WA'S PARKS, WILDLIFE AND CONSERVATION MAGAZINE

LANDSCOPE

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KINGS PARK
Heart of the city

Wheatbelt refuge
Toolibin Lake

Bust the Biddi
Cycling to a record

Saving the salties
Crocodile conservation

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GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

SWAN CANNING RIVERPARK

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Community newspaper group



ON THE COVER

Front cover The pincushion coneflower (*Isopogon dubius*) grows to 1.5 metres high. It has hairy branchlets, with leaves that are between 22 and 55 millimetres long. Its flowers, which are about 50 millimetres across, appear from July to October. This beautiful species is endemic to Western Australia.
Photo – David Bettini

Back cover Set in the heart of Perth city, Kings Park and Botanic Garden comes alive with colour in spring with the botanic garden showcasing 3,000 of WA's 12,000 native species.
Photo – Bec Oldmeadow



Western Australia's natural environment is made up of a diverse and unique collection of plants and animals. The ecosystems of our tall-timber forests and rugged coastlines of the south-west are vastly different from the breathtaking wilderness of the far north. And the species they house are just as diverse.

Visitors to the State are often surprised to learn that WA is home to 12,000 species of native plants. And there is always something new for locals to learn about our unique plants and animals. In this issue of *LANDSCOPE*, we get an insight into a species that was rediscovered on Rottnest Island thanks to a joint project carried out by staff from the WA Herbarium as well as members of the Rottnest Voluntary Guides Association and the Wildflower Society of WA (see 'Discovered' on page 36). We also profile Kings Park, which comes alive with colour during the wildflower season, showcasing 3,000 of WA's native plant species.

In 'Island home: a new start for dibblers' on page 39, we look at a successful collaboration that has seen 841 dibblers bred at Perth Zoo since the mid-1990s for release at a number of locations around the State by Parks and Wildlife Services staff.

These types of programs will be strengthened by the new Department of Biodiversity, Conservation and Attractions. The department is charged with the responsibility of managing and conserving our precious areas, as well as providing opportunities and facilities for people to enjoy them. The new department brings together the staff and expertise of the Botanic Garden and Parks Authority, Perth Zoo Authority, Rottnest Island Authority and the former Department of Parks and Wildlife. It also relies heavily on the support and involvement of the wider community – through engaging with visitors, neighbours and other stakeholders, and with support from a team of dedicated volunteers and community partners.

I trust you enjoy the read.

Mark Webb, ***Director General***

Contributing



Angela Sanders is an ecologist working for Bush Heritage Australia on the Gondwana Link Project in south-west Western Australia. She has worked on the south coast since 1993 and spent five years with the former Department of Conservation and Land Management on the Fitzgerald Biosphere Project. Along with a passion for birds she has a special interest in restoration ecology and monitoring.



Judith Harvey is a DBCA research scientist. She began work with the department in 1981 and has contributed across a wide range of fields including plant and fire ecology and vegetation mapping on Beard's pre-European vegetation map of WA. She has worked on kwongan and eucalypt woodlands (especially salmon gum woodlands) as well as on long-term fire studies and priority flora surveys. She is a Rottnest volunteer guide and volunteer coordinator for the Wildflower Society of WA's Plant Survey Program.

Sarah Comer is DBCA's South Coast regional ecologist. Sarah's work focuses on implementing threatened species recovery programs and documenting the remarkable biodiversity of the south coast. She has been actively involved in efforts to improve feral predator control programs in the region, and has led the adaptive management project trialing landscape-scale feral cat control through the delivery of Eradicat baits. Sarah is building on this through her PhD studies at The University of Western Australia, which aims to improve the understanding of feral cat ecology in south coastal ecosystems.



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This page Saltwater crocodile.
Photo – Andrew McInnes

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

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Snap shot



READERS' PIC

Splendid fairy-wren

Words and photo by Lawreen McIver

"I photographed this beautiful splendid fairy-wren while walking in Dalyellup, next to one of the lakes. This male was possibly heading into eclipse phase as his blue is patchy, consistent with eclipse. These little wrens love low shrubby undergrowth. It is most probably a *Malurus splendens*. His female companion was nearby."

Have you got a fantastic nature photograph you would like to see published in *LANDSCOPE*? Send it, along with a 100-word description of the species or how and where you took the shot, to landscope@dbca.wa. gov.au.



Showcasing WA mammals at international conference

Western Australia hosted the 12th International Mammalogical Congress in July, which attracted more than 750 mammal scientists from 50 different countries.

Scientists from government bodies, universities and private sector organisations gathered at the event to find out the latest developments in conservation, research and techniques, as well as current challenges experienced throughout the world.

The theme of this year's conference was 'Advances in mammalogy in a changing world' and encouraged participants to discuss future challenges and their possible solutions in mammal biology, conservation and management.

Executive Director of Science and Conservation Dr Margaret Byrne said the conference provided an opportunity for department staff to discuss with international experts work being done to protect WA's mammal species.

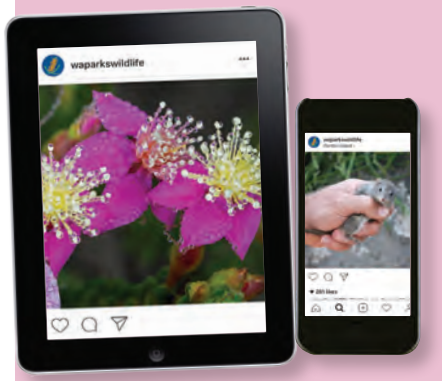
"Our researchers presented on genetic studies, monitoring methods, translocation successes, as well as invasive species management under our *Western Shield* wildlife recovery program," she said.

"WA is home to nearly 200 mammal species, and our agency plays an important role in managing a significant area of the State's lands and waters for conservation and research."

"It was also a good opportunity to hear from scientists and policy managers from other government agencies, universities and the private sector, including plenary speakers Chris Dickman, Marilyn Renfree and David Macdonald."

The event was sponsored by the International Federation of Mammalogists and is held every four years.

Connect with us



Keep up-to-date with developments and discoveries, and marvel at Western Australia's natural wonders through DBCA's social media outlets.

'Like' us on Facebook (facebook.com/waparkswildlife) and 'follow' us on Instagram (@waparkswildlife) to get access to videos, interviews and photos.

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Above left DBCA Animal Science Program leader Keith Morris, Executive Director of Science and Conservation Margaret Byrne and research scientist Adrian Wayne at the conference.
Photo – Karla Graham/DBCA

Chuditch make a reappearance



An exciting discovery was made in Lowlands Nature Reserve near Serpentine recently, when a chuditch (*Dasyurus geoffroii*) was captured in the reserve for the first time in 20 years.

The mission to capture a chuditch in the area was initiated after a remote camera – set up to measure the success of fox baiting in the area – spotted a chuditch in April.

DBCA Parks and Wildlife Services Swan Coastal District manager Brett Fitzgerald said the reappearance of chuditch highlighted the species' increasing numbers on the Swan Coastal Plain, heralding the success of the baiting program.

"Under the *Western Shield* program, the department carries out fox and feral cat baiting on a network of sites across the State to control and reduce feral animal predation on threatened animals," he said.

"More than 1,200 hectares has been baited at Lowlands Nature Reserve in the past three years to protect threatened species including chuditch, brush-tailed phascogale and other small- to medium-sized mammals."

The chuditch – a healthy male – was tagged and released back into the reserve.

Community partnerships are an important part of the wildlife recovery work in the Serpentine area with the Peel–Harvey Catchment Council helping undertake wildlife conservation work on the ground.

Chuditch were once found throughout most of the southern half of mainland Australia. With the exception of a recently translocated population to the Flinders Range in South Australia (see 'Postcards to home', *LANDSCOPE*, Summer 2014–15), the species is now confined to the south-west of WA with the largest populations surviving in the northern and southern jarrah forests.

Above A chuditch.
Photo – David Bettini

A new era for Western Australian conservation

The conservation of Western Australia's natural environment has entered a new era with the creation of the new Department of Biodiversity, Conservation and Attractions on 1 July this year.

The new department brings together the functions and staff of the Botanic Gardens and Parks Authority, Rottnest Island Authority, Zoological Parks Authority and the former Department of Parks and Wildlife.

Led by Director General Mark Webb, the new department focuses on improving WA's natural attractions as key tourism assets, creating opportunities for private sector investment and partnerships while conserving environmental values.

It also provides a strong science focus, through a consolidated conservation science service, to facilitate greater collaboration and knowledge sharing of the State's biodiversity.

Visit dbca.wa.gov.au to access information about the new department.

Guest column



Peter Versluis
Munda Biddi Trail Foundation Chair

This April marked four years since the completion of the Munda Biddi Trail – a 1,000 kilometre 'path through the forest' for mountain bikers, stretching from Mundaring in the Perth hills to Albany on the southern coast. April also marked the start of Declan von Dietze's ride to *Bust the Biddi* and set an official time for the fastest, unsupported end-to-end ride (Read 'Busting the Biddi', on page 28).

As I watched Declan leave Albany, I reflected on the difference between his adventure and mine, some three years earlier.

Leaving from the exact same spot as Declan, a group of 26 riders set off to complete the first-ever end-to-end, the *Munda Biddi Epic*. With sections of the trail still being completed as we rode, we spent 21 days winding our way along the picturesque path. Our journey was a celebration, not a race. We took our time and stopped in towns, joined in trail opening festivities and stayed in the camp sites with nothing more than the snoring of others to interrupt a full nights' sleep.

In comparison, Declan's journey took just over four days to complete; he slept very little and stopped only for the briefest periods for a quick meal before pushing on.

There are many ways to experience the trail – as a predictable, scenic outing for family groups; an adrenalin-filled, dash for downhill thrill-seekers; a fast, long-distance sprint for cross-country enduros testing their stamina over a mix of conditions; a steady slog for bikepackers rising to the challenge of completing an end-to-end; or a smell-the-roses, take-each-day-as-it-comes, multi-week trek for cycle tourists squeezing out everything the trail has to offer.

And there's plenty on offer – the spectacular coast, forest and wilderness scenery; the openness and generosity of locals; the solitude and peacefulness of the hinterland; the hospitality and vibrancy of the transit towns; the elevated heart rate; and simply the chance to be outside and get some exercise.

So do try the trail, it's ours to enjoy.

Munda Biddi TRAIL WESTERN AUSTRALIA





Kings Park and Botanic Garden

There would be very few locals or visitors to Perth who do not have fond memories of time spent in Kings Park. And the activities on offer are as varied as the surrounds. While this metropolitan haven is popular year round, without a doubt the most beautiful (and exciting) time to visit is springtime, when the park is transformed by an array of wildflowers, and comes alive with free activities as part of the annual Kings Park Festival.

Kings Park has a special place in our city – literally and figuratively. It is one of the world's largest inner city parks, and attracts about six million visitors each year. The experiences on offer are as varied as the landscape and range from enjoying twilight concerts on balmy summer's nights, to standing with war veterans on a sombre April morning; from family barbecues, to gala events; and visiting one of the playgrounds or learning about the area's ancient Aboriginal history. Or, for many, Kings Park simply provides a unique setting to walk, run or cycle through bushland to find some tranquility just minutes from the bustle of the city.

AN ANCIENT HISTORY

Kings Park spreads over 400.6 hectares and is bounded by Thomas Street and Kings Park and Mounts Bay roads. This area has been an important land to people for as long as 40,000 years. What is known now as Mount Eliza – the highest point in Kings Park – was known as Kaarta Koomba and was used as an important ceremonial and cultural setting. And the area at the base of the park, which was known as Goonininup, was an important mens' site. Kings Park also features in stories about the Wagyl's journey to sea, which shaped the Swan River. This cultural significance is celebrated in displays and innovative interpretive designs found throughout the park. Indigenous Heritage Tours also runs cultural tours that showcase Aboriginal culture, including how Aboriginal people use native plants for bush food and medicine.

WILDFLOWER HAVEN

Two-thirds of Kings Park is reserved as natural bushland, protecting more than 300 Western Australian species. And there's a point in August when the smell of the park changes and the damp brought by winter rains and cold mornings is replaced by the beautiful perfume of wildflowers. During spring, common donkey (*Diuris longifolia*) and pink fairy orchids (*Caladenia latifolia*), red and green kangaroo paw (*Anigozanthos* sp.), and Swan River myrtle (*Hypocalymma robustum*) transform the park, illuminating the bushland with colour. Walking, running or cycling along the park's many trails when these and other species are in bloom is nothing short of glorious.

For a snapshot of the State's magnificent native flora, visitors can venture to the Western Australian Botanic Garden, which showcases 3,000 of WA's 12,000 plant species. Here you can see everything from the stunning boab trees of the State's north-west to the precious banksia species of the State's south coast. During spring, this area is bursting with charming pink everlastings (*Rhodanthe chlorocephala*), Qualup bells (*Pimelea physodes*), blue lechenaultia (*Lechenaultia biloba*) and Mangle's kangaroo paw (*Anigozanthos manglesii*).



Opposite page
Far left The Lotterywest Federation Walkway guides people over an elevated bridge, providing stunning views out and below to the forest floor.
Photo – Andrew McInnes
Above right Pink woolly featherflowers are one of a number of species showcased in the Western Australian Botanic Garden.
Photo – Marie Lochman

Above Kings Park has a network of paths and roads for walking, cycling and running.
Photo – Sallyanne Cousans

Right Everlastings
Photo – Rhianna King/DBCA

Kings Park Festival: 1–30 September 2017

Festival highlights:

Ephemeral Outdoor Art and Sculpture – set in the heart of the WA Botanic Garden, this work by Western Australian sculptor Sally Stoneman will celebrate the Kwongan region of the south-west.

Wildflowers and Superpowers – this fun outdoor exhibition will showcase the quirky relationships between plants and animals.

Friends of Kings Park Native Plant Sale (16 and 17 September) – thousands of plants will be available for sale, including rare and unusual ones not available from commercial nurseries.

Free walks and talks – Kings Park staff and volunteers will conduct a series of free walks that will explore Kings Park and Bold Park and showcase the magnificent biodiversity of WA.

Aspects of Kings Park Gallery Shop – a number of creative activities, displays and events will be held, including the opportunity to meet artists at work.

The Kings Park Festival is proudly presented by Kings Park and Botanic Garden and the Friends of Kings Park, with the generous support of Lotterywest. For more information about the Kings Park Festival visit www.kingsparkfestival.com.au.

For those who want to enjoy these and other beautiful species in their own properties, the Friends of Kings Park Native Plant Sale is held on 16 and 17 September. Thousands of expertly cultivated plants will be available for sale, including rare and unusual species that you can't find in commercial nurseries.

INNER CITY PLAYGROUND

Kings Park is dotted with playgrounds that have been designed with nature-based play in mind. In line with the movement to facilitate kids making their own fun in nature, Saw Avenue Picnic Area, May Drive Parkland, Lotterywest playgrounds and, when it reopens in late 2017, Rio Tinto Naturescape Kings Park provide families and groups with bountiful opportunities to explore nature, develop and test gross motor skills, learn about the natural environment by experiencing it first-hand and get a little dirty along the way.

The beautiful manicured lawns of the Fraser Avenue precinct play host to community events such as memorials and weddings, and are a favourite for family picnics and gatherings. The magnificent view across the Swan and Canning rivers, city skyline and the Darling Ranges is a must-see for visitors to the city. For those who would like a spot of retail therapy, or visitors who want to take a memento of this beautiful place home with them, the Aspects of Kings Park Gallery Shop is a treasure-trove of Australian-made and designed souvenirs, art, jewellery and books. The Aboriginal Art Gallery specialises in Indigenous art pieces, artefacts and books. A drink or ice-cream at one of the cafes, or dinner at Fraser's Restaurant, is an added treat.

Learn more about Kings Park

Scan this QR code or visit Parks and Wildlife's '*LANDSCOPE*' playlist on YouTube.





