

WA'S PARKS, WILDLIFE AND CONSERVATION MAGAZINE

LANDSCOPE

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CARING FOR COUNTRY

A healing
process

Feeding wildlife

More harm than good

What lies beneath

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ON THE COVER

Front cover A vibrant jewel beetle (*Castiarina castelnaudi*) on an endemic Mt Augustus foxglove (*Pityrodia augustensis*).

Photo – Janine Guenther

Back cover Goordgeela Lookout Walk Trail, Mount Augustus National Park.

Photo – Michael Phillips/DBCA

Spending time in nature has been found to have positive impacts on our mental health. Simply taking a short walk through the bush or admiring an ocean view can leave us feeling energised and restored.

In Western Australia, despite the restrictions imposed by the COVID-19 pandemic, many people have been lucky enough to continue to be able to visit our amazing and diverse national parks and other reserves to enjoy a wide variety of natural landscapes, landforms and wildlife.

This issue of *LANDSCOPE* features some of these amazing places, including Mount Augustus National Park (see page 8) and the Bibbulmun Track (see page 36).

Realising the benefits of spending time in nature does not mean having to travel to remote or pristine locations. During the pandemic, many people have had more time to focus on enjoying their backyards or local parks, and the wildlife that inhabits them.

Interactions with wildlife are a key part of enjoying nature for many people, whether it's seeing birds in your backyard, catching a glimpse of a lizard sunning itself on a rock at your local park, or marvelling at kangaroos bounding through the bush.

Planting native species in your garden can help attract birds and butterflies, with around 17 species of butterfly that may visit your garden in south-west WA if you have the right plants. Your garden could also attract honeyeaters, pardalotes, magpies, wattlebirds or the cheeky willie wagtail. Whiling away the minutes (or hours!) watching them flitting from bush to bush, drinking nectar from the flowers or seeking out insects is not a bad way to spend some time.

A growing body of research is documenting the positive benefits that interacting with wildlife can bring, particularly in urban environments. While these benefits are often intangible, having the opportunity to interact with wildlife can have significant and positive impacts on people. However, we need to ensure we don't love our wildlife to death and 'kill them with kindness'. In this issue, we explore why feeding wild animals is not such a good idea (see page 48).



Dr Fran Stanley, Executive Director, Conservation and Ecosystem Management
Department of Biodiversity, Conservation and Attractions

Contributing Peter Nicholas is a DBCA audio-visual production officer, producing a range of videos for *LANDSCOPE* as well as visual stories to reflect the efforts of rangers, wildlife officers, scientists, staff and volunteers within the department. He enjoys being able to showcase WA's unique landscapes, fauna and flora.



Peter is a keen photographer and has been taking underwater photographs for nearly fifty years, winning several international awards, and continually striving for improvement.

Kaylee Martin is a communications officer with DBCA's Public Information and Corporate Affairs branch. She has worked up close with native and exotic fauna species in city and open-range zoos and is passionate about raising awareness for conservation projects, endangered species and wildlife welfare. She is also currently completing a Certificate IV in veterinary nursing and hopes to use these skills while volunteering in dog shelters and wildlife rescues.



Felix Steinwandel is 10 years old and growing up in the Perth Hills. He has participated in many *Nearer to Nature* activities over the past six years and loves spending lots of time outdoors riding his bike or scooter. His other passion is performing arts and he recently performed in *Priscilla* at Crown. At school, his favourite subjects are English (writing) and sport. When he grows up, he wants to be either an entertainer or a firefighter.





Features

- 8 Parks for People: Mount Augustus National Park**
Exploring Burringurrah and the traditional lands of the Wajarri people
- 12 Connection to Boodja: A healing process**
Tjaltjraak Ranger Group caring for country
- 18 A new chapter for kyloring**
A successful translocation of western ground parrots
- 24 Adventure out: Big Kids Campout**
Ten-year-old Felix camps out in Perth Hills
- 28 Bridging the gap: The art of interpretation and its importance in geology**
Interpretation at WA's giant landforms
- 36 Touched by nature: Jim Freeman**
Bush poet and Bibbulmun Track devotee
- 42 Life down under: the mysterious world of subterranean fauna**
The dark 'under' world of minute invertebrates
- 48 Feeding wildlife: Doing more harm than good**
Dispelling myths around what's helpful and harmful

Regulars

- 3 From the desk of Dr Fran Stanley**
A foreword from Executive Director, Conservation and Ecosystem Management.
- 6 Bush Telegraph**
Short stories from around the State, reader's pic and a guest word.
- 23 In Review**
A collection of books and applications.
- 35 Discovered**
Guinea flower (*Hibbertia proberae*).
- 53 Kaleidoscope**
Connecting kids with nature.
- 54 Nature's pin-up**
Spinifex pigeon (*Geophaps plumifera*).

