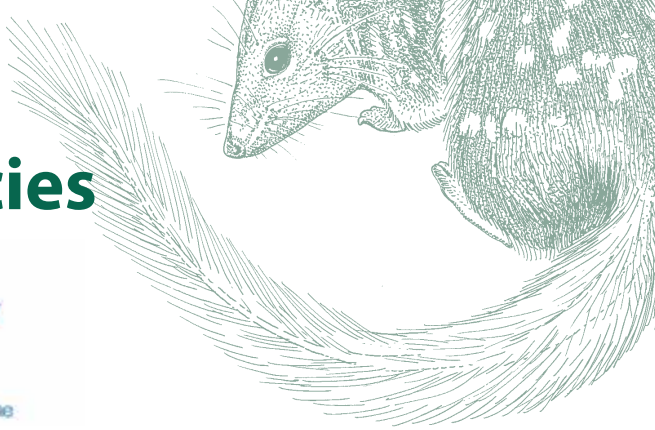
Understanding Buloke Woodlands

Translocating threatened Australian plants

Threatened Species Recovery Hub

National Environmental Science Programme

IMAGE: BEN HORNE



NESP and threatened species

The TSR Hub is a serious investment by the Australian Government in the science of saving threatened species, but it's not where the NESP investment ends. The TSR Hub is one of six National Environmental Science Programme hubs and each is making its own important contribution to the national effort to recover our threatened species. The TSR Hub is always keen to acknowledge our many collaborators across our broad suite of projects, however, with this editorial I'd like to look beyond our own hub and highlight the good work being done on threatened species by our sister hubs.

Clean Air and Urban Landscapes Hub
National Environmental Science Programme

The **Clean Air and Urban Landscapes (CAUL) Hub** is focusing on the sustainability and liveability of urban environments. Biodiversity conservation (including threatened species management) lies at the centre of many of its projects and TSR and CAUL are collaborating on several projects including studies of urban populations of frogs and flying foxes. Other research of the CAUL Hub includes understanding urban residents' interactions with nature and developing protocols for reintroducing species into cities.
http://www.nespurban.edu.au/

Earth Systems and Climate Change Hub
National Environmental Science Programme

The **Earth Systems and Climate Change Hub** is improving our understanding of climate processes and how they are changing. Changes in our climate – including increasing temperatures, changes in rainfall, more extreme rainfall and increased fire-weather risk – could all impact on threatened species and pose new threats to other species. Accessible climate change information will improve our understanding of these possible impacts, and inform threatened species policy and management decisions.
http://nespclimate.com.au/

Marine Biodiversity Hub
National Environmental Science Programme

The **Marine Biodiversity Hub** is developing improved and innovative approaches that increase the options available to managers and stakeholders to protect and recover priority marine species. Approaches include seascape analysis to identify priorities, national threat-based analyses and priorities for multiple species, and use of cutting-edge genetic techniques and telemetry to estimate population size and connectivity of rare and difficult to sample species. Conservation of sharks is a dominant theme of the Hub's research. Other focal species include spotted handfish, southern right whales and seasnakes. The Hub is increasingly engaging in restoration of compromised habitats, especially shellfish reefs and saltmarshes.
https://www.nespmarine.edu.au/

Northern Australia Environmental Resources Hub
National Environmental Science Programme

The **Northern Australia Environmental Resources Hub** is developing knowledge to underpin improved sustainable planning, management and policy in northern Australia. Within this they are identifying high-priority areas for threatened species and ecosystems to better target threat abatement and species recovery investments; and are trialing practical species recovery techniques in Kakadu National Park. TSR is working with the Northern Hub on several research topics including management of feral animals and the design of monitoring programs.
http://www.nespnorthern.edu.au/

The TSR Hub is one of six National Environmental Science Programme hubs and each is making its own important contribution to the national effort to recover our threatened species.

Tropical Water Quality Hub
National Environmental Science Programme

The **Tropical Water Quality Hub** works to build Great Barrier Reef resilience through research projects that improve water quality and reducing other pressures on these ecosystems. Many projects focus on improving prospects for the coastal, seagrass and reef habitats that sustain threatened species such as turtles and dugongs.
http://nesptropical.edu.au/

As you can see, the science of threatened species cuts across multiple sectors and relates to all dimensions of Australian life. While the TSR Hub has a tighter focus on the theme of 'threatened species', protecting our endangered animals and plants is a common cause whether we are working in the space of our cites, regional Australia, the marine realm or the atmosphere.

Which raises a key insight we all should keep in mind; the key to the successful recovery of Australia's threatened species does not lie in only one research centre or network. Rather, it depends upon multiple approaches engaging a variety of different skills and insights.

Australia has an enormous challenge ahead in recovering its many threatened species. NESP science in all its forms and places give us a much better chance of meeting that challenge.

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Professor Brendan Wintle
Director, TSR Hub
http://www.nespthreatenedspecies.edu.au/

Inside the spring 2017 issue of *Science for Saving Species*

Threatened Species Recovery Hub
National Environmental Science Programme

Mammals on 'arks'

Sarah Legge (ANU/UQ) discusses the importance of havens from cats and foxes for Australia's besieged mammals

Two hundred years ago, a small Australian wallaby known as the boodie (or burrowing bettong) was abundant across several million square kilometres. Then, with astonishing rapidity, it disappeared from its entire mainland range, largely because of predation by introduced cats and foxes. Fortunately, the boodie occurred on four islands off the WA coast where there are no cats and foxes. Those islands – representing far less than 1% of the boodie's former range – allowed this species to narrowly avoid extinction. Eight other Australian mammal species similarly had island populations that persisted as their mainland populations disappeared. Many other species weren't so lucky. They are gone forever.

As well as acting as accidental 'arks', islands have played a critical role in ongoing efforts to conserve Australian mammals. Managers have carefully harvested some individuals from isolated island populations, and from diminishing mainland populations of other species, and translocated them to other islands to establish additional populations and reduce extinction risk. As our capability to eradicate feral cats and foxes from islands improves, the options for island translocations have expanded.

Offshore island options have been augmented by 'mainland islands': areas surrounded by purpose-built fences keeping out cats and foxes. The number and area of offshore islands and mainland fenced exclosures used for translocations of threatened mammals has increased considerably since the 1990s. The importance of these areas to the conservation of threatened species is reflected in much of the TSR Hub's research.

I recently co-convened a symposium on the 'safe-havens' approach (with fellow TSR Hub leader John Woinarski and Keith Morris from the WA Department of Biodiversity, Conservation and Attractions), at the International Mammalogy Congress in Perth. We sought to take stock of the contribution of 'safe-havens' to mammal conservation, identify challenges and chart future steps.

At this symposium I presented research, compiled with many other contributors, that provided the first consolidated national tally of havens for threatened mammals. This exercise revealed that of the 66 threatened mammal taxa that are highly susceptible to predation by cats and/or foxes, 38 are represented across 103 islands (that's a total of 2,188 km^2 free of feral predators) and 15 mainland exclosures (324 km^2). This is good progress. However, almost half the taxa that need a haven are yet to be have one.