Above *Leucospermum* species.
Photo – Andrew McInnes

Below (background) Boronia.
Photo – Jason Thomas

Visitors to the park in September will also be able to revel in a number of special displays, as part of the annual Kings Park Festival. Local sculptor Sally Stoneman is creating a large and stunning piece that will be on show in the heart of the WA Botanic Garden. This work – an ephemeral art piece – honours the precious Kwongan region of south-west WA. The Wildflowers and Superpowers outdoor exhibition will showcase the relationships between plants and animals, where visitors of all ages will be informed and entertained. On certain days in September visitors will also have the opportunity to meet Kings Park scientists and join guided walks of the exhibition.

TAKE A LOOK

As part of the Kings Park Festival, Kings Park staff and volunteers will also run a series of free guided walks and talks that will highlight the conservation values of Kings Park and Bold Park and feature the State's magnificent biodiversity.

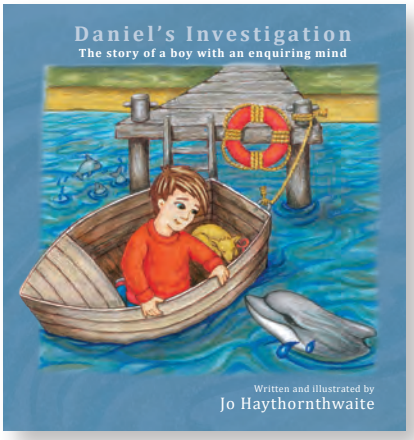
Of course visitors can explore the park on the network of trails year round– whether it be a casual stroll through the manicured gardens, or a more rigorous journey through the bush. The 620-metre Lotterywest Federation Walkway starts at the Lord Forrest statue and finishes at the Beedawong Amphitheatre and guides people across the 52-metre elevated walkway that soars through the treetops and provides a view of the forest floor below. The Bushland Nature Trail is a perfect way to experience the park's beautiful wildflowers, trees and birdlife. A mia mia marks the beginning of the trail. Meanwhile, the 1.7-kilometre Memorial Walk passes the State War Memorial, Lord Forrest statue, 10th Light Horse Memorial, South African War Memorial, Bali Memorial, Kokoda Track Memorial, ANZAC Bluff and the Jewish Memorial. These walks, and others, are all made more beautiful by the springtime wildflowers and, conveniently, are right on our city doorstep and available for all to enjoy.

Do it yourself

Where is it?: Kings Park is 1.5 kilometres from Perth's CBD.

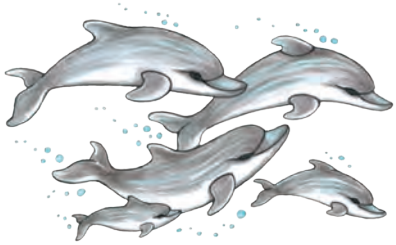
What to do: Picnicking, walking, running, cycling, wildflower and bushland appreciation, climbing the DNA tower, taking free guided tours, visiting Aspects of Kings Park Gallery Shop and the Aboriginal Art Gallery.

Facilities: Aboriginal Art Gallery, restaurants, gallery shop, cafes, kiosk, toilets, walk trails, playgrounds, Lotterywest Federation Walkway.



DANIEL'S INVESTIGATION: THE STORY OF A BOY WITH AN ENQUIRING MIND

BOOK



This charming children's book follows the journey of Daniel, who is on a mission to uncover whether dolphins are still present in the river, why the river is polluted and how it could be cleaned up for all river creatures to thrive. What starts as a grim look at the state of the river, ends on a high note when Daniel discovers that everyone can play a part in river conservation, especially through programs such as *River Guardians* and (spoiler alert) that dolphins can still be found.

The message of this story is one that can never be shared with kids too often or too early. Books like this help to imprint on our next generation that every little bit helps and that we should all play a role in protecting our precious plants, animals and the ecosystems in which they live. The bright, bold illustrations make this tale particularly engaging and the information at the back adds to its educational value.



Daniel's Investigation – The story of a boy with an enquiring mind *was written and illustrated by Jo Haythornthwaite and published by DBCA. It is available from shop.dbca.wa.gov.au for $14.95. Part proceeds from the sale of the book will be reinvested into the* River Guardians *program and the conservation of our rivers.*



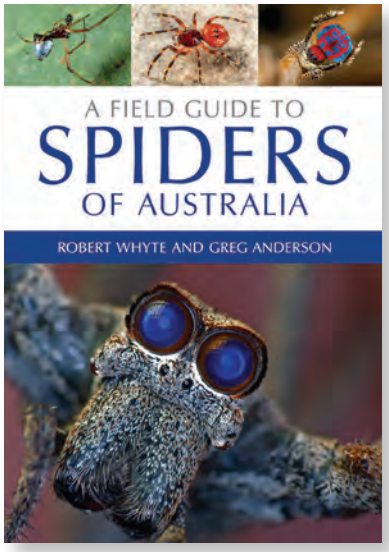
SECRETS AT SUNRISE

FILM

In one of the most remote and beautiful parts of the State, a tiny population of critically endangered western ground parrots cling to life, under constant threat from bushfires, shrinking habitat and feral predators. A Riggs Australia film, *Secrets at Sunrise*, shines a spotlight on the dedicated efforts of Parks and Wildlife Service and Perth Zoo staff to ensure the survival of these beautiful birds. With the help of volunteers from friends of the Western Ground Parrot, they monitor the shy and secretive parrots during exhausting field trips to Cape Arid National Park, carry out emergency feral cat control as part of the department's *Western Shield* program, and embark on an ambitious captive breeding program to bolster dwindling bird numbers.

The documentary, produced, written and directed by the talented Jennene Riggs, and funded through the State NRM program, is a rollercoaster ride, filled with spectacular vision of WA's south coast national parks and a message of hope for threatened species recovery.

DVDs and online downloads of Secrets at Sunrise *will be available for sale at www.western-ground-parrot.org.au from November. The film screened at Perth's Revelation Film Festival in July 2017 and further screening venues will be announced at www.secretsatsunrise.com.*



A FIELD GUIDE TO SPIDERS OF AUSTRALIA

BOOK

I feel like I should disclose from the outset that as a sufferer of mild arachnophobia, *A field guide to spiders of Australia* is not my usual go-to book. However, I took a few deep breaths, reminded myself that it was impossible for the spiders to come alive from the printed page and run up my arm, and delved into the world of Australian spiders. And, I must say, this book showcases our amazing arachnids in a way that makes it impossible not to be impressed by their biology. Even the big hairy ones!

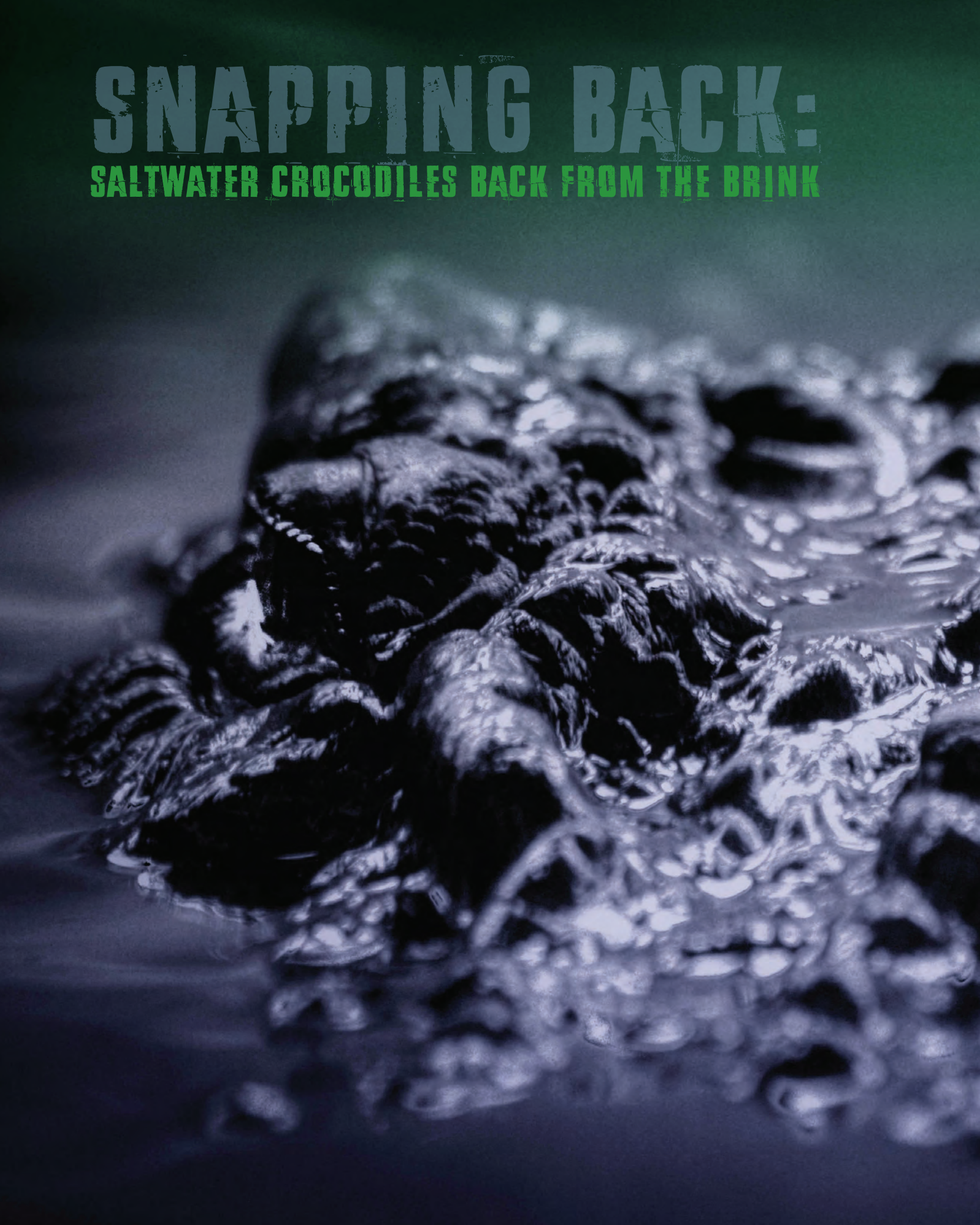
This book is the most comprehensive account of Australian spiders ever published. It features more than 1,300 photos that depict the amazing diversity of Australia's eight-legged residents. The introduction describes spiders' body parts, behaviours, webs and burrows, and contains other tidbits such as Australia's rich arachnological history. The rest of the book describes spiders using easy-to-understand language that is complemented by amazing photos – a useful guide for identifying spiders you may encounter.

This book is a welcome reminder that there is so much more to spiders than hairy legs. Some of them – like the peacock spiders – are actually quite endearing!

A field guide to spiders of Australia *was written by Robert Whyte and Greg Anderson and published by CSIRO and is available for $49.95 from www.publish.csiro.au.*

SNAPPING BACK:

SALTWATER CROCODILES BACK FROM THE BRINK



For many people, a primeval fear of large carnivores clouds their ability to see how top-order predators struggle to survive on a planet dominated by an ever-intrusive human population. Lions, tigers, wolves, bears, sharks and crocodiles have all suffered extensive population losses due to the proximity of their habitats to cities and towns. Today, Australia has sophisticated nature management capabilities supported by appropriate legislation and enforcement. However these capabilities were not present when the saltwater crocodile was hunted to the brink of extinction between 1950 and 1970. It was only after a national ban on hunting crocodiles was put in place around 1970 that crocodiles were able to begin a slow process of recovery which continues to this day.



by Andy Halford and Daniel Barrow

Today's crocodiles and alligators all belong to a single clade, the Crocodylians, which has been around for about 100 million years. Only a few groups from this clade survived the cataclysmic extinction event in the late Cretaceous period (about 65 million years ago), when a massive asteroid impact killed off the non-avian dinosaurs leaving the surviving crocodilians as the world's dominant large reptiles. Having survived such events, it is sobering to think how close saltwater crocodiles might have come to regional extinction in the post-war years when the country was recovering from the financial and emotional toll of war. The ready availability of .303 rifles in the wake of WWII provided a large-calibre weapon for reliably killing crocodiles, and the high international price for crocodile skins motivated those seeking adventure and the opportunity for financial gain. As a result, commercial crocodile hunting became extensive across the top of Australia, between 1950 and 1970 with an estimated 270,000 skins exported between 1945 and 1972. In Western Australia, hunting peaked in the mid-1960s and by 1969 crocodiles were considered rare in the Kimberley and elsewhere, with fewer than 8,000 crocodiles estimated left across their natural range and only 2,500 of these in the west Kimberley. Hunting finally stopped in 1972 when the Federal Government declared a total ban on the import and export of crocodile products.



Previous page
Main Saltwater crocodile.
Photo – Marc Russo

Above The powerful jaws of saltwater crocodiles makes them formidable predators.
Photo – Andrew McInnes

STUDY SUBJECT

Research into the remnant saltwater crocodile (*Crocodylus porosus*) population started in the Northern Territory in 1971, led by a team run by the indefatigable Professor Harry Messel from the University of Sydney. This science expert and his team went on to produce a series of 20 monographs detailing the population size and structure of crocodiles across all major rivers in WA, NT and Queensland. This established an unprecedented baseline upon which future work could be based. In the NT, annual surveys of crocodiles have continued across multiple rivers since 1975, enabling a detailed understanding of how crocodile populations have recovered during the more than 30 years since hunting ceased. This has not been the case in WA where there were no follow-up surveys since Messel and colleagues completed two in 1978 and 1986.

To rectify this situation, the then Department of Parks and Wildlife re-surveyed the two biggest river systems in the West Kimberley during the winter of 2015 as part of a research project funded through the Western Australian Marine Science Institution (WAMSI) and the department. Between late July and early August a small team of crocodile experts, including traditional owners, traversed about 300 kilometres of creeks and rivers in the Prince Regent and Roe-Hunter river systems, heading out each night in a five-metre boat to count and size crocodiles. These 'spotlight' surveys took advantage of the crocodiles' tendency to freeze under the glare of a powerful torch beam, enabling the team to approach close enough to estimate the size of each animal. By repeating these surveys at the same time of year, using the same techniques and covering the same ground as Messel and his colleagues, direct comparisons between Messel's studies and the new surveys could be made.

IT'S ALL IN THE NUMBERS

In the eight years between 1978 and 1986 the total number of non-hatchling crocodiles in the Prince Regent and Roe-Hunter river systems increased from 293 to 505. In the 30 years from 1986 to 2015 the numbers increased to 1,171. In 1978 you were likely to encounter only a single crocodile for every kilometre of river you travelled along, and that crocodile would, on average, weigh about 15 kilograms and be 1.5 to 1.8 metres long. In 2015 you could find four crocodiles for every kilometre you travelled with the average crocodile weighing about 26 kilograms and being 1.8 to 2.4 metres long. While the numbers represent an increase in abundance of up to 300 per cent from their 1978 nadir, they only tell part of





the story, and it is the size structure of the population that provides a more informative picture of their recovery.

In 1978 about 13 per cent of the population, or 39 crocodiles out of the 293 non-hatchling crocodiles counted, were longer than 2.1 metres. By 2015 this rate had climbed to 16 per cent of the population, equating to 186 crocodiles out of the total of 1,171. However, only 29 of these 186 crocodiles were three metres or longer. These size categorisations are important because they help researchers understand the rates at which a crocodile population can replenish itself, as male crocodiles do not reach sexual maturity until they are about three metres in length and 16 years old, and females around 2.1 metres and 12 years old.

The other vital measure of the ability of a population to recover is the number of hatchlings or new recruits that enter the population each year. Only 25 per cent of crocodile eggs survive to hatching and 55 per cent of the hatchlings are killed before they are a year old. Young crocodiles are easy prey for other crocodiles, fish, goannas and birds so their earliest years are when they are most vulnerable. However, for the crocodiles that make it to maturity their chances of living a long life are as high as 99 per cent given they have no natural predators, except for man. Nesting success in crocodiles is closely linked to the ebb and flow of the wet seasons as fresh water is required for breeding. Nests are usually built in grasslands that are inundated with freshwater during the rainy season. These areas are at their most prevalent at the furthest upstream reaches of river systems. Ironically, good wet seasons do not always translate to successful nesting seasons because the nests can be washed away by flooding. In the 1978 survey, Messel and colleagues found 119 hatchlings, indicating a successful nesting season. However, in 1986 there was almost complete recruitment failure with only 15 hatchlings observed. The latest surveys counted 213 hatchlings indicating successful nesting in the 2014–15 summer.