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This page Bibbulmun Track, Gloucester National Park.

Photo – Dom Lim



Department of Biodiversity, Conservation and Attractions



READER'S PIC

Fly agaric (*Amanita muscaria*)

Photo and words by Deb Fitzpatrick with contribution by WA Herbarium collections manager, Shelley James

"I'm down in the Margaret River region for a couple of weeks and was out walking yesterday when I came across the most spectacular gathering of mushrooms. I took a couple of photos and my husband insisted they are such amazing specimens that I send the photos 'to someone'. So, since we subscribe to your beautiful magazine, I thought of you."

Editor's note:

This is Amanita muscaria, an invasive, poisonous weed. It is a northern hemisphere species that has been spread around the world. It was first recorded in WA by Richie Robinson in 2009 in a garden in Manjimup is now widespread in the south-west and appears to be invading native bush. It is loved by the general public as the fairy mushroom and is arguably the most iconic toadstool species, and one of the most recognisable and widely encountered in popular culture.

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 landscape@dbca.wa.gov.au.



New funding for WA's Aboriginal Ranger Program

Building on the success of WA's Aboriginal Ranger Program that began in 2017-18 (See 'Connection to Boodja – a healing process', page 12), an additional \$50 million has been committed to continue the program.

The funding will allow more Aboriginal organisations to employ and train rangers to manage country and build community leadership, wellbeing and resilience.

The program helps to provide local jobs for Aboriginal people and educate

visitors and communities about their culture and knowledge.

Since its commencement in 2017-18, the program has continued to train and employ Aboriginal people as rangers to undertake land and sea management activities including:

- biodiversity monitoring and research
- traditional knowledge transfer
- mentoring
- fire management
- cultural site management

- feral animal and weed management
- cultural awareness and immersion experiences for visitors
- guided welcome to country tours and/or talks for visitors
- management of visitors and tourism assets and education programs.

Above left Bardi Jawi Rangers.

Above Karajarri Rangers.
Photos – Amanda Smith/DBCA

Numbat numbers in Dryandra



Images of numbats have been captured on cameras installed across the Dryandra Woodland near Narrogin. Staff have been monitoring wildlife in the reserve since the cameras were installed in 2015, and there has been a significant increase in number of images captured compared with this time last year which indicates population growth in the area. In addition, cameras in outer satellite blocks are now also picking up the odd individual, which shows that numbats are expanding out of the main population and inhabiting new sites.

The results of numbat surveys conducted in April and November 2020 show numbats were sighted in most areas, some where they had not been seen before, as well as personal observations from visitors and staff, are giving the Numbat Task Force confidence about the health of the animals in the wild.

In 2014, population estimates were around 50 individuals. Recent data indicate those numbers are now up around 500.

Above Numbat (*Myrmecobius fasciatus*).
Photo – Jacqui McGhie

Florabase gets a new look

The Western Australian Herbarium's web application *Florabase* is the window to Western Australia's amazing flora, providing detailed information on the State's plants, algae and fungi, as well as hosting the taxonomic journal, *Nuytsia*.

While it has been constantly updated over the years, drawing information from the Herbarium's specimen database and names census, *Florabase* has been redesigned with numerous upgrades, while retaining the

core functions that users rely on to explore the Western Australian flora including a new user-friendly interface, interactive maps, 'news' and 'plant of the month' features as well as 'advanced search' capability.

Florabase 3.0 is now available at florabase.dbca.wa.gov.au.



Below Kalbarri yellow bells (*Geleznowia verrucosa*).
Photo – Kelly Shepherd

Guest column



Linda Daniels
Executive Director,
Bibbulmun Track
Foundation

Hikers are a wonderful lot, and the Bibbulmun Track Foundation is in the enviable position of having a waiting list of people wishing to look after a section of track. Our 400 plus volunteers are integral in the upkeep of the track and campsites as well as planning, events and walker enquiries.