Drawing upon this national tally plus other information derived from a TSR Hub workshop, Jeremy Ringma (UWA/UQ) presented a spatial optimisation approach for adding to this haven network in a systematic manner that efficiently generates the greatest conservation benefit across all threatened mammal species in Australia.

Several presentations focussed on case studies of past and future island translocation projects, often demonstrating increasing ambition as our experience with establishing new havens grows. Reflecting the rich history of island conservation and translocations in WA, Keith Morris described the grandest island restoration project in the nation's history: a sequential translocation of nine threatened mammal species to Dirk Hartog Island. At 628 km^2, Dirk Hartog Island is the largest island in the world from which feral cats have been eradicated.

On the topic of increasing scale, John Kanowski outlined the Australian Wildlife Conservancy's plans for building increasingly large mainland fenced areas.

Duncan Sutherland (Phillip Island Nature Parks) described plans to eradicate feral predators and restore native mammals on Phillip Island. This is a relatively large and populated island, necessitating unprecedented local community support. The Phillip Island Ark project is supported by the Government's Threatened Species Strategy.

Translocations of small numbers of founders to havens present longer-term management challenges, and some presentations addressed examples of these, including managing the genetics of translocated populations, dealing with overabundance when a species does 'too well' within the haven, and quantifying the threat of reinvasion by the eradicated predator(s).

Although havens are critical for safeguarding against extinction in the short-term, solutions for establishing populations of predator-susceptible species outside havens need to be found. As well as providing longer-term security, returning species to open landscapes will also restore many of the vital ecological functions these species previously performed. Katherine Moseby (Arid Recovery/UNSW)summarised some of the novel approaches being trialled to help achieve this goal.

The symposium included global perspectives: John Woinarski summarised the importance of islands for global mammal diversity, and highlighted the relative vulnerability of island-dwelling mammals. Matt Hayward (Bangor Uni) provided an overview of the increased reliance on fencing globally, showing why the expansion of fencing for conservation needs to be carefully managed, with examples of fences that, by mistake or by neglect, have harmed wildlife.

The perspectives provided in our symposium demonstrate that islands and predator-proof exclosures are pivotal for the conservation of an increasing number of Australia's threatened mammals. Havens have their management challenges, but these are increasingly being recognised and resolved. There is enormous potential for a strategic expansion of the haven network, for achieving a more comprehensive representation of threatened mammals within them, and for using haven populations as sources for the restoration of mammals in open landscapes.

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BELOW: Most of us only glimpse Australia's off-shore islands through a plane window. It is this remoteness that has made them historically critical to saving many of our threatened mammals. The island pictured here (photographed by Sarah Legge) is Dirk Hartog Island.

Watching an **island transform**

Monitoring Macquarie Island after a massive intervention

IMAGE: ALEKS TERAUDS

ABOVE: Justine Shaw has watched the ebb and flow of Macquarie Island's natural wonder - from degraded World Heritage site, to a world-first island-wide predator control experiment.

In a time of rampant biodiversity decline, it's heartening to consider that sometimes, when we set our minds to it, grand things can be achieved. For that is exactly what happened on sub-Antarctic Macquarie Island where a multi-million dollar eradication program saw the removal of rabbits, rats and mice in 2013. In the aftermath of this effort, beautiful things are emerging. Dr **Justine Shaw** from the University of Queensland is leading a TSR Hub project seeking to learn from this experience and monitor how ecosystems respond. Here she explains what has happened.

Far to the south of the Australian mainland lies a large chunk of rock and soil known as Macquarie Island; it's about 1500km from Hobart. So special is this place that it is on the World Heritage register as a geologically unique island with incredible aesthetic values. It is also a treasure trove of endemic and threatened species. But the natural values of this World-Heritage island have been steadily eroding over the past century as the island's physical and biological structure has been under relentless attack from a several vertebrate invaders.

Grey petrel numbers are increasing following the removal of vertebrate pests.

The island was an important destination for seal hunters who, over 180 years ago, took cats to the island. Several decades later they released rabbits as a food source and unintentionally introduced rats and mice. All of these mammals made the island their home. Over time these species pushed several native species to the edge of extinction (and caused the extinction of at least two endemic bird subspecies). And the rabbits had devastating impacts on the island's cover of native vegetation (leading to significant soil erosion).

Macquarie Island is currently home to 12 EPBC-listed species; an endemic orchid, endemic cushion plant, an endemic cormorant, 3 species of burrowing petrel, four species of albatross, two species of giant petrel, two species of seal and the Antarctic tern. Many of these species were preyed upon by cats and rats, or indirectly impacted through disturbance and habitat loss by grazing rabbits, or changes in predation pressure due to prey availability. Mice had a big impact on native invertebrates (and specifically spiders).

So, while Macquarie is yet another horrible example of what a small group of non-native species can do to an island ecosystem, it is also turning out to be a wonderful case study and learning opportunity of what can be achieved if those invaders can be removed.

Since the 1970s rabbits were controlled through the introduction and continued deployment of the myxomatosis virus. Feral cats were eradicated from Macquarie in 2000 but it was always acknowledged this partial solution wasn't enough. The motivation for cat eradication at the time was to ensure that burrowing petrel species did not go extinct on the island, which was achieved. Rabbits, rats and mice remained on the island. The rabbit population went through another explosion in the 2000s, due most likely to the eradication of cats, a reduction in the efficacy of myxo and vegetation recovery due to previous myxo success. The big breakthrough came with the successful eradication of rabbits, rats and mice in a program that commenced in 2013 through a large-scale aerial baiting program that cost

Key messages

The eradication of cats, rats, rabbits and mice from Macquarie Island promises to transform the island's ecological trajectory

Monitoring the transformation will be important in guiding island-eradication programs world-wide

LEFT: Grazing and burrowing rabbits removed vegetation resulting in substantial landslipping and erosion. RIGHT: Macquarie Island megaherb (dominated by *Pleurophyllum hookeri*), is now recovering following the eradication of the rabbits.

$24.8 million (that also included targeted follow-up hunting). It was the largest, most ambitious and most expensive multi-species vertebrate eradication program ever attempted in Australia. (The eradication was jointly funded by the Australian and Tasmanian state governments. Logistic support was provided by the Australian Antarctic Division.)

How has the island ecosystem responded to such a large-scale management intervention? I've been privileged to lead a project to find out. I have assembled a team of collaborators; scientists from other universities (Melbourne, Monash, UTAS), and Tasmanian state and federal government agencies. As part of this effort we have recruited three PhD students who will examine different aspects of species and ecosystem recovery. Two are based within the TSR Hub at the University of Queensland, one is at the Institute of Marine & Antarctic Studies at the University of Tasmania.