MODERN-DAY STUDIES

Before Messel and his colleagues completed their surveys, no broad-scale formal assessments of crocodile populations had been done. This means that there is no 'before' baseline against which to compare the current state of crocodile populations in the west Kimberley. Anecdotal evidence suggests that before hunting there were far more crocodiles in the area. But this is just an educated guess.

Discover more about saltwater crocodiles

Scan this QR code or visit Parks and Wildlife's '*LANDSCOPE*' playlist on YouTube.

Above left Gary Umbagai from the Dambimangari, who are the traditional owners of the Prince Regent area, provided his expertise to the study.

Above DBCA vessel *PV Warndoom* at Kings Cascade in Prince Regent National Park. *Photos – DBCA*

So how do we put the health of the current crocodile populations in WA into perspective? Are the populations fully recovered or is there some way to go? Science tells us that eventually an ecosystem will reach an equilibrium and the population of crocodiles will stabilise and not continue to increase year to year. In the NT where there has been much more intensive monitoring they have found that crocodile populations in many of the river systems have reached equilibrium and are considered fully





Top Crocodiles live in the intricate waterways of the State's top end, such as at Saint George Basin Kimberley.
Photo – David Bettini

Above Crocodile sightings, like those in the south arm of the Prince Regent river systems, were recorded on an app developed by DBCA.

Opposite page
Right Wilinggin rangers and local wildlife officers carry out a reconnaissance of the west Kimberley habitat.
Photo – DBCA

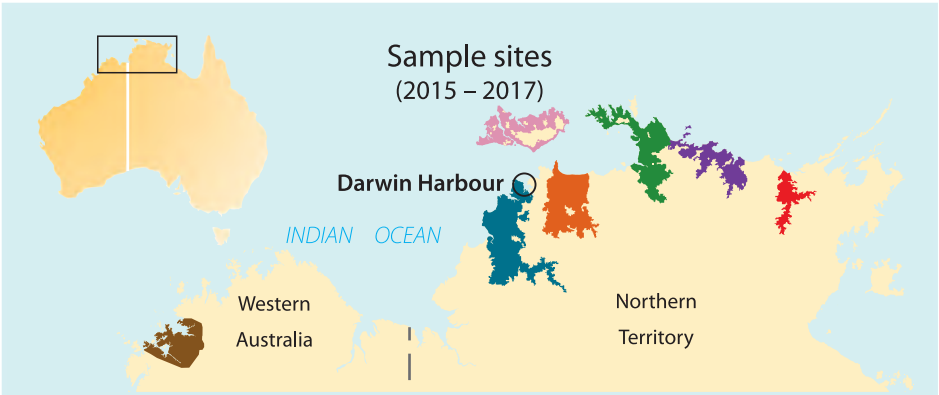
recovered from hunting. We can use these populations to infer where our WA populations are in the recovery process.

We chose the Adelaide and Daley rivers in the NT to inform our study as they are both considered to support fully recovered crocodile populations and are similar in length to the Roe-Hunter and Prince Regent river systems we surveyed. The NT rivers averaged six crocodiles per kilometre of river with the average crocodile weighing about 75 kilograms and measuring between 2.7 and three metres long. These figures indicate that the WA rivers are still holding a considerably smaller and less abundant crocodile population than those found in the NT rivers. This differential is further highlighted by comparing the number of very large crocodiles in each region – NT rivers average 74 crocodiles more than three metres, while WA rivers have only 15. Crocodiles gain weight at an ever-increasing rate once they reach three metres in such a way that a 4.2 metre crocodile can be twice the weight of a three-metre one. Mature crocodile populations stabilise in abundance and then continue to increase in size as larger crocodiles develop in the system.

The river systems of the west Kimberley are quite different to those in the NT. Our systems lack the extensive flood plains at their upper reaches which are typical of NT river systems, while west Kimberley rivers have steep-sided walls for much of their length with only marginal nesting areas available. These fundamental differences may act as a bottleneck to the recovery of the west Kimberley crocodile populations which leads us to conclude that crocodile populations are either still recovering in the region and remain significantly different from their NT neighbours, or these systems will never hold a similar population structure to the NT. Only continued surveys will provide the answer to this.

Individual male crocodiles can travel hundreds of kilometres from their natal rivers to find new areas in which to settle, by taking advantage of favourable currents and water temperatures. This is commonly observed in crocodile populations that are stabilising when larger males drive juvenile males out of their home rivers and they must seek new territory to survive and prosper. These mini-migrations introduce new genes into neighbouring populations and must be taken into consideration when determining the spatial scale at which crocodile populations should be managed. If there is regular exchange of genes between river systems then they can often be managed as a single population. However, if there is limited exchange then populations need to be managed as separate units.

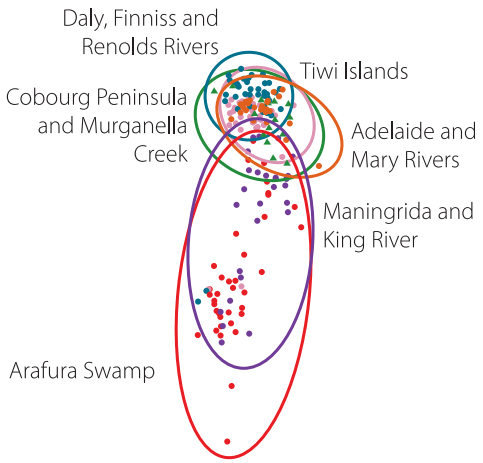
As part of the most recent survey, we collected tissue samples from the West Kimberley crocodile populations and compared them to the genetic signatures of samples collected from crocodiles in NT rivers to determine whether they were separate populations (see 'Genetic clustering among crocodiles at sample sites' on page 17). The results were



Legend

- Hunter, Prince Regent and Roe Rivers
- Daly, Finniss and Renolds Rivers
- Adelaide and Mary Rivers
- Tiwi Islands
- Cobourg Peninsula and Murganella Creek
- Maningrida and King River
- Arafura Swamp

Genetic clustering among crocodiles at sample sites





Results of genetic testing of crocodile populations from Prince Regent and Roe/Hunter River systems and their regional neighbour populations in the Northern Territory. This work was done by Yusuke Fukuda and colleagues from the Department of Environment and Natural Resources in the Northern Territory as part of a national study into the connectivity of crocodile populations.

very clear and indicated that the West Kimberley crocodile populations have no relationship with the NT populations. This result confirms that we must treat the West Kimberley populations as separate and manage them accordingly.

ENSURING ONGOING SUCCESS

There is no doubt that the successful and ongoing recovery of crocodile populations in Australia is a remarkable success story. These ancient animals are perfectly adapted to the environment in which they live and have shown that when left to control their own destiny, they are capable of maintaining their populations even after the extreme impacts of hunting. The other side of this complex ecological coin is that these recovering populations will bring them into potential conflict with increasing human populations, with potentially disastrous consequences. The ability to coexist is a cornerstone of successful marine and terrestrial park management, and DBCA is committed to developing systems that provide the means for humans and species such as crocodiles to live together as harmoniously as possible. This means maintaining the delicate balance between the rights of all animals to exist within the environments they have evolved in and protecting human populations that wish to be a part of the same ecosystems. In the meantime, we can celebrate the remarkable and ongoing recovery of our saltwater crocodiles and their robust health in our tropical estuarine systems, which remain some of the most intact ecosystems on the planet.

Did you know?

Saltwater crocodiles (*Crocodylus porosus*) have a mottled grey, brown or blackish colour. Their snout is broader than that of the freshwater crocodiles and they can have between 40 and 60 teeth. During the wet season, females lay about 60 eggs in nests on riverbanks and can be particularly aggressive during the breeding season. The temperature of the nest determines the sex of the young.

Crocodiles are known for being effective hunters. They are exceptionally fast on both land and water and often ambush their prey. They submerge themselves near river banks and leap from the water to grab prey in their strong jaws. They only have small stomachs, so often stow their kill underwater for later consumption.



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The crocodile study was made possible through a collaborative broad-scale approach to conservation in the Kimberley in partnership with WAMSI and with support from the traditional owners of the Kimberley.



Saving a Wheatbelt wetland refuge



Unseasonal heavy rainfall earlier this year brought much life to Toolibin Lake, filling it for the first time in more than 20 years. But it also brought some unexpected challenges in managing this fragile Ramsar-listed wetland.

by Karla Graham

Amid the patchwork of agricultural land of Western Australia's Wheatbelt lies Toolibin Lake, an important refuge for plants and animals, especially waterbirds. For decades, government departments, local community members and stakeholders have worked to ensure this wetland continues to survive and thrive, despite the pressures of altered hydrology and other threats to natural resources. In February 2017, unseasonal rainfall filled the lake for the first time in more than 20 years, causing much celebration, along with some unique and welcome challenges for those working to conserve the lake.





Previous page
Main The February 2017 rainfall brought much interest to the lake.
Photo – Deanna Rasmussen/DBCA

Above The newly filled Toolibin Lake.
Photo – Karla Graham /DBCA

WATER RETURNS TO THE LAKE

Early this year, more than 160 millimetres of rain was recorded at Toolibin Lake over three days. Hydrologists calculated that about 4,100 megalitres filled the lake, which rose to two metres deep. Nearby, Dulbining and Walbyring lakes, and two un-named wetlands, also received the rain.

Importantly, the rainwater that filled Toolibin Lake was devoid of the salt that usually threatens this wetland. Early days saw the environment re-awaken with a chorus of frog calls ready to begin the breeding cycle; as whirls appeared on the water from tiny invertebrates and bejeweled damselflies; and flocks of waterbirds revelled in the ideal feeding and breeding conditions. By late March, the first sightings of new life could be spotted on the lake.

As a seasonal wetland, Toolibin Lake naturally goes through wet and dry phases. This has contributed to the formation of wooded wetlands, as dry periods enable trees to regenerate in an area that receives an annual average rainfall of 300 to 400 millimetres. However, in recent years, Toolibin Lake has had to withstand the pressures of changes in climate, human-induced impacts on the water table and naturally occurring salinity, collectively known as 'altered hydrology'.

Toolibin is the one of the largest and last remaining inland freshwater lakes in the State's south-west, and the largest in the area that features the threatened ecological community made up of sheoak (*Casuarina obesa*) and paperbark (*Melaleuca strobophylla*). Once common throughout the Wheatbelt, many examples of this type of community have now succumbed to altered hydrology.

Due to its biological diversity, Toolibin is listed as a threatened ecological community with the Australian Government and is internationally recognised as a Wetland of International Importance under the Ramsar Convention.

WATERBIRDS FLOCK BACK

With more than 90 per cent of the surrounding catchment cleared of native vegetation, the lake and surrounding nature reserves provide a stronghold for native plants and animals, including waterbirds.

Since 1965, 50 species of waterbird have been recorded at the lake, including the freckled duck, which has a very small (500 to 1,000) breeding population in south-west WA. This is the highest number of species recorded at any inland south-west wetland.

The February rain event presented a perfect opportunity to carry out a waterbird survey at Toolibin Lake. Parks and Wildlife Service staff spent a day identifying and counting waterbirds. They counted 800 individuals from 12 species, including Eurasian coots, grey teals, pink-eared ducks, hoary-headed grebes, swans and Australasian shovelers, and recorded 63 chicks. The next day, at nearby Walbyring Lake, they counted 592 individuals from 12 species, including 41 chicks. The abundance of waterbirds in these areas is comparable to surveys from 1996, but species richness was much lower. There were very few large wading birds (herons, spoonbills and egrets) and no cormorants. Black swans have taken up residence at the lake again and have been recorded breeding. The surveys will be repeated in spring and summer if water remains in these wetlands to provide more

"... the rainwater that filled Toolibin Lake was devoid of the salt that usually threatens this robust wetland... and flocks of waterbirds revelled in the ideal feeding and breeding conditions."

accurate comparisons to those carried out in 1996.

The area surrounding Toolibin Lake also boasts more than 300 native plant species and 10 native mammal species as well as a wide diversity of insects, reptiles, amphibians and terrestrial birds.

AN ALTERNATE FATE

Just a few kilometres from Toolibin Lake, positioned lower in the landscape, you'll find Taarblin Lake. This monochrome landscape, with its desolate lake bed of petrified trunks and limbs, lies in stark contrast to the vibrant Toolibin Lake. The heavily salt-affected Taarblin Lake provides a sobering glimpse at what Toolibin Lake might have looked like if management intervention hadn't been undertaken.

Since 1994, management of Toolibin Lake has been guided by the *Toolibin Lake Recovery Plan*. Implementing the actions outlined in the plan has relied on the tireless work of Parks and Wildlife Service staff, members of the community, hydrologists, private landholders and volunteers, with support from natural resource management groups such as the South West Catchments Council, Wheatbelt NRM and other stakeholders.



Above Pink-eared ducks are one of the species that occurs at Toolibin Lake.
Photo – Roz Barber

Left The desolate Taarblin Lake.
Photo – Maria Lee/DBCA

Management actions have included constructing a channel, feeder drains and sump to move saline surface water away from the lake; installing a series of pumps on the lake bed to remove and lower groundwater levels; constructing a waterway to move highly saline water through the catchment and away from other natural resources, and carrying out broadscale revegetation on private property and Crown land to help manage altered hydrology and benefit agricultural productivity and biodiversity. This approach was recognised in 2002 when the Toolibin Lake recovery team and its



"A series of removable metal gates installed at the northern end of the channel are closed to direct freshwater into Toolibin Lake, and opened to divert water away when salinity levels become unacceptable."

technical advisory group were awarded the Institute of Engineers of Australia National Salinity Prize for innovation in managing salinity.

A revised *Toolibin Lake Catchment Plan*, which is expected to be released this year, will present an opportunity to audit this approach, and garner continued support for managing this remarkable wetland.

DIVERSIONARY TACTICS

One of the key infrastructural components in the fight against altered hydrology at Toolibin Lake is a seven-kilometre-long, 20-metre-wide diversion channel constructed in 1995 around the western edge of the lake. This channel was designed to redirect saline water flows from upstream away from the lake itself, and into the sacrificial Taarblin Lake, which had already collapsed. A series of removable metal gates installed at the northern end of the channel are closed to direct freshwater into Toolibin Lake, and opened to divert water away when salinity levels become unacceptable. The rain event of February 2017 was the first time the channel had been tested against such a large event.

When the rain fell, Parks and Wildlife Service staff saw a golden opportunity to allow freshwater into Toolibin. The water quality was tested upstream and staff determined it was fresh enough to be let into the lake. They then closed the metal gate panels, thereby closing off the diversion channel and allowing the nourishing freshwater to flow directly into Toolibin Lake. Staff tested the water quality periodically and opened the gates when the fresh flows ceased.

MANAGING GROUNDWATER

But it's not just the water above ground that contributes to the lake's health. The groundwater is closely monitored for its proximity to the lake bed. If the groundwater rises through the soil profile, it brings salt to the root zones of plants, causing their death and the collapse of stands of trees, particularly the two deep-rooted species after which the threatened ecological community is named – paperbark and sheoak.

During the past decade, periodic monitoring on the lake floor and within the catchment enabled the department to monitor groundwater levels. Hydrologists will use this data to develop models that detail how and when water and salt moves through the catchment in order to make recommendations for on-ground works that will help stall any rising of the water table that might be happening.

At the beginning of this year, monitoring the groundwater levels at Toolibin Lake involved driving across the dry lake floor, taking measurements from the top of bores drilled down through the surface of the lake to the water table below. But now, conservation staff make their way around the 300-hectare lake via boat, deftly manoeuvring on the calm waters around sheoak and paperbark trees, stopping at each of the 19 bores now partially submerged to record groundwater levels.