One of our wonderful volunteers (see 'Touched by nature: Jim Freeman' on page 36) wrote the following poem, which really says it all! Thank you, Jim, and every one of our Bibbulmun Track volunteers. We raise a walking stick in salute to all that you do!

Ode to our volunteers

*Our vollies are a funny lot
They work hard and whinge a lot
About the scrub they have to hack
Laying all across the Track
And in the office too
There are lots of things to do
Lick the stamps, answer the phone
Working fingers to the bone
Upon our vollies we depend
To keep the Track free end-to-end
Of trees that have over blown
All of this they do alone
Answer questions by the score
Of people coming to our door
Telling them just what we think
When they want to take the kitchen sink
Vollies are the backbone of this organisation
With lots of skills and occupation
With smiling face, they never shirk
Even the most unpleasant work
Our vollies they are versatile
Never frown, always smile
Fighting ants and sucking ticks
As they pick up rocks and sticks
So, if you're retired and naught to do
Come on down, we'll find a job for you
Join our happy band of volunteers
It will keep you occupied for years
Once a year we get a reward
For all the work hours that we've scored
So come down and join our list
Without our vollies we can't exist.*





Mount Augustus National Park

Drawing obvious comparisons to world-famous Uluru, Mount Augustus offers rocky creeks and gorges, open plains, Aboriginal rock engravings and a variety of wildlife – all the beauty, with only a fraction of the tourists.

Upon entering Mount Augustus National Park, a visitor sees a carpet of arid shrublands dominated by wattles, sennas and *Eremophilas* that blanket the plain and extend right up to and over the giant rock. Sporadic groves of river gums indicate water seepage from beneath the island mountain.

Visitors will encounter rocky creeks, gorges, open plains, Aboriginal rock engravings (petroglyphs) and a variety of wildlife. Mulga, gidgee and other wattles are sprinkled across the plain, and a keen eye will spot spinifex pigeons, crimson chats, mulga parrots and babbler as they forage for food.

Above Geological giant.
Photo – DBCA

At Cattle Pool on the Lyons River, permanent pools attract cormorants, ibis, heron, and a variety of ducks. The trees play home to blue-winged kookaburras, sacred kingfishers and little corellas.

Emus visit regularly to seek out fruits, while bustards sneak up on insects and small reptiles on the ground. On the plain you're likely to see bungarras and red kangaroos, and as you scale the mount, euros and birds of prey can be found.

Taking a moment to sit quietly and enjoy the serenity may afford you the added bonus of seeing some of the more shy-but-inquisitive wildlife, particularly in the early morning or late afternoon. While patiently waiting to glimpse a critter, marvel at the factors, like infertile soils and climate variability, that have shaped the thriving ecosystem.

SITE SIGNIFICANCE

Mount Augustus and surrounds are the traditional lands of the Wajarri people. The Wajarri name for the site is Burringurrah, named after a boy who was undergoing his initiation into manhood. The rigours of this process so distressed him that he ran away, breaking Aboriginal law. Tribespeople chased the boy and hit him with a mulgurrah (fighting stick). Burringurrah collapsed and died, lying on his belly with his left leg bent up beside his body. You can see his final resting pose as you approach Mount Augustus from the south.

Aboriginal occupation is evidenced by engravings on rock walls at Munde, Ooramboo and Beedoboondou visitor sites, and by numerous stone tools discovered in the area.



Common plants and animals of Mount Augustus:

- Wattles (*Acacia* spp.)
 - Sennas (Cassias, *Senna* spp.)
 - Eremophilas (*Eremophila* spp.)
 - Mulga (*Acacia aneura*)
 - Gidgee (*Acacia pruinocarpa*)
 - Spinifex pigeon (*Geophaps plumifera*)
 - Crimson chat (*Epthianura tricolor*)
 - Mulga parrot (*Psephotus varius*)
 - Babblers (*Pomatostomus* spp.)
 - Cormorants (Phalacrocoracidae)
 - Ibis (Threskiornithidae)
 - Heron (Ardeidae)
- Ducks (Anatidae)
 - Blue-winged kookaburra (*Dacelo leachii*)
 - Sacred kingfisher (*Todiramphus sanctus*)
 - Little corella (*Cacatua sanguinea*)
 - Emu (*Dromaius novaehollandiae*)
 - Bustard (wild turkey, *Ardeotis australis*)
 - Bungarra (goanna, *Varanus* spp.)
 - Red kangaroo (*Osphranter rufus*)
 - Euro (*Osphranter robustus*)
 - Birds of prey



Discover more about
Mount Augustus
National Park

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



Top left Edney Springs.