The first stage of the project has been to trawl through a variety of historical sources and databases to collate records of where species have been observed and studied. We are using archival imagery and remote sensing to identify when and where rabbit grazing and burrowing had the greatest impacts on vegetation and threatened species habitat. This work is in conjunction with the Tasmanian Parks and Wildlife Service.

New field data have been collected, and more is proposed in years to come, with the goal of tracking ecosystem change into the future. All of these elements will assist in the development of an optimal long-term monitoring strategy for the island. Furthermore, this project will quantify the conservation return-on-investment of the eradication program. The hope is that we can assist with decisions relating to island eradications all around the planet.

We have identified several 'obvious' candidates for monitoring. Among these were some of the invertebrates found on the island (including spiders). They were a major prey item of mice, and to a lesser extent rats, and rabbits greatly transformed their habitats. They play a major role in nutrient cycling on the island.

Burrowing petrels are another good target for monitoring. They were preyed upon by cats and rats, and their nesting habitats were greatly altered by rabbit grazing. While it has been assumed they will recover, we currently have little data to support this. We do not currently know if all species will respond the same and at the same rate.

Skuas are another focus. This native predatory bird ate rabbits, and some were poisoned during the eradication process (an anticipated but unavoidable form of collateral damage of the project). Skuas also prey on burrowing petrels so there are some interesting and complex feedback interactions that are likely to play out now that the cats, rats and rabbits are gone, and the prey available to skuas has changed. It is of great relevance to managers and threatened species scientists (locally and globally) to determine the impacts of skua predation on threatened borrowing petrels.

What have we found so far? 'Good' responses on the whole.

Preliminary work by PhD-student Melissa Houghton has shown that spiders are increasing in abundance and distribution following the rodent eradication.

Grey petrels have increased since cat eradication. As they are listed under the Agreement on the Conservation of Albatross & Petrels, there is much interest in determining their population status and future trajectory.

As already mentioned many brown skuas (several hundred) died during the eradication process when they ate poisoned rabbit carcasses. But what happened afterwards? Preliminary results collected by PhD-student Toby Travers show a reduction in the breeding population and the reproductive output of the island skua population. This summer we will focus our efforts on investigating how the brown skua diet has changed following rabbit eradication, particularly to understand what the predation pressure may now be on burrowing petrels.

The burrowing habit of the petrels makes then very difficult to monitor. Last summer, bio-acoustic recorders were deployed on Macquarie Island to survey the nesting burrowing petrels (for the first time). PhD-student Jez Bird will undertake more field work this coming season that resurveys areas where we have historic data. This will enable us to estimate trends in relative abundance and the breeding success of these petrels. Jez will review existing methods of species monitoring, and examine known sites to identify an island-wide approach to monitoring seabird presence and abundance.

It is planned that all three PhD students will be travelling south this summer to undertake more field work. The Tasmanian Department of Primary Industry, Parks, Water and Environment is a key collaborator in this project. The project is also funded and supported by the Australian Antarctic Science Program.

No-one can forecast what they will find because what is happening on Macquarie Island is without precedent. I can say, however, there is an enormous sense of excitement as the island's native ecosystems begin to recover after a century and a half of disruption.

There is much greater value to the project than simply documenting change and informing management on Macquarie Island. Since the eradication, there have been other rodent eradications undertaken on sub-Antarctic South Georgia and Antipodes islands, and more are proposed for Gough and Marion Islands. The global island conservation research community is eagerly watching what happens on Macquarie Island in the hope that it will inform what we might do on other islands.

For me the excitement of what is occurring on Macquarie Island is very personal as I have witnessed so much change on this unique sub-Antarctic island over recent decades. In my time I have seen the island inscribed as World Heritage; been present when cats were eradicated; and then the rats, mice, and rabbits removed. Now Macquarie is bouncing back with a tremendous growth in its unique native vegetation. We are seeing the return of the grey petrel, the recovery of endemic orchids, and who knows what's more to follow…

For further information

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Tracking **the ghost** of the **arid inland**

Conserving Australia's least-known bird – **the night parrot**

There is no other species of Australian bird that quickens the pulse of professional ornithologists and amateur birdwatchers alike, as the night parrot. In the 170 years since its discovery, the night parrot has attained legendary status as a ghost of the vast arid inland. Several sightings (and findings) in recent years have revealed the parrot is far from being a ghost, but a dearth of information on the bird makes it hard to plan for its persistence into the future. **Nick Leseberg** from the University of Queensland brings us up to date on what is known about the night parrot, and what is planned for its conservation.

ABOVE: Long-unburnt spinifex on the Pullen Pullen Reserve in western Queensland is ideal roosting habitat for the night parrot (IMAGE: NICK LESEBERG)

Since the night parrot was first recorded by Europeans on Sturt's 1844 expedition to central Australia, the bird was encountered occasionally throughout central Australia until the early-20th century. The night parrot then seemed to vanish for reasons unknown, although the finger was pointed, even then, at the spread of pastoralism, feral animals and changed fire regimes.

For much of the 20th-century the only evidence of the bird's existence was an intermittent trickle of reports; some certainly authentic, some undoubtedly not. These reports came from an eclectic mix of explorers, graziers, jackaroos and indigenous landholders.

It was not until 1990 that hard evidence of the night parrot's continued existence was found by a dusty highway near Boulia in western Queensland. Walter Boles, an Australian Museum ornithologist and probably one of few people who knew what he was looking at, spotted the desiccated carcass of a night parrot by the road side. A piece of road-kill.

This tantalising find was followed by a reported sighting from Western Australia's Pilbara in 2005. In 2006, another dead night parrot was found under a barbed-wire fence in Queensland's Diamantina National Park.

Although these reports verified its continued existence, the night parrot remained Australia's least-known bird. Then, in 2013, on a cattle station in western Queensland, naturalist John Young not only saw the mythical Night Parrot, he recorded its call, photographed one, and even took a short video! This find made the front page of national newspapers, and after more than a century of hope both the scientific and birding communities were abuzz.

Following this discovery, Bush Heritage Australia negotiated the purchase of the land where the parrots were found, following an 18 month interim stewardship arrangement funded by Fortescue Metals Group.

This occurred in parallel with three years of intense research by Dr Steve Murphy. We now know that night parrots in western Queensland seem relatively sedentary and predictably vocal, occupying areas of long-unburnt spinifex, sometimes for extended periods. Year round, the parrots call to each other in the first hour after sunset, and again just before sunrise. In May 2016, a male wore a tiny GPS tag and was found to be travelling several kilometres from his roost to feed on grassy floodplains, stony pavements and small drainage lines. On one night this roving male clocked up at least 40 kilometres.

Researchers at the University of Queensland are now taking a lead role and, in collaboration with the Night Parrot Recovery Team, have defined a series of important research questions.