Opposite page
Left Diversion gates can be opened and shut depending on the saline levels of the water.
Photo – Gary Mills/DBCA

Above Pumps are used to remove saline water away from Toolibin.
Photo – Karla Graham/DBCA

Right All staff from the department's Narrogin and Merredin offices helped secure a breach of the diversion channel by hand.
Photo – Deanna Rasmussen/DBCA

Far right Aerial footage showed the extent of the inundation, which had not been seen in more than 20 years.
Photo – Peter White/DBCA





One method being used to combat rising groundwater is the use of pumping stations. A system of groundwater pumps, some powered by wind and the others electrically, are installed across the lake to pump saline water away from Toolibin into Taarblin Lake.

Many of these recovery actions have only been made possible through the strong collaborations forged between the recovery team and the owners of adjacent farming properties. The extent and interdependency of the Toolibin Lake catchment, which covers some 48,977 hectares, means a collaborative, landscape-scale approach to conservation is the only true method of conserving this Wheatbelt wetland. Indeed, many of the revegetation projects associated with the lake's health have occurred on private property, or via the purchase of high conservation value land by the State Government. Just last year, more than 7,000 seedlings were planted on private property at a farm within the catchment.

UNEXPECTED CHALLENGES

While having the lake fill for the first time in more than 20 years was fantastic news, it also presented some interesting challenges to overcome. A week after the fill, staff discovered a breach in the bund wall of the diversion channel. Without a fast fix, hydrologists predicted the ecological benefit of the fill would be lost as the water drained out. With extreme waterlogging in the reserve and surrounding properties, using heavy machinery to plug the breach was not possible. So within 24 hours, all staff from the department's Narrogin and Merredin offices arrived on the scene to plug the breach by hand. A slow and arduous day of work ensued, with staff



Above Snail orchids are one of 300 native plant species that occur at Toolibin Lake. *Photo – Ray McKnight/DBCA*

Below The transformed landscape. *Photo – Deanna Rasmussen/DBCA*

Do it yourself

Where is it? Toolibin Lake, on Wickepin-Harrismith Road, 20 kilometres south-east of Wickepin, is a 2.5 hours' drive south-east of Perth.

Facilities There is a1.6-kilometre interpretive walk trail, interpretive shelter and signage, barbecue area, picnic tables, toilets, lakeside seating, and a large car park.

See Pink-eared ducks, grey teals, shovelers, black swans; Dulbining Lake and wetlands, Walbyring Lake, salmon gum woodlands, melaleuca thickets, heathland and open jam woodlands with a diversity of wildflowers including orchids.

Stay Stay a while at Dryandra Woodland (fee payable, book at parkstay.dbca.wa.gov.au) or in accommodation cabins at Lions Dryandra Woodland Village (dryandravillage.org.au). Take a drive to Toolibin and surrounding nature reserve during the day, then at night, book a tour at the Barna Mia nocturnal wildlife experience in Dryandra Woodland, where you can go spotlighting and see six species of threatened mammals including the woylie, bilby and mala (fee payable).

Entry No entry fee into Toolibin Lake.

Contact DBCA's Wheatbelt Region office on (08) 9881 9200, or visit dbca.wa.gov.au.

loading about 1,800 sandbags with 50 tonnes of sand, transporting the bags via boat to the bund wall, then stacking them in place to plug the breach. By day's end, they had constructed a substantial sandbag wall and succeeded in retaining the fresh water in Toolibin Lake.

As predicted, the waterbird activity has brought increased fox activity back to the lake, so fox baiting is being undertaken as part of the department's wildlife recovery program *Western Shield*. And the fill was a setback to some of the revegetation that had been taking place on the lake bed. The sheer volume and unexpected timing of the rain washed away hundreds of sheoak seedlings planted over the past three years as part of a density trial, in what one staff member described as bittersweet.

WHAT THE FUTURE HOLDS

Inevitably, the water level from this year's fill will slowly recede and eventually empty, but with the site being a seasonal wetland, this natural recession is part of a long-term cycle. As the lake water evaporates, salinity levels will increase but management guidelines are in place to deal with this situation. Feeder drains and a sump have been constructed on the lake floor and as water quality decreases surface water can be pumped away from the lake.

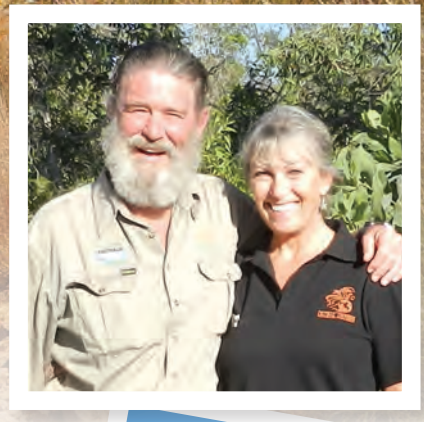
The fill has given the lake vegetation a much-needed boost and, for the first time in more than 20 years, the department has had an opportunity to test all infrastructure installed during the past two decades to manage surface and groundwater, and study the characteristics of the lake when full. Lessons learnt from this event will inform future plans and management decisions at the lake.

With continued intervention, passion and commitment, department staff are optimistic Toolibin Lake will remain an ecological refuge well into the future, with hopes the next fill event will take place sooner than 20 years from now.



Karla Graham is a publications officer at the Department of Biodiversity, Conservation and Attractions. Karla can be contacted on (08) 9219 9818 or by email (karla.graham@dbca.wa.gov.au).

Global Gypsies

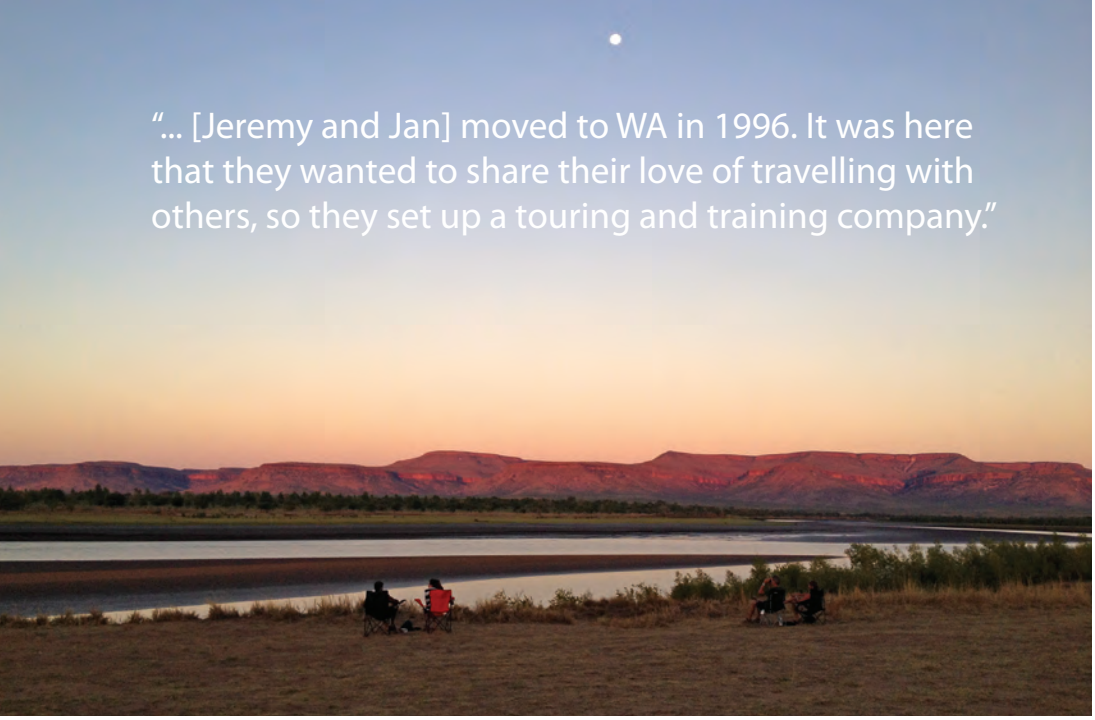






As a qualified mechanic, experienced four-wheel driver, hobby photographer and nature enthusiast, Jeremy Perks is just the type of person you want with you when you're out bush. A consummate bushman, Jeremy and his partner Jan Barrie design and run tours in Western Australia's rugged natural areas and also share their experience with other aspiring tour guides through training courses and a book. At the core of their work is a deep love for the natural environment, and a desire to share it with others in a safe, enriching and sustainable way.

story by Tracy Shea,
photos courtesy of Global Gypsies







Previous page
Main Global Gypsies tours are based on a tag-along model where people take their own four-wheel drive and follow in convoy.
Inset (clockwise from top right) Jeremy Perks and Jan Barrie; exploring the Bungle Bungle Range; enjoying a campfire.

Above Global Gypsies tours travel through spectacular and remote areas of the State.

Above right Exploring the magnificent cave systems of the Kimberley.

Right Even for the well-travelled, WA roads can pose challenges and dangers.

If you ask Jeremy Perks where his favourite place is, his answer will always be the same: "Here". This is not because he's indecisive, or not well-travelled, but because he chooses to live in the moment and enjoy the beauty of wherever he goes. And he has an abundance of opportunities to do this, as he leads tours to some of the most stunning and remote places in the world, including the Canning Stock Route and Kennedy Range, Dirk Hartog Island and Rudall River (Karlamilyi National Park) national parks in Western Australia.

GLOBAL GYPSIES

Jeremy and his partner Jan Barrie met in Africa in the 1990s and travelled together throughout the continent working as photojournalists. They led the lives of self-proclaimed 'global gypsies' until they moved to WA in 1996. It was here that they wanted to share their love of travelling with others, so they set up a touring and training company. When it came time to name the company, 'Global Gypsies' seemed the natural choice.

Since establishing their company, Jeremy and Jan have guided hundreds of clients on trips throughout remote regions of WA and overseas. Their tours are based on a 'tag-along' model where people can take their own four-wheel drive and follow in convoy. Jeremy says that people look to his tours for support and security, as some of the remote destinations they travel to can present challenges as well as dangers. He cites inexperience and unpreparedness as the biggest mistakes people make when they attempt journeys to the outback and says that situations can quickly turn serious. Being part of an organised tour can also provide certainty that the trip will go ahead, where some arrangements between friends and family groups can be less reliable.

Once on the tours, clients can also expect to receive insights and information that Jeremy has gathered over a lifetime of being a naturalist. It is a requirement that vehicles in the tour convoy are fitted with a two-way radio for ongoing communication and so that Jerermy can provide commentary along the way and share his love of, and interest in, the State's unique plants and animals. Where possible, Global Gypsies also partners with Aboriginal tour operators so clients receive cultural enrichment. Global Gypsies also partners with DBCA staff to help with fauna monitoring and recovery programs at sites such as Matuwa (ex-Lorna Glen), Perup Wildnerness and Dirk Hartog Island.

TRAINING THE GUIDES

In the years since Jeremy and Jan established Global Gypsies, they have regularly been approached by tour guides who were interested in learning how to establish and run a successful business. Recognising an opportunity to contribute to strengthening and growing the tourism industry, Jeremy and Jan developed a training course designed to share the realities of the industry, as well as provide practical skills and tools, methods for





Above Jeremy has a life-long love of the natural world.

Above right Convoys offer people safety and security while travelling to remote areas.

handling group dynamics and ways to prevent and deal with emergencies.

The success of the courses and the feedback from the participants reinforced that tour guides were hungry for high-quality, WA-specific information that they could apply to their business to grow and improve their services. This spurred Jeremy and Jan to formally capture their insights and they wrote *How to be an Award-Winning Tour Guide*.

Since its publication in 2016 the book has received accolades by leading academics, tour operators, professional tour guides and tourism organisations. DBCA Parks and Visitor Services Director Peter Sharp credits the work of Global Gypsies for helping to lift the standard of tour guides who operate in WA's natural areas. In June this year, the department provided all of its licensed tour operators with a copy of the book.

"If the tourism industry continues to strive to provide high-quality services in WA's natural areas, then everybody wins," Peter said.

"In the past 30 years we've seen the industry mature from very humble beginnings to one that is now delivering high-quality visitor experiences in a very professional and authentically Western Australian manner.

"There are now 413 DBCA-licensed tour operators throughout the State who provide a range of opportunities and experiences for local, interstate and overseas visitors."

According to Peter, tour guides add enormous value to the experiences visitors can have in WA's beautiful parks and reserves.

"Whether you're swimming with whale sharks or humpback whales in Ningaloo Marine Park, helping to count turtle hatchlings on the beach of Cape Range National Park, or discovering the best places to see WA's spectacular wildflowers, tour operators can take you there and show you things you may well miss, or not have the opportunity to see, if you go by yourself," he said.

In recognition of his tireless, and ground-breaking work, and excellence as a tour guide, Jeremy was awarded the 2004 Forum Advocating Cultural and Eco-Tourism (FACET) Golden Guide Award at the Western Australian Tourism Awards.

Jeremy and Jan's tour guide course, run with assistance from Cherie Toovey, President of Tour Guides WA, has also recently been attended by a number of Aboriginal people who have set themselves up as professional guides delivering unique Aboriginal cultural experiences. Jeremy's course has given them the confidence and skills they need to launch their own tour guiding business, and this is a great outcome for the tourism industry.

TOURING INTO THE FUTURE

Going forward, Jeremy and Jan will continue to run courses for tour guides and will continue to guide tours throughout WA and overseas. With a 70 to 80 per cent repeat rate among their clients, many who join them for tours become friends as well as clients, and the Global Gypsies acknowledge the unique role they play in guiding their clients through what is sometimes a once-in-a-lifetime experience. And, no doubt Jeremy will continue to make the most of 'here' – wherever that may be.

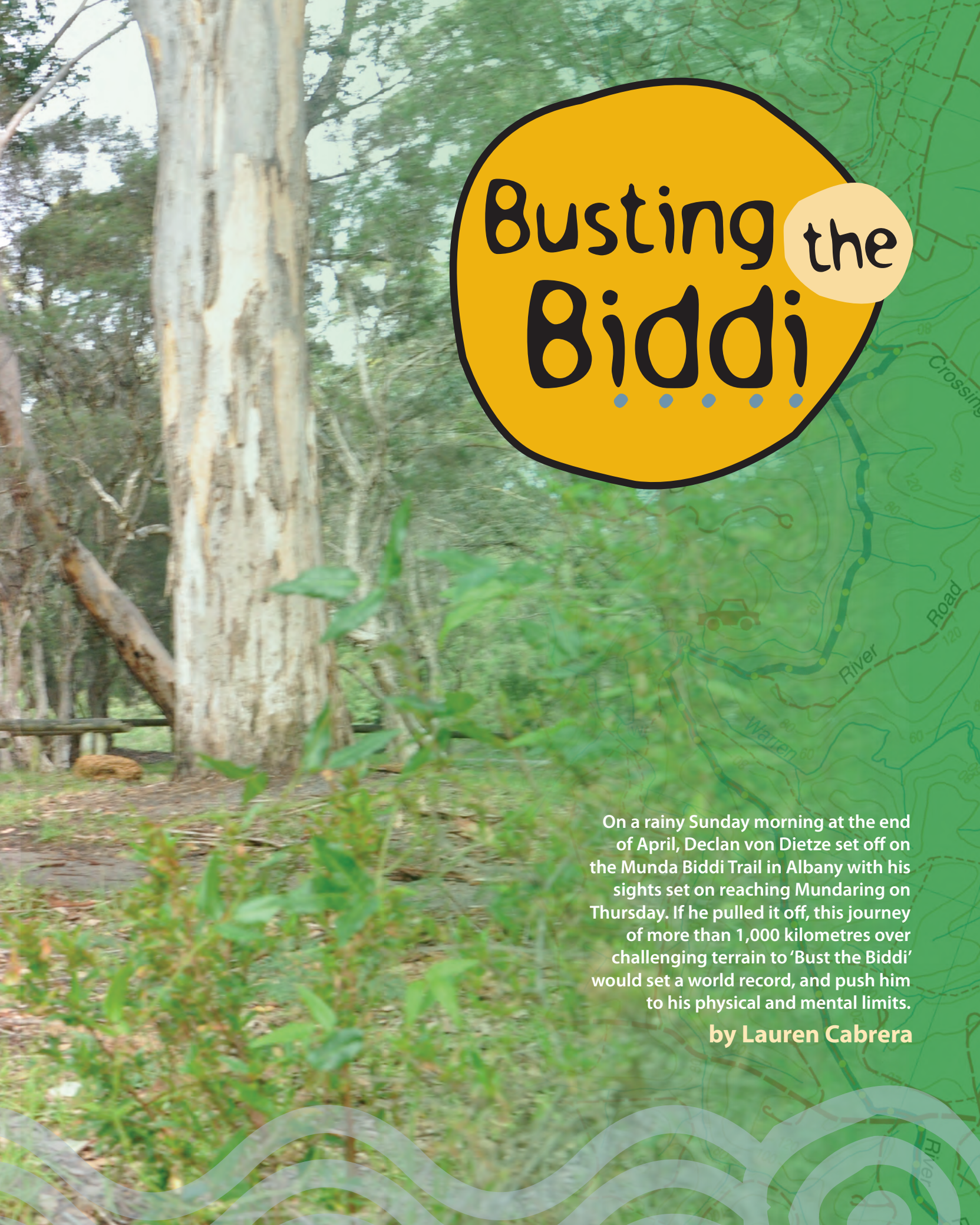
Tracy Shea is the DBCA Parks and Wildlife Service assistant director policy and planning. She can be contacted on (08) 9219 8755 or by email (tracy.shea@dbca.wa.gov.au).