Top View from Summit Trail.

Above Animal tracks on the red dirt.
Photos – Michael Phillips/DBCA

Left (clockwise from top) Blue-winged kookaburra; Goanna. *Photos – Sallyanne Cousins; Red kangaroo. Photo – Jiri Lochman; Acacia sp. Photo – Eddy Wajon/Sallyanne Cousins Photography*



STAYING SAFE

Tragically, several lives have been lost at this location in recent years, mainly on the Summit Trail and due to heat stress. Despite this, some visitors continue to arrive and go on to hike without sufficient preparation. This park is incredibly remote and even small problems can escalate quickly when far from help.

These tips will help you plan your visit and pack appropriately:

- Carry and drink a minimum of four litres per person per day when hiking, and more in hotter months. There is no drinking water in the park.
- Walk during the cooler parts of the day (there will also be more wildlife about during this time). Aim to start the longer trails soon after sunrise.
- Wear sturdy shoes, a hat, loose long-sleeved shirt and sunscreen.
- Walk in groups of three or more – in an emergency one might need to wait with the injured person while someone goes for help.
- Carry first aid kit, a personal locator beacon (PLB) or satellite phone as mobile coverage is limited.
- Beware of loose rocks, unstable surfaces and undercut cliff edges.



Top left *Acacia* plants are common in Mount Augustus.

Top right Flintstone geology.

Above right Burra or jilarnu (*Eremophila fraseri*) is a flowering plant found in WA's rangelands.