Key messages

The night parrot has now been 'rediscovered' at several locations across Australia's vast interior

A major research effort has been launched to determine if the species is rare or just difficult to detect

Its ongoing conservation will involve the active participation of private landholders


IMAGE: ANDREW DAWSON

The instrument being set up in the image above is an acoustic recorder. These instruments are an important tool for night-parrot research and are used for both detection and long-term monitoring.

As part of my PhD at UQ, and working with James Watson and Rich Fuller, I am planning to conduct further GPS tracking to confirm whether birds adjust their behaviour during dry periods, travelling further afield, or targeting different resources. This activity will inform habitat modelling and wider searches for more populations (all of which is currently under review for funding in the next round of NESP TSR projects).

Investigations are also underway on threats facing the bird. We know that cat numbers are low in the landscape where the parrots occur, and foxes are absent. Work by the TSR Hub, supported by Bush Heritage Australia, is looking at the impact of dingoes on cats. It will also be important, now that grazing is excluded from some of the areas where the birds occur, to monitor any changes this causes in resource availability and its impact on the parrots.

Since 2013, night parrots have been found on Diamantina and Goneaway National Parks and a couple of nearby pastoral leases. Birds have also been found in central Western Australia, and in the past few months what are very likely to be night parrots have been recorded calling at a site in the southern Northern Territory. It is early days for these newly discovered populations, but plans are also underway to conduct similar research on them.

Superficially the habitats where these birds occur are quite different. Do these different habitats support different levels of occupancy? Answers to these questions will help us determine the true status of the night parrot, which is one of the most important aspects of this intriguing bird. Is it truly rare, or just very hard to detect?

Finally, conservation of the night parrot will require an appreciation of how modern conservation techniques can be adapted for the species. As populations are likely to be widely spaced and isolated, it is doubtful that Australia's protected area estate will satisfactorily conserve the species. Instead, integrated conservation measures implemented jointly between state authorities and private landholders will be required.

Pleasingly, in the region where the birds have recently been found in Queensland, landholders have demonstrated a general willingness to assist with night parrot conservation, provided this can be balanced with the demands of managing their land for profit. Given that most night parrots are likely to occur on private land, the goodwill of private landholders will be an important component whatever the direction night parrot conservation takes.

For further information

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IMAGE: NICK LESEBERG


IMAGE: NICK LESEBERG

The ghost that squawks

As the name suggests, the night parrot is nocturnal. The birds roost during the day in small tunnels in long-unburnt spinifex. Shortly after sunset they emerge from their roosts and spend a few minutes calling to each other before moving out to spend the night feeding on grassy floodplains, or ironstone plains with scattered patches of succulent plants. They sometimes travel large distances to get to their preferred feeding areas. Around sunrise they return to the same roost, calling again for a brief period before settling in for the day.

Pictured above is a juvenile night parrot (left). Young birds are much greyer than the adults (shown on the right) which are bright green with a yellow belly and covered in black spots and barring.

The **Last Stand** for **Threatened Buloke Woodlands?**

Understanding why threatened woodland species are failing to regenerate

IMAGE: KATE CRANNEY

The Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions is an Endangered Ecological Community. Cleared over much of their original range to open up land for livestock grazing, the largest remaining remnants now lie inside national parks, but these are highly degraded. Park managers hoped that by removing livestock the Woodlands would regenerate naturally but, so far, this has failed to happen. Dr **David Duncan and colleagues** at the University of Melbourne have taken on the problem. Here he explains their multi-pronged approach.

Buloke Woodlands (also known as pine-buloke woodlands) are a semi-arid woodland community that occurs in the dune swales and former floodplains of 'mallee' landscapes in South Australia, Victoria and NSW. These relatively fertile swathes of country would have been important habitat for mammal species now regionally extinct such as woylie, red-tailed phascogale , bridled-nail-tailed wallaby, and the dingo. The woodlands were important hunting and foraging grounds for indigenous peoples, and evidence of their presence is frequently revealed by shifting sands.

When pastoralists first encountered the woodlands, they saw promising opportunities for livestock grazing. The woodlands were rapidly cleared or 'opened-up' for pastoralism, converted to freehold, and in places later developed for cropping. Cattle were introduced, bringing pasture weeds, and dingoes were exterminated. Eventually, following a review of public land use by the Land Conservation Council (in Victoria), grazing leases were extinguished and three of the largest Buloke Woodland remnants were incorporated into the Mallee National Parks of North Western Victoria.

The hope was that these large remnants would regenerate, but unfortunately, this has not been the case. Rabbits and kangaroos took advantage of increased grassy pick, goats made use of artificial water sources, and combined with the absence of dingoes a rapid increase in herbivore numbers resulted. Unfortunately, these changes perpetuated the damaging grazing pressure that the Government had sought to remove.

Parks Victoria aims to promote the natural regeneration of woodland species by managing and monitoring total grazing pressure – the combined impact of native kangaroos and introduced herbivores (primarily rabbits and goats). The exercise marks Parks Victoria's longest continuous park management intervention. This management model, informed and adjusted over time (and with the help of considerable local knowledge and research partnerships), reflects the assumption that if grazing pressure is kept under control then recruitment events will naturally occur. However, although numbers of rabbits and kangaroos have been maintained at around or below target levels for extended periods, the Buloke Woodlands Community has not bounced back.

ABOVE: Ami Bennett (left) and Emily Baldwin look out from the crest of an ancient dune toward the Wirrengren Plain (Wyperfeld NP). A solitary young pine grows below the dune, and behind it a mature buloke. The area they are gazing at would have formerly been dominated by the Buloke Woodland Community.

A regeneration crisis

The Buloke Woodlands Community is experiencing a regeneration crisis. The remaining populations of the dominant tree species, buloke (*Allocasuarina luehmannii*), for which the community is named; belah (*Casuarina pauper*); and slender cypress pine (*Callitris gracilis*) are aging, and there are few seedlings and saplings coming up to take their place. Concern about the future of the community increases with each passing year in which no recruitment of canopy species occurs.

Unfortunately, it is not the only problem the Buloke Woodlands Community faces; the more

Key messages

Despite formal protection, the Buloke Woodlands Community is not regenerating

To help managers, we need to know when and where herbivore grazing pressure threatens seedling survival

Our approach combines field experiment, field survey, remote sensing and scenario modelling

palatable shrub and herb species were greatly reduced during the period of pastoralism, and most woodland patches have only a fraction of the native understorey species once present. Missing are important species such as wattles and peas, once common in this community, and the mammals mentioned earlier. Nonetheless, the recruitment of canopy species is fundamental to preserving the structure of the community, and a breakthrough is urgently required to ensure that we are not witnessing the Woodlands' last stand.

Previous research has identified information gaps that need to be filled if managers are to adaptively address the problem, which is where the TSR Hub comes in. Our researchers are undertaking a set of projects to target these knowledge gaps. Here are the key questions we are tackling:

Under what circumstances do seedlings survive to become reproductively mature adults?