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'Touched by nature' is a feature that tells the stories of people who have used their experiences in nature to enrich the lives of others.







Busting the Biddi

On a rainy Sunday morning at the end of April, Declan von Dietze set off on the Munda Biddi Trail in Albany with his sights set on reaching Mundaring on Thursday. If he pulled it off, this journey of more than 1,000 kilometres over challenging terrain to 'Bust the Biddi' would set a world record, and push him to his physical and mental limits.

by Lauren Cabrera

Western Australia's world-famous Munda Biddi Trail is an off-road cycling trail that runs 1,000 kilometres from Mundaring to Albany. Trekking through a range of ecosystems and through many towns, it can be enjoyed in stages, or as part of an end-to-end journey. But, for a determined 22-year-old Declan von Dietze, the trail presented an opportunity to push himself mentally and physically and complete the trail solo and unsupported in four days. He also hoped to raise awareness of the trail and stop at every hut and town along the way.

To give this mission context, the first ever end-to-end trip took a group of experienced riders three weeks to complete. The riders spent time in every 'trail town' along the way, carried plenty of food and supplies, and got a solid eight to 10 hours of sleep each night. Declan's challenge involved sleeping only a few hours a night, and keeping his bike as light as possible and buying almost all his food and drinks from the towns along the trail. He embarked on this gruelling endeavour carrying only a lightweight sleeping bag, a spare pair of socks, a thin jacket, basic bike repair equipment, a few band-aids and some snacks. He was confident that, aside from any major mechanical or physical issues, he could do the distance in four days. *Here is his journey …*



DAY 1 Albany to Walpole

230km
13 hours riding
5 hours sleep
"A few body niggles, but nothing major."

After months of training and planning, and with adrenalin coursing through his veins, Declan steadied himself to accept words of encouragement from Albany Mayor Dennis Wellington; receive a reminder to keep safe from Munda Biddi Trail Foundation Chair Peter Versluis; and enjoy one last hug from his mum, Kay and dad, Erich. Local Menang Elder Carol Petterson gave a moving Welcome to Country, which gave him permission to pass through the ancient land as her people have done for tens of thousands of years. She also presented him with a message stick, an item carried by traditional people passing through country, which was decorated with emu feathers – a totem of the Menang people – to carry on his journey. After a final countdown, and cheers from the gathered crowd, Declan rode off into the rain to embark on his epic journey.

The first few hours were the fastest, and saw Declan ride along sealed roads through Albany. He then travelled past old railway reserves and Torbay Head in West Cape Howe National Park – the most southern point in Western Australia, which is almost completely covered in heathland and forest.

Declan credited the rain with being his biggest challenge on the first morning –



Map 1 *Albany to Walpole*

"Bikepacking is only going to grow in popularity and the Munda Biddi Trail provides the perfect setting."

though it helped compact the sandy parts of the trail, it also made trail conditions unpredictable.

Declan arrived in the busy southern coastal town of Denmark for lunch, where he was joined by his parents who said their goodbyes. Then he headed off to one of the most beautiful sections of the trail. Just two days prior, a new section of the trail opened from Denmark heading north – a 10-kilometre stretch heading north along the coast near Lights Beach. Declan was the first to ride it and stopped a couple of times along the way to photograph the beautiful landscape.

The rain cleared up as the day went on and Declan carried on towards Walpole, passing through the beautiful and remote section of jarrah and karri forests of the Walpole Wilderness. The section from Denmark to Walpole normally takes people two days to complete, due to the heavy sand, but Declan, aided by the rain, did it in half a day.

He continued riding into the early hours of the morning, past the turn-off to the world famous Tree Top Walk in the Valley of the Giants, until he was 10 kilometres out of Walpole where he stopped on the side of the trail for a few hours' sleep.





Previous page
Main Riding along the Denmark River.
Photo – Lauren Cabrera/DBCA

Top Declan was presented with a message stick, a totem of the Menang people, by Menang Elder Carol Petterson.
Photo – Sally Bostwick/DBCA

Inset above Point Hillier Vista, Denmark.
Photo – Lauren Cabrera/DBCA

Bikepacking

Bike enthusiasts will tell you that bikepacking as a sport has significantly increased in popularity during the past 10 years in WA and much more around the world. DBCA officer and recent Munda Biddi 'end-to-ender' Rod Annear said the last 10 or 15 years had seen a huge growth in bikepacking around the world.

"It's a sport and a recreation that is attracting new and young people to national parks," Rod said.

"They might not go out there looking for the solitude and quiet of the bush, but that's often what brings them back. Bushwalking has and always will be popular, but mountain biking brings a whole new generation of people to parks.

"Bikepacking is only going to grow in popularity and the Munda Biddi Trail provides the perfect setting."

Bikepacking is a relatively new phenomenon. The older style of bike touring involves large pannier saddle bags that are fixed to the sides and front of the bike. Bikepacking is about taking the minimum impact, lightweight bushwalking sensibilities and putting them in a biking context.

As part of an effort to promote WA as a mountain biking destination, a State master plan for mountain biking was recently released. The *Perth and Peel Mountain Bike Master Plan* outlines plans to expand the current network of trails from 125 kilometres across nine sites to 575 kilometres across 24 sites in the Perth hills, Wungong, Dwellingup, Swan Valley, Jarrahdale and Yanchep. The plan, and more information, can be found at www.westcycle.org.au.



DAY 2 Walpole to Manjimup

230km
14 hours riding
3 hours sleep
"Starting to feel soreness in knees
Few issues with charging battery packs."



Declan arrived in Walpole two hours ahead of schedule, having ridden 20 per cent of the trail. The plan for the day was to get to Northcliffe for a late lunch (130km away), then Pemberton for dinner.

After breakfast, he set off north past Swarbrick Art Loop up long, steep climbs towards the popular Yirra Kartta camp site. Yirra Kartta means 'high mountains' in the local Menang Aboriginal language, and the hut is next to an impressive granite dome.

Declan passed the Boorara tree in the mid-afternoon, before heading on to Northcliffe near Warren, to D'Entrecasteaux and Shannon national parks. Surrounded by karri, marri and jarrah forest, he pushed on in the dark to Pemberton on a part of the trail that is mostly along old railway formations that are considered good riding. He enjoyed the fast downhill parts out of the Warren River Valley approaching the famous Gloucester Tree.

After dinner at the Pemberton pub, Declan rode towards Manjimup before stopping to rest on the floor of a school in Quinninup. He continued 40 to 50 kilometres to Manjimup before breakfast.

DAY 3 Manjimup to Collie

295km
20 hours of riding
2 hours sleep
"Sore knees, strain through tendons.
Some adjustments on the bike needed,
few things starting to wiggle their way
loose."

With an acceptance that his pace would start to slow, Declan ventured through the beautiful karri forest between Manjimup and Nannup. This terrain includes sections of 'switchbacks' – downhill zig zags with hard-packed soil and tight (potentially dangerous) corners.

Unfortunately, he misread a sign post and took a wrong turn, which added about seven kilometres to his journey up a challenging climb – a tough reminder that the trail required mental focus as well as physical brawn.

"With mountain biking you have to pay attention to the trail and navigate as well, so it's as much of a mental challenge as it is a physical one," Declan said.

The switchbacks led Declan to the historic One Tree Bridge where, in 1904, a giant karri tree was laid across the Donnelly River with a deck on top – a testament to the ingenuity of local pioneers. It was replaced in 1971, but a section of the log remains as a memorial on the banks of the river nearby.

Donnelly River is roughly the halfway mark on the Munda Biddi Trail and often the place where, according to Donnelly River Village Manager Andrew Sullivan, riders come through and say, "well, I've come this far, I can do the rest of it".

End-to-end riders often stay overnight in the village, have a day of rest and then set off to complete the second half. Declan stayed for less than an hour, during which time he enjoyed a giant freddo frog, some milo and a chat with Andrew surrounded by friendly resident emus and kangaroos. The next section to Nannup along a gentle downward slope on a stunning karri-lined gravel road, provided welcome respite for his weary legs and he soaked in the pleasant ride through quiet, cool jarrah and karri forest.

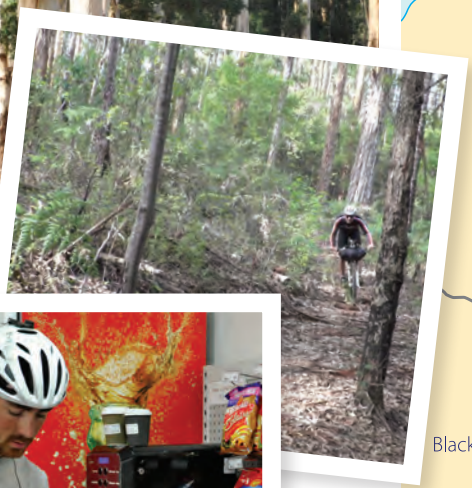
After crossing the iconic 115-metre Blackwood River Rail Bridge out of Nannup

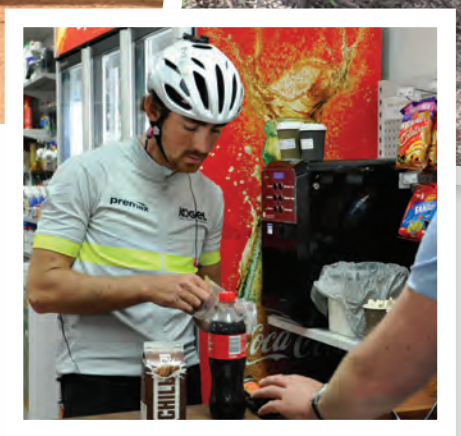
Above Approaching the Swarbrick Art Loop.
Photo – Shem Bisluk/DBCA

Above right Declan was dwarfed by the incredible towering karri trees.
Photo – Lauren Cabrera/DBCA

Opposite page
Inset left Stopping to refuel in Northcliffe.
Photo – Sally Bostwick/DBCA
Inset right Enjoying the switchbacks near Karta Burnu camp site.
Photo – Mark Whittle





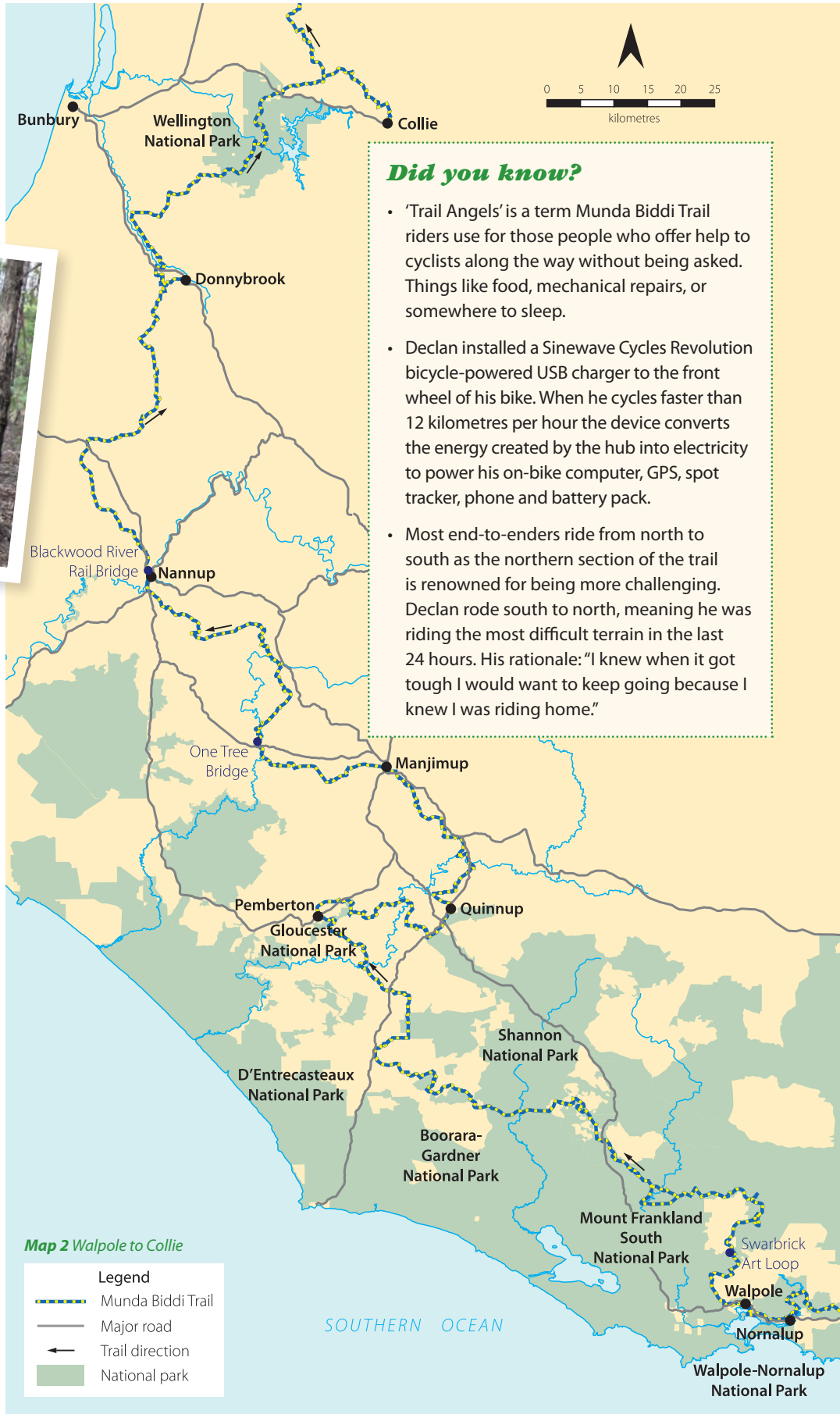


"Donnelly River is roughly the halfway mark... riders come through and say, "well, I've come this far, I can do the rest of it."

he followed the Sidings Rail Trail through jarrah and banksia woodlands, and pine plantations before reaching the forest settlement of Jarrahwood. He pushed further north to Donnybrook for a late dinner.

Following a series of forest tracks in the dark of the night, Declan descended into the scenic Ferguson Valley in Wellington National Park and rode through more switchbacks – some uphill, some downhill – and past huge granite boulders.

He got to Honeymoon Pool at about midnight feeling good, but after a lot of climbing and walking decided to push on until he was about 30 kilometres out of Collie.



***Map 2** Walpole to Collie*

Did you know?

- 'Trail Angels' is a term Munda Biddi Trail riders use for those people who offer help to cyclists along the way without being asked. Things like food, mechanical repairs, or somewhere to sleep.
- Declan installed a Sinewave Cycles Revolution bicycle-powered USB charger to the front wheel of his bike. When he cycles faster than 12 kilometres per hour the device converts the energy created by the hub into electricity to power his on-bike computer, GPS, spot tracker, phone and battery pack.
- Most end-to-enders ride from north to south as the northern section of the trail is renowned for being more challenging. Declan rode south to north, meaning he was riding the most difficult terrain in the last 24 hours. His rationale: "I knew when it got tough I would want to keep going because I knew I was riding home."