Above Goordgeela Lookout Trail.
Photos – Michael Phillips/DBCA



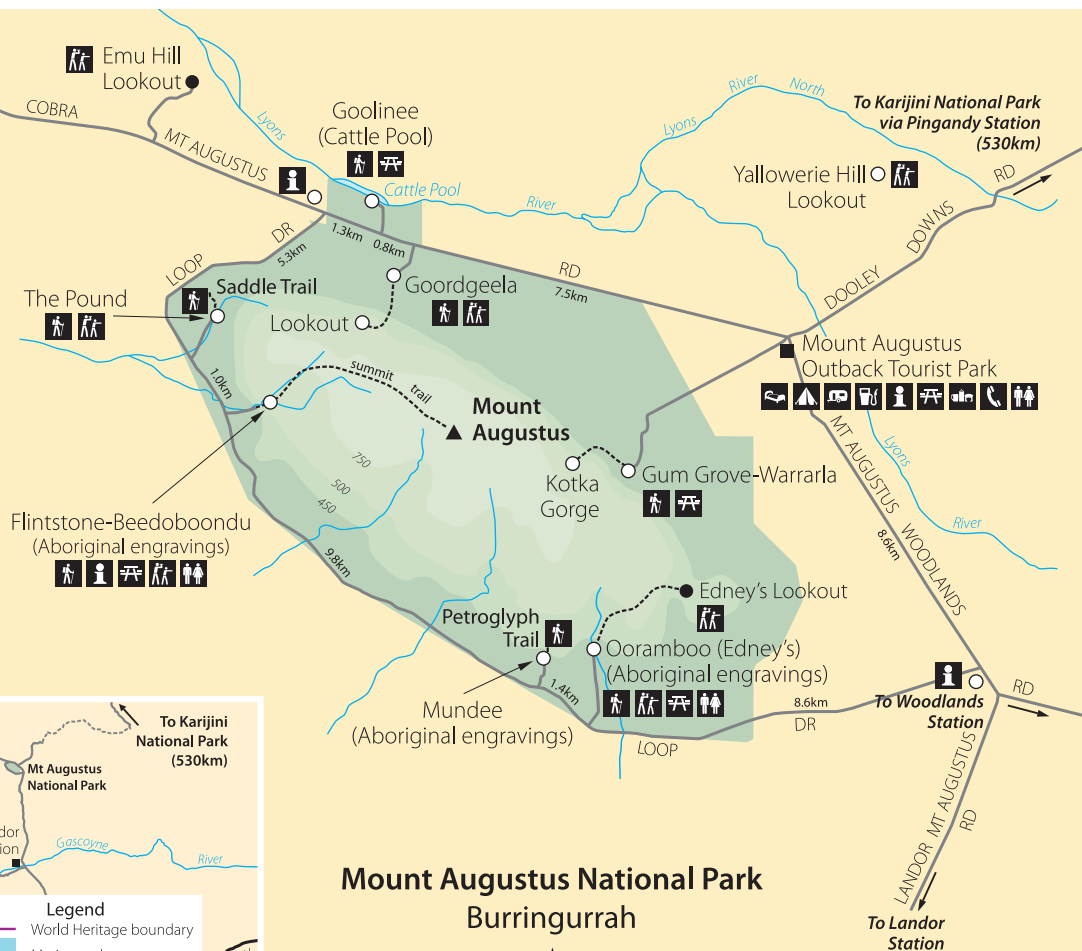
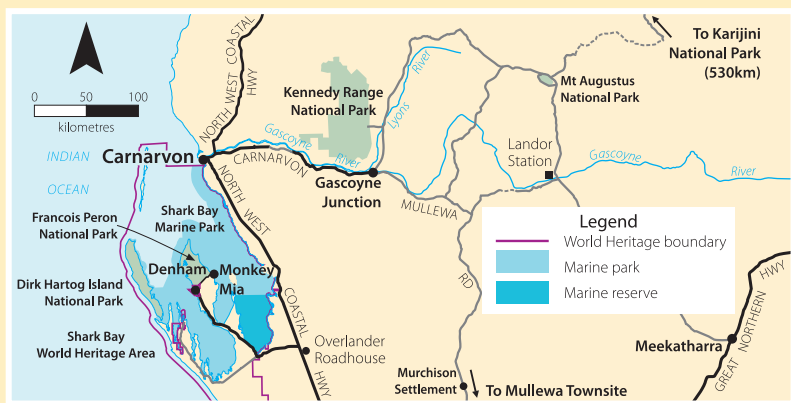
A FAMOUS COUSIN

Mount Augustus is often — and mistakenly — referred to as a monocline (one sided slope) or monolith (one rock), and frequently compared to Uluru. Both consist of sedimentary rock, but they differ in almost all other aspects including dimensions, geological evolution, and ages of both the landforms and the underlying rocks (see 'Mega Geology', *LANDSCOPE* Winter 2021). The Mount Augustus sandstone is estimated to be about 1.6 billion years old and thought to be about three times older than the sandstone of Uluru.

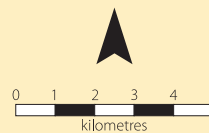
Mount Augustus is in fact an 'asymmetric anticline' because of the arch-like shape it is folded into, which is composed of multiple rock types. The mount can also be described as an inselberg, meaning 'island mountain', and rises 715 metres out of the surrounding alluvial plain.

Legend

National park	Hiking trail
Sealed road	Information
Unsealed road	Picnic tables
Walk trail	Scenic vistas
Accommodation	Store supplies
Camping	Telephone
Caravan park	Toilets
Fuel station	



Mount Augustus National Park Burringurrah



THINGS TO DO

The park has 11 trails in total, from short hikes to moderately difficult hikes through to the extremely challenging Summit Trail, which is a five-to-eight-hour hike and requires a high level of fitness and preparation.

All hike trails in the park are essentially unmodified and ground-level trail markings should be followed. Hikers should read the information and classification for each trail and choose hike trails suitable to their capabilities. In case of emergency, it is strongly recommended you carry a Personal Locator Beacon (PLB) or satellite phone as mobile phone coverage is extremely limited.

Carry and drink a minimum of four litres of water per person per day of hiking, wear sturdy shoes and protection from the sun, wind and rain. The area experiences extreme heat in the warmer months (September to March), so hiking is not recommended. If you do walk in the heat, extra water is essential.