In the absence of natural regeneration of the missing tree and shrub elements of the Buloke Woodlands Community, Parks Victoria has undertaken extensive revegetation through direct seeding and replanting of buloke, belah, slender cypress pine, and several species of *Hakea* and *Acacia* amongst others. Past revegetation efforts have had limited success. Consequently, the prognosis for the current plantings is uncertain.

Emily Baldwin, currently undertaking her Masters research, is modelling seedling survival using monitoring data from revegetation projects. Emily's work asks: what level of grazing pressure can seedlings tolerate? Can seedling survival be improved by management interventions such as protective seedling guards?

Dr Ami Bennett is leading a complementary, field experiment focused on hand-planted buloke seedlings. Buloke is the most perplexing case of recruitment failure in the Buloke Woodland Community because the species does recruit readily in other parts of the country. Ami's experiment is testing how herbivore exclusion treatments and landscape position influence the survival of buloke seedlings.

Can native herbivore feeding patterns be forecast from remotely-sensed data?

PhD student Linda Riquelme is looking at how satellite imagery can be used to estimate grass biomass to help Park managers refine their kangaroo management strategy.

One of Park Victoria's most heavily scrutinised management actions is the control of western grey kangaroo populations by culling. Western greys are thought to be the primary native grazer responsible for regeneration failure in this community. Kangaroo numbers are controlled (as are introduced herbivores) so that native seedlings may survive and reach reproductive maturity.

Buloke and pine seedlings are not the favourite food of kangaroos. However, it is believed that when the amount of native grass drops, kangaroos switch to other food sources, like seedlings of buloke, pine, shrubs and forbs. Therefore, managers need to be able to forecast how much grassy forage is available to better target kangaroo control to times when the risk of over-grazing is high.

Putting the pieces together

Each of the above studies targets a particular knowledge gap. Filling these gaps will benefit the management of the Buloke Woodlands Community into the future by providing an evidence base upon which more targeted and cost-effective management decisions can be made.

My job will be to combine new insights from these studies with existing knowledge from previous work to simulate management action and consequence scenarios for the Buloke Woodlands. The models I produce will help identify management priorities in the coming years.

Enhancing regeneration of buloke woodland species has proved a more difficult challenge than I ever imagined. Through targeted field trials, addressing knowledge gaps, and synthesising decades of disconnected work, we hope to contribute to a reversal of the fortunes of the Buloke Woodlands Community.

For further information

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BELOW: A typical remnant stand of buloke in Wyperfeld NP where seedlings have not appeared in over 50 years. Wooden stakes mark experimentally placed saplings.

IMAGE: AMI BENNETT

Welcome to the Community

Whilst the bulk of the research undertaken by the Threatened Species Recovery Hub deals with individual species, the Hub's work also encompasses Threatened Ecological Communities.

Ecological communities – you might like to think of them as ecosystems – are assemblages of species that occur and interact together, and will have co-evolved together, in a particular area typically defined by soil, rainfall and geomorphology.

That might sound a bit technical, and the communities in question each have their specific and technical definition, but often these communities correspond to well-known plant assemblages. For example, the grassy basalt plains to the west of Melbourne are known to many, but fewer will know of them as the Natural Temperate Grasslands of the Victorian Volcanic Plain, which is their formal designation as an Endangered Ecological Community.

The Buloke Woodlands of the Riverina and Murray Mallee Depression Bioregions as an ecological community is Endangered, even though many of its constituent species are not. Neither are constituent species necessarily confined to the community; buloke itself occurs from semi-arid South Australia along the inland plains of the Great Dividing Range as far north as Cairns!

A range of native animals, including several iconic and threatened species, also form part of the Endangered Ecological Community and depend on it for habitat. Major Mitchell's cockatoo preferentially nests in the hollows of mature slender cypress pine, which are in desperately short supply. The Endangered red-tailed black cockatoo feeds on buloke seeds a little further south and could plausibly benefit from a resurgence of buloke in the mallee.

IMAGE: JEN SILCOCK

Keeping tabs on **Plants going places** in Australia

LEFT: Dr John Morgan of La Trobe University monitors a translocated population of the Endangered grassland herb *Rutidosis leptorrhynchoides* on the Victorian Volcanic Plain. Planted in the mid-1990s, some of the original plants are still alive, and in November 2016 there were more than 100 seedlings. Hotter spring temperatures being experienced in the region mean their survival is not assured.

People have transported, cultivated, tended, used, celebrated and worshipped plants for tens of thousands of years. Sometimes our efforts led to a few species doing very well. Most of the time, however, our interactions have caused the diversity of plant life to shrink – through habitat loss and fragmentation, disease, weeds and overgrazing. Now we've started moving plants around to safeguard their survival. Indeed, we've been doing this for decades but so far we haven't reviewed what we know about this process. But that's about to change. Dr **Jen Silcock** from the University of Queensland provides an overview on the effort to build a new translocation database.

The science of conservation translocations – the intentional movement of species to a new area (or augmentation of existing populations), with the aim of reducing a species' extinction risk – has emerged and rapidly evolved in the past four decades. The use of translocation seems likely to increase in the coming years in response to intensifying threats, not least the spectre of anthropogenic climate change.

Translocations are challenging, high-risk, often costly and involve serious ethical considerations. However, in Australia (and North America, where a similar study is being conducted) we have very little idea of what has been done in the way of plant translocations, how they have been used and whether they have worked. The literature is limited and biased towards successful projects. Most of the data on plant translocations sits in people's heads or in filing cabinets (or on hard-drives these days), or buried in hard-to-access documents like internal reports and evaluations.

So what has been going on? Where have plants been moved to and from? What plants are involved? Who has moved them and why? And have these translocations been successful, in terms of establishing viable new populations or enhancing existing ones and, ultimately, decreasing extinction risk for species?

Last year, a NESP Threatened Species Recovery Hub workshop brought together about 30 plant-translocation experts to discuss what data should be collected to review Australian translocations. Having decided on the areas to focus on, Laura Simmons and I spent most of the last year compiling an ever-growing, sprawling database. After visits, phone calls and emails to more than 150 'translocators' (including botanists, Government agency scientists, University researchers, conservation groups, consultants and landholders), we have a database documenting some 950 separate translocations, involving around 400 plant species.

Ninety of these translocations include multiple experimental treatments, such as some plants being fenced, watered or fertilised, placed in different habitats or grown using different techniques.

The majority of the translocation records have been finalised with complete datasets on where the translocation occurred, habitat, propagule type, treatments applied, survival at last monitoring date, and assessment of success based on reproduction and significant recruitment into the population. About 150 translocations have incomplete monitoring data and will be excluded from the analysis. And we are still waiting on data from around 100 translocations.

While we are still checking and tidying the database and are yet to delve into serious analysis, I presented a very preliminary preview at the Plants Going Places Information Day, followed by the ANPC's Guidelines workshop (see the breakout box), in Sydney in August.