DAY 4 Collie to Jarrahdale

220km
18 hours riding time
90 minutes sleep
"Knee soreness, blisters, saddle soreness."



Following a trail spur, Declan journeyed into Collie and filled his panniers with as many bacon and egg muffins as he could to get him through the day.

President of the Collie Mountain Bike Club and owner of Crank'n Cycles Erik Mellegers said the real mental challenges kicked in from Collie.

"By this stage riders have got blisters, saddle soreness and all the things that will draw their mind away from what they're trying to achieve."

"Collie is working towards becoming a mountain biking destination, and is building trail networks and interest," Erik said.

"The Munda Biddi is made for bikepacking."

Although Declan was still two hours ahead of schedule, he faced lots of climbing to Dwellingup and then deep pea gravel near Jarrahdale.

"The hardest part is always making sure that you're with it," Declan said. "Focusing on every sign post and not missing anything."

Declan pushed on through the rolling hills of Zephyr Road, enjoying the crisp smell of the blackbutt forest and the Brunswick River, on to Yarri camp site near the Harvey River, which is named after the Aboriginal word for blackbutt tree.



Supporting local communities supporting riders

The Munda Biddi Trail passes through 16 towns from Mundaring to Albany, which provides significant investment in local goods and services.

Donnelly River Village Manager Andrew Sullivan said the walkers and cyclists that came through Donnelly River were a unique type of customer.

"We really value them and think of ourselves as caretakers for them," he said. "We take our responsibility for them really seriously. We've adapted our shop to not only provide food, but basic bike repair products and other things they might need along the way."

The trail also provides opportunities for volunteers to make a meaningful contribution, while spending time in some of the most beautiful parts of the State.

Munda Biddi Trail maintenance volunteer Bron Suchecki said he volunteered on the trail because it was an asset for WA and a big drawcard for visitors and locals.

"I'm out riding the trail anyway so I may as well clip some trees and do a little bit of work. It's not an imposition at all, and I feel like I'm giving back to the community," he said.

"It's mainly just moving branches that have fallen over the trail, trimming back overhanging branches, and occasionally you get a big tree that needs chainsawing.

"Volunteers' sections cover around 10 kilometres each. I take a bit of pride in my section, as you don't want to be known as the guy who's got lots of trees fallen down in his section."

The Munda Biddi Trail has 96 active volunteers for the 108 maintenance sections. Each section is between seven and 20 kilometres and some volunteers are responsible for more than one section.







A numbers game

- 1,124 kilometres travelled
- 4 wrong turns
- 67.5 hours total riding time
- 15,505 metres elevation
- 12 hours sleep
- 6 crashes
- 18 litres of water
- 1.4 kilograms of chocolate
- 8 litres of soft drink
- 21 coffees
- 2 pairs of socks
- 1 pair of bib shorts
- 1 jersey
- 1 jacket
- 1 bivvi bag
- 2 battery packs
- 1 pair gloves
- 4 numb fingers
- and... 4 well earned beers

Opposite page
Above left Fellow riders show support for Declan.
Photo – Sharon Morris
Inset below Declan receives a warm welcome from Andrew Sullivan.
Photo – Donnelly River Village

Above Crossing the finish line in Mundaring.
Photo – Emma de Burgh/DBCA

Right Munda Biddi Trail marker.
Photo – Peter Nicholas/DBCA

Lake Brockman Tourist Park was a welcome pit stop after some tough hills near Logue Brook Dam and as the sun was setting he rode through the popular Nanga Mill in Lane Poole Reserve and then on to Dwellingup.

After dinner at the pub and some minor bike repairs, he set off in the dark to ride the 47 kilometres to Dandalup Hut – one of the toughest sections of the trail. With 800 kilometres under his belt, Declan pushed through ankle-deep pea gravel, dragging his bike uphill for a gruelling 20 kilometres.

He finally made it to Dandalup Hut at 2am where he rested for 90 minutes before setting off again to Jarrahdale.

DAY 5 Jarrahdale to Mundaring

140km
10 hours riding
"Left knee swollen, sharp pains. Scratches and minor injuries from falling over a lot in pea gravel."

As Declan embarked on his final day Peter Versluis said the hardest part would be coming into Perth because he would be tired, the hills were bigger and the pea gravel was like riding on ball bearings with sand underneath them.

"Your tyres sink into the gravel and you slide all over the place. If you're tired, it's even harder still," he said.

At 6.45am, after already completing two hours of riding, Declan stopped to be interviewed by Peter Bell – one of his footy heroes – on ABC breakfast radio. After he finished the interview he hung up the phone, took a few deep breaths and let the tears of exhaustion roll down his cheeks. If he was to continue, he would have to dig deep.

"I had to remind myself that sitting on the ground wasn't getting me anywhere, I might as well have a go and keep moving forward," Declan said.

The Jarrahdale General Store was his final chance to gather supplies. Breakfast was nutella sandwiches – perfect fuel for the huge uphill ride into the Canning River Catchment. The effort through more pea gravel and up a steep gradient was rewarded by the magnificent jarrah forests encountered on the way.

The downhill ride into The Dell was welcome relief and Declan was met by a group of 'last leg riders' who joined him to ride the last 15 kilometres to the finish line.

THE BIG FINISH

A crowd had gathered at the northern terminus at Sculpture Park in Mundaring. Mountain biking groups, DBCA staff, Dennis Wellington, Peter Versluis and curious passersby anxiously awaited his arrival.

Conversations among those gathered turned to what it meant for the Munda Biddi to have an elite endurance racer set a world record on the trail and the news that other elite athletes were now considering the trail as their next challenge.

Then, four days, six hours and 39 minutes after he left Albany, Declan journeyed down the home stretch at a cracking pace; around the oval and through the archway.

Declan's phenomenal ride set a world record and a tough benchmark for others to follow. Word about Declan's record spread online around Australia and internationally, bringing the Munda Biddi Trail to the attention of the world's cyclists. Who knows when the next person will try to 'Bust the Biddi', but, in the meantime, Declan can revel in his well-earned bragging rights.

Lauren Cabrera is a project officer – editorial. She can be contacted on (08) 9219 9814 or by email (lauren.cabrera@dbca.wa.gov.au).



Forget-me-not, not forgotten any more

Rediscovery of *Myosotis australis* on Rottnest Island

Myosotis australis, a native annual commonly known as the southern forget-me-not, is in the Boraginaceae family along with the culinary herb borage and purple weed Paterson's curse. It has previously only been collected from nine locations in Western Australia, including Rottnest, Garden, Bald and Woody islands (collected from the latter by well-known artist and geographer Elizabeth Rippey), as well as near Albany, and Bridgetown.

Two collections from Rottnest Island, which were both gathered by ornithologist and herpetologist Dr Glen Storr, date back to 1956 and are currently housed in DBCA's Western Australian Herbarium. One, from The University of Western Australia, does not have a collection number but is labelled 'Barker Swamp 30 August', and the other is from shallow sand over limestone labelled 'Rottnest collection no. 178' and dated 28 August. The specimens look very similar.

In July 2016 the WA Herbarium received a request from Heidi Meudt at the Te Papa Museum in Wellington, New Zealand, for some leaf material from the Western Australian *Myosotis* to contribute to her investigation of the genetic relationships of southern hemisphere *Myosotis*.

So, from August to October Elizabeth Rippey, Jon Dodd and I searched for *M. australis* around Barker Swamp – the largest of three fresh water swamps remaining on the island (five others have been mined for marl to be used as road base). There were signs of extensive grazing by quokkas, numerous weeds and no sign of the *Myosotis*. Was it locally extinct?

Then, on 7 October, during a joint survey by members of the Rottnest Voluntary Guides Association and Wildflower Society of WA, Rottnest volunteer Richard Fox spotted a *Myosotis* plant near the western end of Porpoise Bay near Watson's Glade. This was the first of approximately 30 plants that were found at the site – three kilometres south-east of Barker Swamp; 60 years after the previous collection.

The plants were growing amongst low heath of *Acanthocarpus preissii*, *Guichenotia ledifolia*, berry saltbush (*Rhagodia baccata*) and scattered shrubs of *Acacia littorea*.

I returned to the site to collect leaves from 15 plants, which were stored in big teabag-like bags and sent to New Zealand. One voucher was sent to New Zealand and another lodged with the WA Herbarium. Another survey was carried out at the same time on Garden Island by DBCA's Adrienne Markey and Kate Brown, but only a few juvenile plants were found. A seedling that had been collected by Adrienne was grown to maturity to provide Heidi with genetic material from Garden Island.

So now having found *Myosotis* in a very different habitat from where it was first collected on Rottnest, voluntary guides and Wildflower Society members will be on the lookout for new populations of this delicate native herb this spring. Who knows where it will pop up next.



Top *Myosotis australis.*
Photo – Steve Dillon/DBCA

Above *M. australis* habitat is often shared with quokkas, as evident by the scats.
Photo – Peter Coyle

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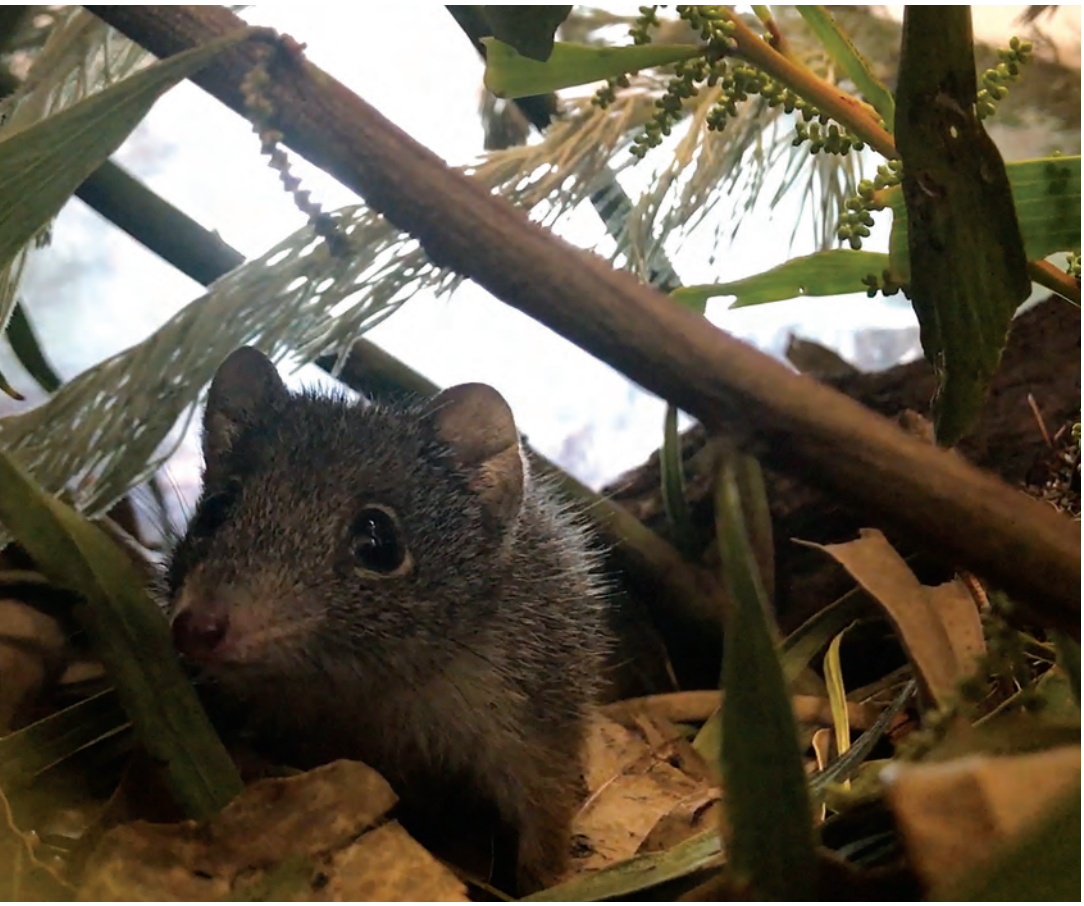


Once found across much of the south-west of Western Australia, dibblers now only occur in a few scattered populations. Thankfully, in recent years, a project to create a number of strongholds using captive-bred dibblers from Perth Zoo has been undertaken with very positive results. The most recent translocation – to Gunton Island in the Recherche Archipelago – is already showing signs of success.

BY TONY FRIEND

ISLAND HOME

A NEW START FOR DIBBLERS







Previous page
Main The dibbler is about the size of a small quenda.
Photo – Jiri Lochman

Top Breeding enclosures are used for dibblers at Perth Zoo.
Photo – Peter Nicholas/DBCA

Above left Eight hundred and forty-one dibblers have been bred for release at Perth Zoo.

Above Zookeeper Lesley Shaw from Perth Zoo's breeding program.
Photos – Leanne O'Rourkes/DBCA

Western Australian subfossil records indicate that dibblers *(Parantechinus apicalis)* once occurred from Shark Bay to Israelite Bay and as far inland as Peak Charles. While it is thought that, like so many native Australian animals, their distribution had contracted before European arrival, the dibbler has undoubtedly fallen victim to the effects of changes to the landscape that have occurred, such as clearing habitat for agriculture and development, introduction of foxes and feral cats, altered fire regimes and changes to vegetation caused by plant disease. They were believed to be extinct until 1967, when their rediscovery near Albany sparked new interest in this elusive species. By the mid-1990s, dibblers were only known to occur on Boullanger and Whitlock islands off the mid-west coast, and in Fitzgerald River National Park. The species had earned itself the unenviable status of 'Endangered' – fauna that is likely to become extinct or is rare – and its future looked bleak unless effective action was taken.

In the ensuing years, the Perth Zoo – under advice from the dibbler recovery team – established a breeding program. This has seen up to 10 adult pairs at any time producing young that are released into the wild by Parks and Wildlife Service and predecessor agencies. Since 2000 all the animals have been sourced from Fitzgerald River National Park and the animals have been rotated through the program to ensure genetic diversity and maximum breeding output. In total, an impressive 841 zoo-bred individuals have been released under the program, giving the species a hefty leg-up towards its long term survival.

TRANSLOCATIONS

The animals born into the Perth Zoo breeding program were used to create two new populations – one on Escape Island (three kilometres off Jurien Bay) and the other at Peniup proposed nature reserve to the west of Fitzgerald River National Park.

The population on Escape Island was established between 1998 and 2001 with the release of 88 dibblers of Boullanger and Whitlock islands stock, of which 83 were bred at the Perth Zoo. This population has persisted since its inception and there is cause for optimism that it will endure.

The Peniup proposed nature reserve population was the first mainland reintroduction of dibblers. A number of releases since 2001 saw 243 animals bred from Fitzgerald River National Park animals, released into this area. While this





Above Gunton Island is home to species such as the south-western crevice-skinks.

Left *Leucophyta brownii* occurs on the island.
Photos – Marie Lochman

Below right Dibbler young in a female pouch.
Photo – Jiri Lochman

population may persist, natural fluctuations in numbers and predation by foxes, feral cats, grey currawongs and other native birds means the long-term survival of this colony is not considered secure.

Animals from the breeding program were also reintroduced to Stirling Range National Park and into a 380-hectare enclosure in Waychinicup National Park but these colonies have not survived.

A SOUTHERN HOME

In more recent times, the recovery team has set its sights on securing a population of dibblers on an island off the south coast. Gunton Island is a 95-hectare island located within the Recherche Archipelago Nature Reserve, near Esperance. Gunton is one of more than 100 islands in the archipelago and is in a group of three significant islands to the south of Cape le Grand National Park. At its closest point, it is just over eight kilometres from the mainland.

While translocating dibblers to the island is viewed as an introduction, live specimen records and subfossil evidence indicate that dibblers probably extended to the east of Esperance, indicating that they most likely occurred on the island when the sea level was lower and the Recherche Archipelago was part of the mainland.