The Wajarri Traditional Owners request that visitors complete all their hiking during daylight hours and be off the mount by nightfall.

The 49-kilometre Loop Drive around Mount Augustus allows access to all visitor sites within the park. The Loop Drive and all access roads are generally two-wheel-drive friendly.

Do it yourself

Where is it? 465 kilometres north-east of Carnarvon via Gascoyne Junction

Total area: 9168 hectares

Recreational activities: Hiking, appreciation of nature and culture

Nearest Parks and Wildlife Service office: Shark Bay District office, Knight Terrace, Denham 6537. Phone (08) 9948 2226

Where to stay: Mount Augustus Tourist Park adjacent to the national park offers camping, accommodation and basic supplies.

Before your visit: Check alerts.dbca.wa.gov.au for current park alerts and download the free Emergency+ app.



Connection to Boodja

a healing process

After Native Title was recognised for an area of about 27,000 square kilometres of land surrounding Esperance, the Esperance Nyungar community is coming together to continue to care for country. The Tjaltjraak Ranger Group was established as part of WA's Aboriginal Ranger Program and is encouraging the sharing of knowledge, allowing for culture and language to be strengthened and conserved.

by Dr Kate Rodger and Dr Amanda Smith



The Esperance Nyungar community has a strong connection to place and country. Connection to Boodja (our land) provides identity and a sense of belonging.

A central component of this is the concept of belonging to land rather than owning land and having a shared responsibility to care for land and sea.

For many years the Esperance Nyungar community has aspired to renew and uphold links with its ancestral lands. On 14 March 2014, after 18 years of negotiations, the Federal Court of Australia recognised the Native Title rights and interests for an area of about 27,000 square kilometres of land surrounding Esperance to the Esperance Nyungars (see map on page 15).

Following this, on 6 September 2016, Esperance Tjaltjraak Native Title Aboriginal Corporation (ETNTAC) was registered as an agent by the Federal Court of Australia as the Native Title Body Corporate for the Esperance Nyungars.

With the legalities in place, the Esperance Tjaltjraak Nyungar community was able to exercise its traditional rights over their land. As part of this process, the Tjaltjraak Elders saw the need for a ranger program to provide a secure future for its people and culture, and allow for healing of country.

“They had secured their Native Title rights but then it was a bit empty until they had their family out fulfilling their obligations as custodians and managing country and caring for it,” the ETNTAC CEO Peter Bednall said.

MANAGING COUNTRY

The need for rangers on country coincided with the launch of WA’s Aboriginal Ranger Program in 2017–18, a five-year, \$20 million initiative to support Aboriginal organisations to manage country with support from the Department of Biodiversity, Conservation and Attractions (DBCA).

The Tjaltjraak Ranger Program commenced in April 2018 after receiving funding through the program, allowing



Previous page

Main Tjaltjraak Rangers undertaking cultural dig at Duke of Orleans Bay.

Photo – Shem Bisluk/DBCA

Inset top right Tjaltjraak (*Eucalyptus pleurocarpa*).

Photo – Jiri Lochman

Inset centre right Quandong nuts.

Right Water sampling at Lake Windabout.

Above Dempster Head.

Photos – Shem Bisluk/DBCA

Right Tjaltjraak (*Eucalyptus pleurocarpa*).

Photo – Jiri Lochman

the Esperance Tjaltjraak Elders the opportunity to see their wish come true.

“I worked with all these fellas (rangers) grandfathers and great grandfathers and old fellas,” the Tjaltjraak Senior Cultural Advisor said. “I lodged that Native Title claim so I did a lot of work with the old fellas back in the early days.”

“It has been a long time coming, this ranger program, and we have been very privileged and honoured to be chosen to be able to carry out this program. It is just humbling to see after many years of fighting I can say to the old fellas now that our journey is just starting to

Where the tjaltjraak grows...

The tjaltjraak is a traditional Nyungar name for a culturally significant eucalypt. The Esperance Nyungar people believe the distribution of the tjaltjraak corresponds closely to their territory and as far as the tjaltjraak grows to the east and north, so extends their country.