Key messages

Conservation translocations are increasingly being used to secure the future of many of Australia's threatened plant species

We are currently bringing together data on what's been achieved so far, and what we can learn from these efforts

Here are a few translocation highlights.

Australia's first plant translocation was done, appropriately enough, by an elder statesman of Australian field botany, Bob Parsons, with John Stuwe. Jumping Jack wattle (*Acacia enterocarpa*) seedlings were planted on a reserve near Stawell in western Victoria in 1976, and at another site the following year with the help of the Nhill Lions Club. Most translocations in the late 1970s and early 1980s were done by these botanists, joined by Neville Scarlett, also at La Trobe University. They focused on species that had become very rare and fragmented due to habitat loss, mostly on the Victorian Volcanic Plain.

From the mid-1980s, other states began to translocate their threatened species, with a spike in the early 1990s with Manfred Jusaitis' experiments in south-eastern South Australia. The number of translocations undertaken per year has increased dramatically since the early 2000s, with most years seeing between 30 and 80 translocations nationally. Many of these have been done in south-western Australia by Leonie Monks (WA Department of Biodiversity Conservation and Attractions) and colleagues, and in south-eastern South Australia, targeting populations of highly endangered trees and shrubs that are now restricted to narrow degraded roadsides or threatened by disease such as Phytophthora dieback. Grassland and grassy woodland translocations have also increased, as these habitats continue to shrink with urban development, particularly around Melbourne. This includes many orchid translocations, which pose special challenges, ably risen to by Noushka Reiter and her colleagues at the Royal Botanic Gardens in Melbourne.

Queensland's first translocation occurred in 1990, when Stradbroke Islander Ellie Durbidge moved 20 *Phaius australis* lilies (pictured here) from a proposed sand mining loading dock development to a safe place about 100 metres away. All have survived and there has been good recruitment into the population.

Australia's first plant translocation was done in 1976, when about 50 Jumping Jack wattle (*Acacia enterocarpa*) seedlings were planted into Lonsdale Forest Block (now Conservation Reserve). By 2016, they had grown into a dense thicket within the fenced area and recruits had spread out across about one hectare.

While these are typical 'conservation translocations', there has also been a major increase in species being translocated as a condition of development proposals since the late 1990s. This has happened in the Victorian grasslands, but also for road upgrades and dam building in the sub-tropical rainforests and coastal heathlands along the Queensland-New South Wales coast. There are also examples from the brigalow country where gas pipelines have cut across it, and in mining areas across Australia. These are often 'salvage' translocations, where entire plants are moved out of the way of the development and planted somewhere else.

These different areas, lifeforms, climate zones, vegetation types and goals each necessitate different management and ecological considerations and success criteria. As a consequence, each will be considered separately in our meta-analysis. However, we can provide some summary numbers.

Most translocations are introductions to new sites within a species range, while about one-fifth are augmentations of existing populations. There have so far been no assisted migrations, where species are moved outside their known range based on predicted climate-change scenarios. Most plants are not moved far (<50 km), and they typically arrive as nursery-grown seedlings and sometimes cuttings; entire plants and direct seeding are less common. Most are nurtured – watered, weeded, fenced, even hand pollinated in the case of some orchids – and about one-quarter involve follow-up plantings. Interestingly, often very small numbers of plants are involved, with 370 translocations involving less than 50 propagules.

About 65% of translocations have involved the collection of monitoring data, which has shown that there has been at least 50% survival after one year. But only 70 (about 10%) could thus far be considered successful in the longer term, having flowered, set fruit and produced substantial recruitment into the population. For many species, some form of disturbance is likely to be needed to stimulate recruitment, while for others it is simply too early to tell.

For now, we're still chasing up data on a handful more translocation efforts. Then we'll attempt to tame this huge, messy, monster database. There are missing values aplenty and data of varying quality, but we have assembled a huge body of collective knowledge residing within the Australian botanical community about this complex and evolving way of nurturing plants in our modern and changing world.

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Updating **the key text**

Our review of Australian plant translocations comes at a key time as the Australian Network for Plant Conservation (ANPC) is currently revising their *Guidelines for the Translocation of Threatened Plants in Australia*. The last edition was published in 2004, and has become the go-to handbook for translocation practitioners. However, around 650 translocations, or nearly 70% of all documented Australian translocations, have occurred since 2004. So, there's an abundance of new knowledge and the need for an update.

The ANPC has appointed Lucy Commander to manage the Guidelines revision, and held a workshop in Sydney in the first week of August. About 30 translocation experts and ecologists, including four of the six authors of the 2004 edition, commenced work on the re-writing of the Guidelines chapter-by-chapter. Lucy is now collating these edits and suggested changes, and will be working with chapter authors over the coming months. Numerous case studies are also being written to showcase a variety of translocation projects, both successful and less so.

An Information Day organised by Heidi Zimmer (from the NSW Office of Environment and Heritage) and Cathy Offord (from the Royal Botanic Gardens Sydney) was held in conjunction with the workshop, and was attended by a sell-out crowd of nearly 100 people – testament to the interest in translocations in Australia and how they can be best applied to reduce the extinction risk of our most vulnerable plant species.

Western **sanctuary**

Learning from **translocations**

Dr Mike Smith joined the Australian Wildlife Conservancy (AWC) as a Regional Ecologist just as the organisation was kicking off a major conservation program to re-establish 10 regionally extinct mammal species in the south west of WA, an exciting time to come on board. The area they were being released into is an exclosure site set up by the AWC at Mt Gibson. Here he shares a few of the trials and tribulations of working with threatened species – and the exhilaration of seeing some of Australia's most imperilled animals bounce back.

ABOVE: The purpose-built exclosure fence at AWC's Mt Gibson sanctuary. Threatened species released on this side of the fence don't have to contend with exotic predators like cats and foxes. (IMAGE: W LAWLER, AWC)

Mt Gibson lies around 350 km north of Perth. Covering over 131,000 hectares it straddles a botanically rich transition zone between the wetter southwestern province and the more arid inland (Eremean) province. The property supports magnificent eucalypt woodlands of salmon, gimlet and york gum as well as a host of other rare and declining vegetation communities and up to 50 threatened plant species.

The big news at Mt Gibson is that AWC has built a specially designed 43 km conservation fence enclosing around 7,800 hectares of the best habitat on the property. Construction of the fence took 9 months. It's a couple of metres high with a skirt, an overhang and electric wires. All of the feral cats and foxes that were present have been removed from within this fenced area. Which is why we call it an exclosure rather than an enclosure, as its primary function is to keep out cats, foxes and other unwanted non-native animals (such as pigs, rabbits, goats, horses, camels and, in some cases, even house mice). The exclosure at Mt Gibson is the largest fox and cat-free area on mainland Western Australia.