The island was selected for the project based on its size, accessibility, security, suitable vegetation type and cover, lack of introduced predators and likely lack of competitors. It also supports an abundance of invertebrates, which provide a food source for dibblers. Half the island is covered in vegetation, with a low woodland of Rottnest tea tree (*Melaleuca lanceolata*), *Acacia conniana* and berry saltbush (*Rhagodia baccata*), and a shrubland of blueberry tree (*Myoporum insulare*), coastal daisybush (*Olearia axillaris*) and *Leucophyta brownii* – which is the most extensive plant community on the island. Seabird burrows have been recorded under the *Myoporum* canopy.

The island supports Cape Barren geese, singing and brown honeyeaters, rock parrots, welcome swallows, red-eared firetails, stubble quail, silvereyes, Australian ravens, white-bellied sea-eagles



Dibblers at a glance

About the size of a very small quenda, dibblers (*Parantechinus apicalis*) are small, stockily-built marsupials that weigh between 40 and 120 grams. They have bright white rings around their eyes and have body hairs that are tipped with silver. They also have a somewhat 'grizzled' appearance and are recognisable by their hairy, strongly tapering tails.

They are mostly active around dawn and dusk – between those times they shelter in nests under shrubs on the ground surface. They seek their prey in swift, short bursts, often rummaging through leaf litter in search of insects and small skinks. They also eat berries, and possibly nectar.



Dibblers breed in autumn and females produce up to eight young. Males live one to two years in the wild and females over three years in age have been recorded.

Hear more about the translocation project

Scan this QR code or visit Parks and Wildlife's '*LANDSCOPE*' playlist on YouTube.



Above DBCA's Tony Friend (left) and Tim Button monitoring the new dibbler population on Gunton Island.

Right Gunton Island is one of more than 100 islands that make up the Recherche Archipelago.
Photos – Rob Blok/DBCA



and Pacific gulls. It is also home to three species of skink – south-west crevice skinks (*Egernia napoleonis*), the common south-west ctenotus (*Ctenotus labillardieri*) and the lowlands earless skink (*Hemiergis peronii*).

MAKING MOVES

In 2015, with the blessing of the recovery team, a plan was developed to translocate dibblers from the breeding colony at Perth Zoo to Gunton Island, starting with a group of 30 in October 2015 as part of a two-year release program. These animals were caught by Perth Zoo staff on the morning of their planned release, assessed for fitness and viability and placed individually into boxes for transport. Then they were flown from Perth to Esperance and transported by department staff to the Bandy Creek marina. Then staff and the dibblers boarded onto the vessel *Eclipse* for the next leg of their journey.

Getting the dibblers onto Gunton Island had its own set of challenges, as landing ashore requires alighting from a boat onto rocks, which can only safely be done in favourable weather conditions. This is a double edged sword – it means that people visiting the island (and therefore disturbing the dibblers) occurs rarely, but it also makes operations such as translocations a bit tricky.

Once safely onto the island, department staff carried the dibblers in their crates about 500 metres to each of the two release sites, both at the top of the southern slope of Gunton Island. Then, during the late afternoon, in their normal activity period, the dibblers were released. This process was repeated in April and October of 2016, with the final release in April 2017. By this time 80 captive-bred dibblers and two wild-caught animals had been released on the island.

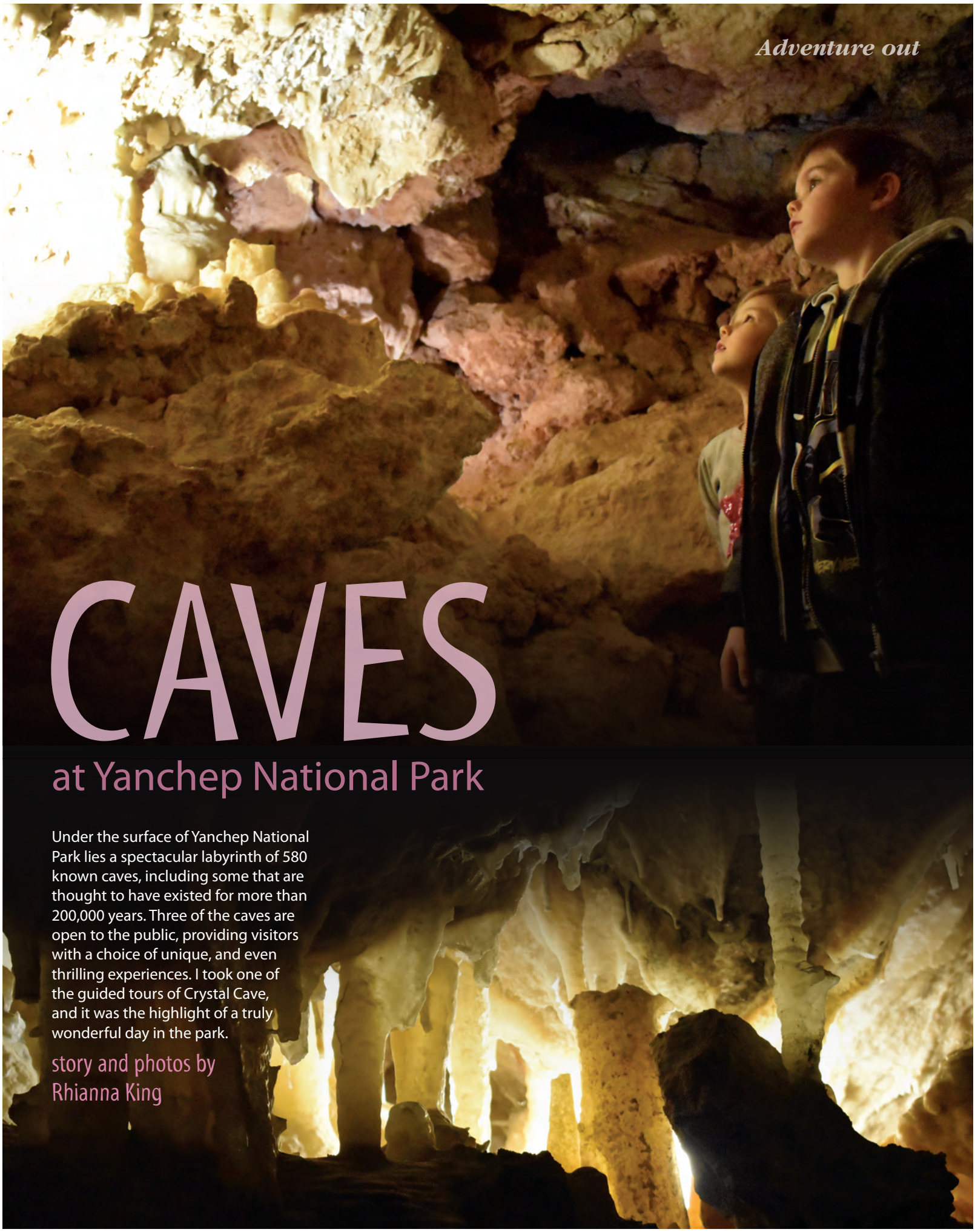
FACT FINDING

In order to measure the success of the translocation, 11 sensor cameras were installed on the island. Initially, sealed Elliott traps containing peanut butter baits were positioned in front of the cameras to attract dibblers into view. Unfortunately, ravens were also attracted, often breaking the traps free to remove the bait. Not only did this result in the baits being moved out of view of the camera, it also triggered the camera, rapidly filling the memory cards with images of ravens. In April 2016, the Elliott traps were replaced by PVC bait canisters, which were much more resistant to interference, so the ravens lost interest and from then on most cameras functioned for the entire period of their deployment.

The cameras recorded an increased rate of dibbler activity from April 2016, perhaps in part due to the change of bait container. It's very likely, however, that an important factor was the release of six mated pairs of dibblers from Perth Zoo during the same trip. Juvenile dibblers were spotted from late August visiting a nest box monitored by a camera and images collected on all the cameras between October 2016 and January 2017 indicate that the high level of activity has continued. This sustained activity across all the cameras indicates that the translocations to Gunton Island have been a success, and the population there is thriving. Monitoring on the island will continue and will involve trapping at least once a year to census the new colony.

By creating new dibbler populations, we are offering security to a species that would otherwise only have been able to rely on five populations, of which three are very small. This action will increase the number of populations and individuals and the geographic range of the species. At least for now, the future of the dibbler is more secure. Going forward, there are plans to reintroduce dibblers to Dirk Hartog Island in Shark Bay as part of the *Return to 1616* fauna restoration project.

Tony Friend is a DBCA principal research scientist. He can be contacted on (08) 9842 4523 or by email (tony.friend@dbca.wa.gov.au)



CAVES

at Yanchep National Park

Under the surface of Yanchep National Park lies a spectacular labyrinth of 580 known caves, including some that are thought to have existed for more than 200,000 years. Three of the caves are open to the public, providing visitors with a choice of unique, and even thrilling experiences. I took one of the guided tours of Crystal Cave, and it was the highlight of a truly wonderful day in the park.

story and photos by
Rhianna King





Previous page
Top Chloe (4) and Bailey (6) enjoying a trip to Crystal Cave.
Bottom Magnificent columns adorn the caves.

Above left Tour guide Jonnie Saegenschnitter leads the group through Crystal Cave.

Above 'Shawls' are so called because they look like hanging fabric.

On a wet July day in the school holidays, my family and I drove 45 minutes from the Perth CBD to Yanchep National Park to join one of the guided tours of Crystal Cave. There was much chatter in the car on the way up about the likelihood (or lack of) that we'd see any of the cave-dwelling superheroes that occupy space in my six-year-old son's imagination, and a general buzz of excitement that we were going to spend the morning underground.

We started the tour at a shelter decorated with information panels that provided information about how caves were created and the type of creatures that live there. Here we met our tour guide Jonnie Saegenschnitter, who has an infectious adoration of the caves and is a font of information about their history, geology and ecosystems. Then, it was time to set off, and my kids' eyes widened when Jonnie showed us to the stairs that led down to the "first chamber", which, in the minds of a four and six-year-old, might as well have been middle Earth. Any concerns I had that they might be unsure of being in a dark environment were quickly allayed when they charged ahead (a little too fast for my liking) down the steep steps and into the cave.



DOWNWARDS DESCENT

Once I made it down the stairs, my senses went into overdrive interpreting this new and unfamiliar environment. The first thing I noticed was the dense quiet of being underground – a stark contrast to the sound of the wind whipping through the trees above us. The second thing I registered was the ambient temperature. The cave is an average temperature of 15 to 20 degrees Celcius changing slightly with the seasons, so it was nice to get some shelter from the wind chill aboveground. Jonnie noted that cave tours were particularly popular on summer days when the conditions were a welcome relief from the heat.

Over the next few moments my eyes adjusted and I could more clearly make out my surroundings. The quiet of the cave was soon disturbed by utterings of 'wow' and the 'ooos' and 'ahhs' of members of the group. The descent into the 'first chamber' is just nine metres beneath the ground but it seems like another world. The decorations that adorn the walls and ceiling came into focus and Jonnie pointed out stalactites, stalagmites, shawls, columns and straws.

He explained that the caves were formed when carbon dioxide from the atmosphere dissolved in rainwater, which then absorbed other acids. This seeped through decaying vegetation at the soil surface and slowly dissolved the underlying limestone, which is quite soft, comparatively speaking. Some cave systems were formed by underground lakes that gradually dissolved rock and created passages and chambers, while others were carved by underground streams and rivers.

UNDERGROUND TREASURES

After another short descent, our next stop was the magnificent Pantheon chamber. This spectacular space, which is 17 to 18 metres below ground level at its deepest point, is about 300 square metres. Everywhere we looked we saw beautiful







Take a journey to the Yanchep National Park caves

Scan this QR code or visit Parks and Wildlife's '*LANDSCOPE*' playlist on YouTube.

Far top left Jonnie shows the group the properties of a column, which resembles a big lump of candle wax.

Far left Everywhere you look in the cave there are spectacular formations.

Left Visitors to the cave have the opportunity to touch some display stalactites.

Below 'Straws' have formed from a drip of water leaving behind a calcium deposit.

and ancient formations. The solid 'shawls' look like they may blow in a breeze, obviously named because they look like bits of fabric draped from the roof. The columns look like they were created by massive melted candles. And the straws are spectacular hollow structures that have formed from a drip of water leaving behind a calcium deposit.

While admiring the cave and its remarkable formations, we were rewarded for also paying attention to its more minute features. While we were there, a single drop from a stalactite fell onto the corresponding stalagmite that it was creating underneath. One drop may not seem significant until you consider that the 'growth rate' of these remarkable formations is about one inch every 100 years.

GAME CHANGER

In the middle of the chamber, a small body of water captures the reflections of the cave roof. This water has been piped in, and unfortunately is a fraction of the amount that once naturally existed here. Water levels in the cave began to drop and became completely dry in 1997. This was most likely caused by human activities on the Gnangara Mound aquifer and has destroyed the environment once inhabited by a number of species of stygofauna. Efforts were made between 2000 and 2012 to re-water the cave, but unfortunately these were unsuccessful. Considering water has most likely been present in the cave for up to 200,000 years it's alarming that human impact could have such a significant toll.

Sadly, the dry caves are not the only sign of human impact – there are a number of stalactites that bear the scars of 'souveniring' and some structures that are forever changed by the accumulation of the 'invisible' oils that humans carry on their skin. Nowadays, those looking for a tactile experience on the tour have the opportunity to touch some of the display stalactites as part of a hands-on display.

Nearing the end of the tour, Jonnie pointed out footprints in the sand belonging to rats – the only mammal that occurs in the cave. He also told us that the local Nyoongar people believed the caves were inhabited by the feared Ginki Spirit, so they never entered them. This means it's unlikely the caves were used by people until Europeans discovered them 114 years ago.

At the end of the tour we climbed back up the stairs and into the sunlight, exhilarated by our experience underground. The rain held off long enough for us to enjoy a walk along the Wetland Trail and a visit to the koalas. And lunch at the Yanchep Inn was an added bonus. Exhausted by the day's activities there wasn't much conversation in the car on the way home, but any talk of superheroes was replaced by reflections about stygofauna, and our beautiful natural environment.

Do it yourself

Where is it?: Yanchep National Park is 51 kilometres north of the Perth CBD.

What to do: Cave tours, bushwalking, culture appreciation, picnicking, camping, wildlife appreciation.

Take a tour: Tours of Crystal Cave are run every day. Bookings for the tour can be made at McNess House Visitor Centre 30 minutes prior. Adventure caving tours are also run.

Contact: Yanchep National Park
Cnr Indian Ocean Drive and Yanchep Beach Road Yanchep, Western Australia, 6035
Phone: (08) 9303 7759
Fax: (08) 9561 2316
Email: yanchep@dbca.wa.gov.au

Visit www.parks.dbca.wa.gov.au for more information.



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Continuing the battle:
Felines in the Fitzgerald Biosphere







Feral cats have been identified as one of the top priorities in the Australian Government's Threatened Species Strategy. Integration of *Eradicat*® baiting into the *Western Shield* program in conservation reserves on the south coast has been a focus for DBCA and its predecessors since 2010. And future work will engage partners across conservation landscapes to achieve the vision of addressing the threat of feral cats to biodiversity conservation.

by Sarah Comer, Dave Algar, Angela Sanders, Simon Smale, Peter Speldewinde and Karl Hansom



In recent years, visitors to Fitzgerald River National Park on Western Australia's south coast have seen significant upgrades to facilities and roads. Not quite as apparent are the results of more than five years of feral cat control, which has been carried out to improve the conservation of a remarkable array of native birds, mammals and reptiles that occur there.

Fitzgerald River National Park lies in the heart of the Fitzgerald Biosphere – a 1.5 million-hectare world-recognised UNESCO biosphere reserve that encompasses wild and diverse ecosystems, agricultural communities, and that has a rich Nyoongar and European history. The 297,000-hectare national park, which is the core area of the biosphere, is well known for its remarkable flora diversity, with more than 1,700 species of plants known to occur there. Some 2,500 taxa are found in the wider biosphere, with 100 of these found nowhere else in the world.