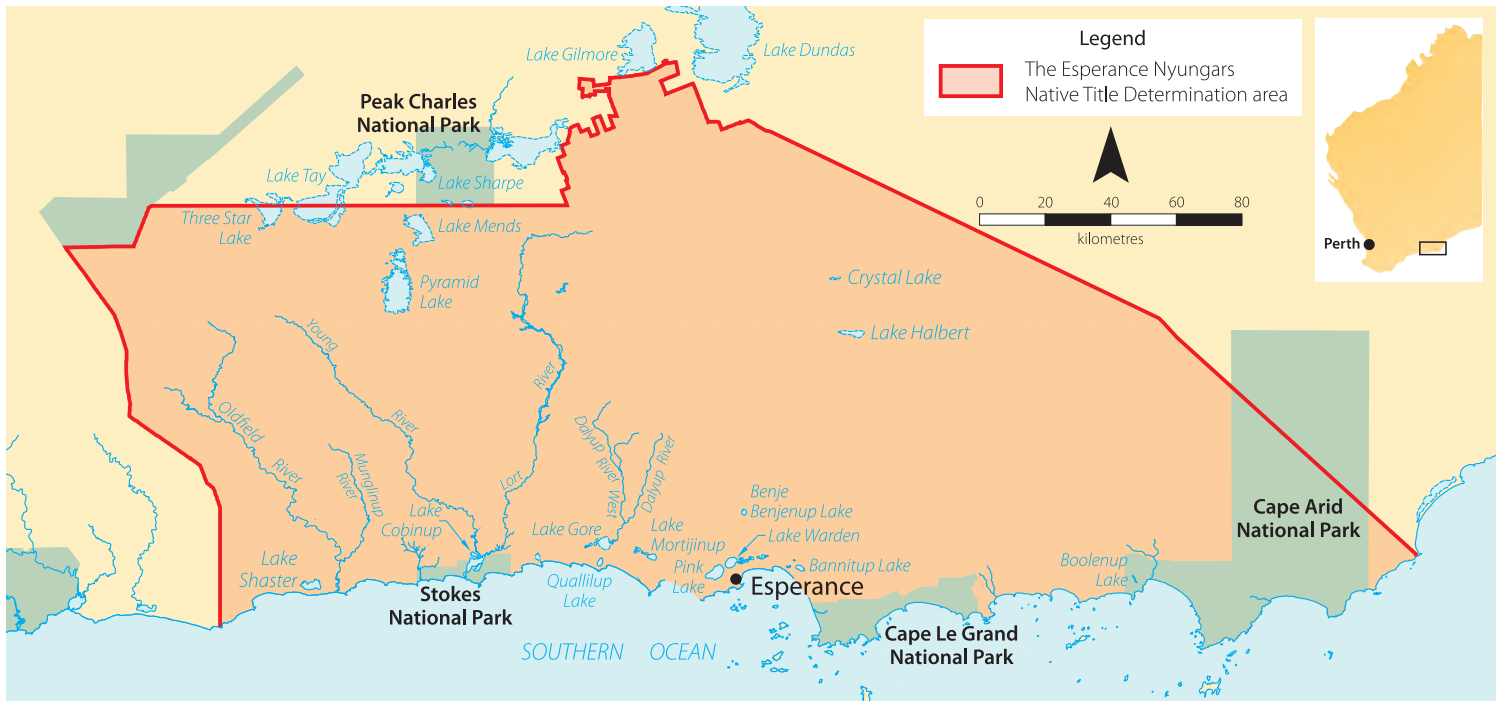


begin through the employment of our rangers.”

WHAT’S OLD IS NEW

“Today’s ranger program that we have got continues the aspirations of the old people for looking after and caring for country and done in a way that the cultural values are embedded and protected,” a Tjaltjraak Elder said.

“Sharing of knowledge, allowing for culture and language to be strengthened and conserved is possible through the Aboriginal Ranger Program. Culture and knowledge are shared across the generations.”



“When you take rangers out there now, they are like sponges on the culture... I show them a place, I explain the cultural significance of the area, the cultural corridor.”

“When you take rangers out there now, they are like sponges on the culture. When we take them out and I show them a place, I explain the cultural significance of the area, the cultural corridor,” the Senior Cultural Advisor said.

“A lot of them know a lot of the places, they just don’t know the importance so my role is to start to embed, inform, teach or guide the rangers and their leaders into following the aspirations because in the culture we have an honour, we are duty bound to pass our knowledge down to our kids and our grandkids and our great grandkids. So, I am actually fulfilling that for a lot of the old people who aren’t here today.”