"My hope is that in 50 years' time the research we're doing now will still be available and guiding the actions of what people will be doing then. "

Areas like Mt Gibson's exclosure, provide an exciting opportunity to establish viable populations of threatened native wildlife free from the impacts of exotic predators. It's a captivating place. Strolling around Mt Gibson and coming across a woylie or a greater stick-nest rat (at night) or numbat (during the day), is an extraordinarily exciting experience. Sometimes it can be easy to forget just how significant this program is, but when species that were recently extinct from the area are back living, breeding and doing their thing, it's pretty cool.

Research is fundamental to the success of these ventures; we have so much to learn. In some cases we are seeing species back in environments where they have not been in for a long time. This is when you might observe 'new' behaviours (eg, animals making use of habitats that they are currently not associated with). Anything we can do to improve the success of future translocations and to provide information that assists these activities is worth the effort.

Releasing a red-tailed phascogale into a nest box in the still of the night.

Research and **recovery**

So what are the types of work being done to learn how best to recover threatened species being released into predator exclosures? Here are a few tin tacks.

1. Tracking the outcomes of reintroductions: using radio/GPS collars, camera traps, live traps, nest-boxes and other types of monitoring, to determine survival, home range, habitat use and other attributes of reintroduced animals. These outcomes are compared with animals from different source populations (for example wild vs captive-bred) to identify optimal reintroduction methods for each species.

2. Genetic analysis and modelling: to determine the optimum source of founders and long-term genetic management of reintroduced populations.

3. Surveys of fauna, vegetation and ecological processes: to determine the response of the host environment to reintroductions.

4. Testing different survey methods: including live trapping, transect surveys, camera trapping and genetic mark-recapture from scats, in order to develop robust, cost-effective monitoring protocols.

A red-tailed phascogale gets measured.

An ecologist releases a woylie at Mt Gibson

What I enjoy the most is devising monitoring approaches that give us the best possible information to answer the questions we want answered. We have trialled a lot of different things over time and we have had our share of ups and downs. However, we are now starting to gather a collection of monitoring approaches that should produce good information for decades to come.

A numbat caught on one of the AWC's camera traps. In some cases ecologists are witnessing new behaviours as long vanished species become reaquainted with these relatively intact landscapes.

As an example, we have been working with the WA Department of Biodiversity, Conservation and Attractions to trial a new way to monitor bilbies. Because we have a good idea of how many bilbies are in the exclosure, it provides us with an opportunity to test the effectiveness of the approach.

Some species, such as banded hare-wallabies, are not really trappable and in some habitats spotlight surveying appears to be ineffective. We have developed a scat-monitoring approach for this species that provides excellent occupancy data (ie, are the banded hare-wallabies present or absent in a region, even if we don't actually see the animals themselves). We are now working on new technology that has the potential to give us further insights into these populations.

My hope is that in 50 years' time the research we're doing now will still be available and guiding the actions of what people will be doing then.

It needs to be stressed that running a large exclosure such as the facility at Mt Gibon and effectively managing our release program is no small undertaking. Thankfully I have a very talented, passionate, hardworking and dedicated team of ecologists that make this process, and my life, a lot easier. I also always like to mention the many people working hard behind the scenes in Operations, Administration, IT, Finance and the Supporter teams. They all play a really important role in generating the conservation outcomes being achieved here at Mt Gibson.

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Mt Gibson Sanctuary project site

Who's involved?

If it takes a village to raise a child, then it takes a large, diverse and committed community to reintroduce a threatened species. The reintroductions and associated research at Mt Gibson are being conducted by AWC with the TSR Hub (AWC is a partner in the Hub). Additional advice and assistance with sourcing animals is being provided by the WA Department of Biodiversity, Conservation and Attractions, other state government agencies, species recovery teams, Perth Zoo, Adelaide Zoo and other members of the Zoo and Aquarium Association. Researchers from The University of Melbourne, Murdoch University and University of Sydney are collaborating on specific reintroduction projects. AWC is seeking to involve the Badimaya Yamatji, the Aboriginal people who speak for the Mt Gibson area, in the research.

Breakfast with a **bettong**

Celebrating **Threatened Species Day** 2017

Rachel Morgain (Knowledge Broker for the TSR Hub) describes a breakfast with a difference.

I suppose it was inevitable, but as soon as I mentioned that the TSR Hub was staging a 'threatened species breakfast' invited guests couldn't help but ask: "Really, what species are on the menu?" To which I would reply: "northern corroboree frogs and eastern bettong," and we would all laugh – except that I wasn't joking.

Okay, corroboree frogs and eastern bettong weren't on the menu so much as being with the menu. Both species were present at our special Threatened Species Day Breakfast held at Old Parliament House on a cold, windy morning in early September – Threatened Species Day 2017 (see the box on Threatened Species Day). Both species served as emblems of our nation's fight to slow and reverse the catastrophic declines we are witnessing in our native biodiversity. Thanks to good science and clever management, both are making a comeback (see the boxes on frogs and bettongs).

"Threatened Species Day is an occasion to stop and reflect on what we have lost, what we might be losing, and what can be done to redress the parlous state so many of our native animals, plants and ecological communities now find themselves in."

And, judging by the chorus of frog croaks echoing around the dining room and the calm, contented manner of Banksia, the lovely bettong brought along for the show, the individual animals representing their species didn't appear too put out by the proceedings.

Some might say having these animals present was simply a gimmick to bring the punters in, but if you had been present I think you would have been amazed at the attention and wonder they generated in the breakfasting crowd.

And that, in part, was the point. Threatened Species Day is an occasion to stop and reflect on what we have lost, what we might be losing, and what can be done to redress the parlous state so many of our native animals, plants and ecological communities now find themselves in. The TSR Hub, for its part, saw it as an opportunity to stage a breakfast in the heart of the nation's capital that would bring together

Everyone gave their polite attention to the speakers but the star of the show was Banksia the bettong (held here by its keeper Emily Belton).

ABOVE: John Woinarski sets the scene for the Threatened Species Day TSR Hub Breakfast by summarising what has been lost (including mention of the extinct Australian animals and plants pictured at the top of the page), what science is telling us about what we need to do, and why this is one fight we can't afford to give up on.

policy leaders, scientists and advocates for science and the environment, to focus on the challenge of saving threatened species.

The event began with a warm welcome from Ngunnawal Elder Warren Daley and opening remarks from TSR Hub's Director Brendan Wintle who noted that: "Doing conservation research in this country, I'm always struck by the deep human history of nature stewardship, of the 60 plus thousand years that First Nations people have been custodians of our amazing natural heritage – And, of course, the speed with which the balance has been lost since European settlement. Which is why we're here today, to talk about ways of rediscovering that balance."

Brendan then asked three of the Hub's leading researchers to briefly outline the dimensions

National **Threatened** Species Day

September 7 is National Threatened Species Day in Australia. The date commemorates the death of the last known thylacine (or Tasmanian tiger, *Thylacinus cynocephalus*) in 1936. It is believed to have died from the cold after being locked out of its sleeping quarters in Hobart Zoo. Although neglect killed the last individual, its rapid decline from abundant to extinct was largely due to human persecution.

of that challenge and how we are tackling it. John Woinarski gave a powerful testament to what we have lost with every extinction in Australia, but also encouraged us not to lose hope, showing how dedicated conservation action and science has slowed down, and could even reverse, these terrible trends.