While the floristic diversity of the biosphere is outstanding, the vertebrate fauna is also significant. In fact, the Fitzgerald Biosphere contains one of the most intact native animal assemblages in Australia and the national park is home to more species of vertebrates than any other conservation reserve in the south-west of WA. Some 29 mammals, 51 reptiles and 209 bird species are found in the national park and a significant number of these, including nine species of mammal and more than 200 species of birds, are listed as threatened or priority species. Local landowners work in cooperation with the department to manage this precious area, which receives ongoing monitoring as well as some visitors using the area for recreation purposes.

WESTERN SHIELD

Since 1997, the department's *Western Shield* program has worked to control foxes (*Vulpes vulpes*) through baiting in Fitzgerald River National Park, and the nearby Corackerup and proposed Peniup nature reserves. Before 2010, there was no feral cat (*Felis catus*) control in the area but, in 2010, feral cat control using *Eradicat*® was started in Fitzgerald River National Park, in the eastern part of the biosphere. This work was conducted as part of a research trial by the Integrated Fauna Recovery Project team to test the effectiveness of baiting in southern ecosystems, and has included monitoring of threatened and common fauna species in the park. The results of this work are encouraging with up to 50 per cent of feral cats taking baits, and increasing numbers of chuditch (*Dasyurus geoffroii*) observed in the park in the past six years. Dibblers (*Parantechinus apicalis*) started to appear at the native fauna monitoring site in October 2014 four years after baiting began and, anecdotally, numbers of ground-dwelling birds like malleefowl (*Leipoa ocellata*) and southern scrub-robin (*Drymodes brunneopygia*) also appear to have benefited from feral cat control.





Previous page
Main Quoin Head, Fitzgerald River National Park.
Photo – Tourism WA
Inset top Black-gloved wallaby.
Photo – Jiri Lochman
Inset middle Feral cats are being targeted in the area.
Photo – Sallyanne Cousans
Inset below Chuditch.
Photo – Jiri Lochman

Above Aerial view of the Gondwanalink landscape with Stirling Range National Park on the horizon.
Photo – Sarah Comer/DBCA

RESTORING CONNECTIONS – THE GONDWANA LINK VISION

Fitzgerald River National Park and the native vegetation that surrounds it form an integral part of the Gondwana Link connectivity conservation effort. The Gondwana Link vision is focussed on reconnecting remnant vegetation, maintaining and restoring ecosystem function and biodiversity across south-western Australia, across karri forest, woodlands and the Nullarbor Plain. In the biosphere transition zone to the west of the park, the vision of Gondwana Link – 'reconnected, healthy and resilient country across south-western Australia' – is being implemented by Bush Heritage Australia, Greening Australia,





Above right DBCA regional ecologist Sarah Comer collects data from a feral cat.
Photo – Mark Comer /DBCA

Right Spotted nightjar – a ground nesting bird that occurs in Fitzgerald River National Park.
Photo – Sarah Comer/DBCA



the Fitzgerald Biosphere Group and local farmers and landholders. Restoration and protection of bush reserves surrounding Corackerup in the vicinity of Corackerup Nature Reserve and the Peniup proposed nature reserve has seen replanting and restoration of fauna habitat across some 4,000 hectares. In the longer term, it is hoped that improved connectivity between the Fitzgerald River and Stirling Range national parks will enhance fauna movement and habitat between these important reserves.

THE GONDWANA LINK PLAN

A conservation action plan was first developed for this section of Gondwana Link in 2004. The plan is updated and amended to accommodate for changing factors, and is now up to its third iteration, which sets out the objectives and targets to measure conservation efforts. DBCA supports the plan and the efforts of the community and non-government organisations.

Bush Heritage identified introduced predators as a very high threat to tammar wallabies (*Notamacropus eugenii*) and western brush wallabies (*N. irma*), which are targeted by the conservation action plan. Monitoring for wallabies has been carried out since 2007 to provide baseline data that informs an introduced predator control program. Surveying and monitoring has revealed their preferred habitat and identified the most effective monitoring methods for each species. Other species known to occur in the Gondwana Link habitat include malleefowl, southern scrub-robin, chuditch and a translocated population of dibblers in the Peniup proposed nature reserve (see also 'Island home: a new start for dibblers' on page 39). Effective introduced predator control will undoubtedly benefit these species as it has in Fitzgerald River National Park.



Above A pilot program was carried out at Corackerup Nature Reserve.
Photo – Sarah Comer/DBCA

Biosphere reserves

The Fitzgerald River Biosphere Reserve is one of a number of global biosphere reserves established under the UNESCO (United Nations Environmental, Scientific and Cultural Organisation) MAB (Man and the Biosphere Program). The objectives of biosphere reserves are to address a sustainable balance between the goals of conserving biological diversity, promoting economic development and maintaining cultural values. Special attention is given to 'buffer zones' which surround the relatively untouched core area. Surrounding the biosphere buffer zones, which are recognised as having an important connectivity function in the larger landscape context, is the transition zone, where sustainable agriculture and other land uses and practices are developed and promoted by the community. Both buffers and transition roles build on the protection and conservation values in the biosphere.

BIOSPHERE RECOVERY PLAN

The Gondwana Link partners are now building on their previous work and incorporating some of the learnings of the Integrated Fauna Recovery Project in Fitzgerald River National Park into the management of landscapes in the Gondwana Link pathway. By leveraging the enthusiasm for introduced predator control shown through the *Red Card for Foxes* program, and exploring how integrated feral cat and fox control can be extended into fragmented landscapes, it is hoped that the vision of Gondwana Link can be realised to protect native fauna from introduced predators.

A small, short-term pilot introduced predator control program was carried out by Bush Heritage on some of the restoration properties that lie to the north of Corackerup Nature Reserve in 2012 and 2013. The program identified several major obstacles to integrated control, including timing and coordination of control efforts, and difficulties in locating and trapping feral cats. The availability of better information from feral cat control research, the registration of *Eradicat*® feral cat bait for use in WA and the federal Department of the Environment and Energy's national *Threat Abatement Plan for Predation by Feral Cats* of 2015 supporting a major push against feral cats, contribute to the timing being right to undertake a larger project in the area.

The South Coast Integrated Fauna Recovery Project has been trialling landscape-scale delivery of *Eradicat*® in the core of the biosphere since 2010 (see 'Controlling cats – the work continues', *LANDSCOPE*, Autumn 2013). Monitoring the success of this program in Fitzgerald River National Park, by examining feral cats' use of space and response to baiting, has given the team insights that will help inform a program in the rest of the biosphere. This will include timing of delivery and supporting control methods that specifically target feral cats in areas where broadscale baiting is not possible.

Understanding how feral cats use space and resources in fragmented landscapes is also essential to the design of targeted control programs. In the Gondwana Link reserves, this work is







Above left Mallee fowl.
Photo – Jiri Lochman

Left Tammar wallabies photographed at night.
Photo – Bush Heritage

Above BHA ecologist Angela Sanders and DBCA regional ecologist Sarah Comer downloading data from a collar fitted to a feral cat.
Photo – Sarah Comer/DBCA

being supported by Sarah Comer's PhD research project through The University of Western Australia. Sarah's research is building on the outcomes of the Integrated Fauna Recovery Project and is looking at how feral cats use their habitat in the larger reserves and how feral cat predation impacts native species such as tammar and brush wallabies. It does this through monitoring the movements of radio-collared feral cats in the heart of the Gondwana Link reserves. Interestingly, the data retrieved so far suggest that feral cats may move through a fragmented landscape differently to animals in intact reserves like Fitzgerald River National Park. These insights may be useful in designing a targeted control effort. The study of the diets of feral cats, which involves stomach content analysis, is showing a much greater diversity in prey species for cats in the larger reserves than in smaller remnants. It seems that although there is some reliance on introduced mice (*Mus musculus*) and rabbits (*Oryctolagus cuniculus*), the Gondwana Link cats appear to be highly dependent on native fauna, which includes ground-dwelling vertebrates like small skinks and snakes as well as birds and mammals.

The concept of 'smart' baiting – baiting that targets specific areas frequently used by cats in fragmented areas – is being investigated to build on the Integrated Fauna Recovery Project work in the bigger reserves. Looking at the movements of cats in the Gondwana Link reserves will help to identify refuges and places where strategic control can intercept or align with these refuges.

WORKING TOGETHER

In November 2015, a group made up of community members and staff from Bush Heritage, South Coast Natural Resource Management (NRM) group, The University of Western Australia and the then Department of Parks and Wildlife met in Ongerup to discuss the development of an integrated control program. It is hoped this program will build on the successes of the Integrated Fauna Recovery Project work in the Fitzgerald River National Park throughout the Gondwana Link fragmented zone. In particular, the idea was to support the efforts of local farmers and NRM to control introduced predators and complement the *Western Shield* baiting programs in Corackerup and the proposed Peniup nature reserves. The support of The University of Western Australia is twofold, through conducting the additional research required to understand feral cat behaviour in the Gondwana Link fragmented zone, and to provide a mechanism to monitor the effectiveness of an introduced predator control program.

On Christmas Island, work carried out since 2010 by DBCA and its predecessors has demonstrated that collaborating with the local community can enhance the impact of control efforts on feral and stray cats. Consultation with the people on the island enabled the development of a program to de-sex, microchip and register all domestic cats, which was followed up with the removal of stray and feral cats. The enthusiasm with which the community embraced the program indicates there will be continued support which will contribute to its ongoing success.





Top An integrated approach – across private and government landholders – is crucial to the success of the programs.
Photo – Sarah Comer/DBCA

Above The southern scrub-robin occurs in the Gondwana Link.
Photo – Jon Pridham/DBCA

THE FUTURE

In 2015, the Commonwealth Government established a National Feral Cat Taskforce under the guidance of Threatened Species Commissioner Gregory Andrews to lead a national approach to feral cat control. This initiative brings together government and other stakeholders in the fight against the threats posed to native fauna by feral cat predation.

Back in WA, the working group has agreed to collaborate to develop an integrated introduced predator management program to trial in the Gondwana Link fragmented zone on a cluster of the conservation reserves and adjacent farmland. The aim is to involve local government, non-government organisations, universities and NRM bodies in this work. This pilot program will aim to address and enhance the control of cats and foxes, and help to achieve the fauna conservation goals of the Gondwana Link fragmented zone conservation action plan and Fitzgerald Biosphere Recovery Plan. It is hoped this will meet the challenges of managing foxes and cats in this important conservation landscape, identify opportunities to tackle the threat posed by invasive species over the broader landscape and provide a strategic corridor for reconnecting the Fitzgerald River and Stirling Range national parks.

Sarah Comer is the regional ecologist for DBCA's South Coast Region. Sarah has been involved in the introduction of feral cat control programs into south coast reserves and works on a number of threatened species recovery programs. Sarah can be contacted on (08) 9842 4513 or by email (sarah.comer@dbca.wa.gov.au).

Angela Sanders is the ecologist for Bush Heritages' Gondwana Link and Kojonup Properties. Angela has worked on the South Coast within the Fitzgerald Biosphere since 1993 and has conducted fauna and vegetation monitoring on Bush Heritage's properties there for the past 10 years.

Simon Smale is Bush Heritage Australia's Gondwana Link Landscape Manager, responsible for overall management of the organisation's contribution to the Gondwana Link project, including management of Bush Heritage's reserves in the area, and of partnerships with the owners of other private conservation reserves.

Dave Algar is a principal research scientist in Science and Conservation Division at DBCA. He has worked throughout WA conducting research on feral cat control for the past 25 years.

Peter Speldewinde is a lecturer at The University of Western Australia's Centre of Excellence in Natural Resource Management and is based at the Albany campus. He has worked in the field of conservation for more than 20 years and is currently developing models to refine the use of motion triggered cameras as a monitoring tool for feral cats.

Karl Hansom is the Biodiversity Program Leader with South Coast Natural Resource Management in Albany. Karl has worked in Landcare and NRM on the South Coast for the past nine years, and is involved in facilitating projects to protect the regions natural assets.

by Grace Milne

River Rangers visit Purnululu National Park

kaleidoscope
kids exploring nature



In early May 2017, six *River Ranger* cadets from John Pujajangka-Piyirn School in Mulan, south of Halls Creek, enjoyed a weekend exploring Purnululu National Park with rangers Vincent Edwards and William Edwards and Kimberley Region *Bush Rangers* coordinator Sally Johnston. The camp was offered to *Bush Ranger* and *River Ranger* cadet units across the Kimberley, to reward cadets who had demonstrated a keen interest for cadet activities over the past term. Cadet Unit Leaders submitted written applications stating why their students should take part. The camp provided an opportunity for students to learn about the day-to-day role of park rangers, as well as the natural and cultural assets protected within the park. The camp will be on offer to cadet units again in 2018.

River Ranger cadets Grace Fernandez and Arle Lulu were part of a group of six cadets who travelled 470 kilometres to enjoy a weekend exploring the secrets of Purnululu National Park.

On the first night, the *River Ranger* cadets went straight down to the creek where they saw lots of cane toads and frogs; they were easy to spot with torches because their eyes shone.

Everyone was up early the next morning to jump back in the cars for a tour of the park. Vince took the group to a number of rock-art sites, on a short hike through the spikey spinifex, and shared stories of visiting the sites as a boy with his family.

Arle remembers: "On the first day Vincent showed us rock art. It was like a long hill and there were painting of men and hands and dingoes and crocodiles and fish – some black bream and crayfish. They were mostly coloured red. Vincent told us that these paintings were made a long time ago and that it was the old people who painted them."

The next stop was Echidna Chasm. The group got a bit of a fright when *River Ranger* cadet Matthius spotted a small snake under the steps when they were walking through the gorge.

After lunch they explored Cathedral Gorge at the southern part of the park. Vincent explained to the group how much damage a big wet season could cause, and the work rangers must do to keep the tracks in good shape. The walk ended with an up-close look at the beehive domes.

The park rangers then took the group to one of their favourite fishing spots, away from the tourists' trail, along the Ord River on the park boundary. For Arle, this was a highlight.

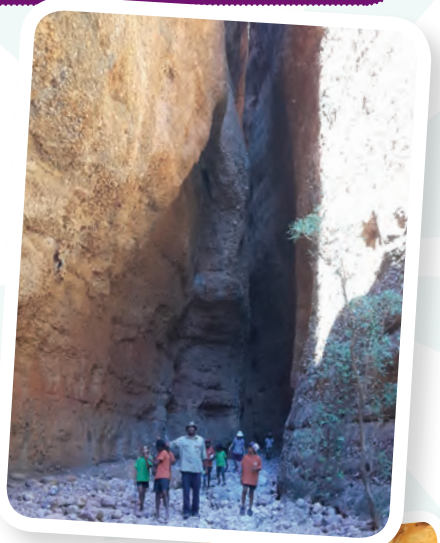
"There we saw crocodile tracks. We were all fishing and we all caught fish except for Keri. Grace gave him one of the big black ones she caught," Arle said.

That night the group heard about the impact of cane toads on native species. They also learnt where the cane toad's poison glands are and how to safely pick them up.

Then they gathered their torches and plastic bags, put on their gloves, and went out to catch cane toads near the creek.

The next morning they had time for a quick tour of the ranger station and workshops before it was time for the long trip back to Mulan.

When she leaves school, Grace would like to work as a park ranger. Arle would like to be an animal scientist.





Above left and above *River Ranger* cadets explore Purnululu National Park with rangers Vincent and William.
Photos – Sally Johnson/DBCA

River Rangers *is a cadet program for students in Years 5 and 6. It seeks to engage and educate the next generation of children to help us protect our local rivers and empower them to make positive changes to their local communities and environment.* River Rangers *take part in a range of activities, such as tree planting, litter pick-ups, bird and bat box building, biodiversity surveys, water quality testing and building native gardens.*

Visit dbca.wa.gov.au/get-involved/nearer-to-nature/river-rangers for more information.

LANDSCOPE's **Kaleidoscope kids exploring nature** page is an exciting regular feature for kids.



Gillam's bell *(Darwinia oxylepis)*

Gillam's bell is a dense shrub that grows up to 1.5 metres high in stony, peaty sand and rocky gullies. The beautiful, bell-shaped flowers appear from August to November. The plant is native to Western Australia and occurs in a few populations north of Albany. It is considered threatened.

Illustration by Gooitzen van der Meer

Reference photo by Jiri Lochman

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