Martine Maron invited us to think creatively about what we mean by biodiversity offsets, how we can do this better, and the possibility of moving beyond our current 'no net loss' system to a regime of net biodiversity gain.

And Sarah Bekessy spoke of the importance of sustaining 'everyday' nature in our urban living spaces: "We're not talking about offsets here," she said. "We're talking about biodiversity onsets, the establishment of new habitat spaces in our cities and homes, and all the benefits that brings to our society." (I'm pretty sure this isn't what people usually mean by the term 'onsets'; but maybe it will be now.)


IMAGE: DAVID SALT

The Hub's Director, Brendan Wintle (left), presents the outgoing Threatened Species Commissioner, Gregory Andrews, with a token of our appreciation: a framed set of the Hubs' signature illustrations.

The Threatened Species Commissioner Gregory Andrews gave our keynote address. He spoke of the enormous fulfilment his job had given him in the three years he had held the post, and of his best wishes to the next Threatened Species Commissioner, and to the threatened species movement as a whole. As he said, science is one of the pillars of the Threatened Species Strategy he championed, of which he is rightly proud. He is moving back into the diplomatic service but hopes to be active in his support for threatened species conservation as a citizen (and maybe a citizen scientist).

The TSR Hub has enjoyed an excellent relationship with the Commissioner: as Steering Committee member, partner, advocate and ally of our work. It was very fitting that the breakfast gave us, through Hub Director Brendan Wintle, the opportunity to thank Gregory publicly for his effort and support. As a token of our gratitude Brendan presented him with a framed set of our Hub's stencilled illustrations, drawn by Michelle Baker.

Of **frogs** and **bettongs**

Corroboree frogs with their striking black and yellow markings are Australia's most recognisable frogs. There are two species, northern and southern corroboree frogs. Both live in remote sub-alpine wetlands in south-east Australia and both are critically endangered. The primary threat to these frogs is the deadly chytrid fungus. Captive breeding programs have been established in NSW, ACT and Victoria to prevent their extinction. The hope is that research will help conservation managers re-establish many self-sustaining populations in the wild.

Eastern bettongs were once common throughout the woodlands of south-east Australia where they provided an important ecosystem service by digging up the soil for food and, in so doing, cycling nutrients and improving soil structure. But they disappeared from the mainland in the 1920s, with foxes believed to have played a major role in their decline. In fox-free Tasmania, however, the eastern bettong can still be found. In recent years Tasmanian bettongs have been brought to the ACT where they have been released in a fox- and cat-free exclosure at Mulligans Flat. From a starting population of 36 bettongs there are now over 200 who call the sanctuary home.


IMAGE: ANNA-LISA HAYES


IMAGE: ANNA-LISA HAYES

The stars of the breakfast were the northern corroboree frogs and Banksia the bettong. The frogs attended courtesy of Tidbinbilla Nature Reserve (thanks to Jenny Pierson and Hannah Waterhouse). Banksia the bettong attended courtesy of the Woodlands and Wetlands Trust (thanks to Banksia's handler, Emily Belton).

Sustaining **life**

A love for Australia's wildlife lies at the core of our nation's identity. It sustains our wellbeing. That is something that Dr **Leonie Valentine** can personally attest to as her passion for wildlife has helped her through good times and bad. Here she explains how.

TSR Hub Researcher Profile

IMAGE: MASON CRANE

Leonie with a quenda (also known as a southern brown bandicoot). Once common throughout many parts of coastal Australia, the quenda now only persists in isolated pockets in some urban and peri-urban reserves, where Leonie's research is investigating their role in ecosystem restoration. These prodigious diggers are believed to play an important ecosystems engineering role by cycling nutrients and distributing seed and fungus.

I've wanted to be a zoologist since I was 4. It began with a field trip in the rainforests of Queensland's Wet Tropics, an expedition led by the renowned zoologist George Heinsohn. The story goes (for truth be said I can't remember much of this, it's a story my father recounts) that I followed George around, watching him capture and identify all sorts of animals. I informed my parents that this is what I wanted to do when I grew up.

Many of my younger years were spent traipsing after Dad, an ex-farmer turned uni lecturer with a passion for butterflies. He took us to many remote places as he hunted for obscure food plants and described various butterfly life cycles. My parents were very active in encouraging and fostering a love of nature and wild things; and I started bird watching at a young age. Although never a brilliant naturalist, I loved knowing what animals were what, and why they lived where they did.

My education and training only deepened that passion, and cemented what will probably be a life-long passion for reptiles. I earned a Bachelor of Science and PhD at James Cook University, where the numerous field trips in deserts, forests and shorelines exposed me to more amazing wildlife.

I did a lot of fieldwork on cattle grazing stations in tropical savannas for my PhD. Here, I met a diverse range of land managers and began to really appreciate that you don't have to be a 'conservationist' to have a strong conservation ethic.

After this, I worked in government agencies in Queensland and Western Australia, where I focussed on a range of land management issues. The time I spent in government was valuable for showing me how the outputs of research can be adopted by land management policies; and some of the challenges facing management practitioners.

I returned to academia as a post-doc, first at Murdoch, then at the University of Western Australia. At UWA I joined Richard Hobbs' Ecosystem Restoration lab, where I now work on aspects of restoration ecology. My passion for conservation and asking questions is driven by a belief that we have an ethical responsibility to do what we can to reduce our impact on the environment.

My current research with the TSR Hub investigates how fauna can drive landscape restoration. Working in collaboration with managers and researchers from environment agencies, we are examining the role of digging mammals as ecosystem engineers.

Recently, I had a career break due to treatment for aggressive breast cancer. Like many people who have had brushes with death, it is easy to question one's life purpose during such times. When I was at a very dark time, my love of wildlife kept me strong. I would find joy in watching the honeyeaters in the garden and dreaming of wild places yet to be visited. This appreciation for the environment helped me find my purpose again.

I have since returned to conservation science at UWA. I have less energy than I once had, but with a greater conviction that conservation research is worthwhile and valuable. I hope my enthusiasm for wildlife and understanding the complex interplay of life is contagious and encourages more people to value our unique and precious natural heritage.

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Science for saving species

A quarterly publication of the Threatened Species Recovery Hub

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COVER IMAGE: TSR HUB PHD STUDENT MELISSA HOUGHTON IS MONITORING INVERTEBRATES ON MAQUARIE ISLAND TO TRACK ITS RECOVERY AFTER RABBITS, RATS AND MICE WERE REMOVED IN 2013. (SEE PAGE 4 FOR THE FULL STORY). IMAGE: BY BEN HORNE

Threatened Species Recovery Hub
National Environmental Science Programme