Through the sharing of knowledge comes the reconnection to culture and country, and the program provides the younger generation with the opportunity to reconnect with country.

“Specially all my grandies and children, it is like they are connected back to country when you pass on your knowledge and language. Otherwise, if I don’t pass it on, my kids wouldn’t know and their children wouldn’t know, and it would be just ‘yeah we are from Esperance and that’s it’ but you need to know the country you are part of, the country and the stories and the song lines,” another Tjaltjraak Elder said.



Above left Tjaltjraak Rangers viewing the Archipelago of the Recherche.

Above Identifying freshwater fauna at Lake Windabout.

Photos – Shem Bisluk/DBCA

Learn more about the Tjaltjraak Ranger Group

Scan this QR code or visit Parks and Wildlife Service’s ‘LANDSCOPE’ playlist on YouTube.



HEALING PROCESS

The increased access to country and opportunity to work on country through the program is part of the healing process by allowing the younger generation to connect to Boodja.

“The funding that we have gotten from the State allows us to go back out there and connect back on country. That spiritual connection to country is a very important part of the healing process,” ETNTAC Chairperson said.

“When you are back on country and caring for country, you are reconnecting with country that is where that healing will also come from, from our people.”

“Esperance holds a special place for a lot of us rangers,” a Tjaltjraak Ranger said.

“We’ve all got a significant site or place where we have grown up with

our elders or we’ve got a dreaming or a story that our family has told us and every time we go past that certain place we feel overwhelmed and overjoyed knowing that we are doing our ancestors proud.”

Connection to Boodja provides identity and a sense of belonging.

“I suppose it is like we are empowering our young ones,” a Tjaltjraak Elder said.

“Before they might have been lost, don’t know who they are, don’t know where they come from. Whereas now it is like ‘oh, I belong somewhere, this is my home’. It grounds them.”

LOOKING FORWARD

The ETNTAC is aiming to form a legacy to empower and support future generations.

“The ranger program allows us to look at and protect cultural values, cultural sites and is also an opportunity for young rangers to learn more about the culture and go out to places that they only hear about but they can’t access,” the Tjaltjraak Senior Cultural Advisor said.

“What I’m trying to do now is impart a lot of that knowledge and aspirations to rangers. A transitional process so that we will continue to grow.”

.....
Above Undertaking interviews on country.

Below left Water sampling at Lake Windabout.

Below Identifying aquatic fauna at Lake Windabout.

Photos – Shem Bisluk/DBCA

Continuing commitment

A further \$50 million over four years has been committed to expand the Aboriginal Ranger Program so that more Aboriginal organisations can employ and train rangers to manage country and build community leadership, wellbeing and resilience. Visit dbca.wa.gov.au/aboriginalrangerprogram



In their words...

DBCA research staff visited the Esperance Tjaltjraak Rangers and spoke to them about the program. These are some of the many social outcomes that have been identified:

CONSERVING LANGUAGE

“We’re still learning about our language. It sort of died out with a lot of the elders. So now we’re trying to learn from some of the elders that still remember it. Got time to spend with family out on country learning about culture and language. Wouldn’t have happened without the Aboriginal Ranger Program.”

Esperance Tjaltjraak Ranger



“This corporation without cultural rangers is just a corporation, so having the Aboriginal Ranger Program provides that solid career opportunity for the region here. Taking that away...I just don’t know what we would do. Being able to work under a culturally-guided, culturally-led organisation is important for everyone.”

*Healthy Country Plan Coordinator
Esperance Tjaltjraak*

STRENGTHENING CULTURE

“It makes community think that we are out there, gives us respect and more awareness about our culture. They believed that there was no Aboriginal people here. Now we are looking after country.”

Esperance Tjaltjraak Ranger

“We all love doing this, coming out on country. If the program stopped it would be very hard ‘cause it is things that our grandfathers and our great grandfathers have done, walked on this country and we’re doing it now and for it to stop then it would be not a nice feeling.”

Esperance Tjaltjraak Ranger

CONNECTION TO COUNTRY

“Personally it makes me feel good and a sense of being somewhere, sense of place. Got a lot of connection, as you come into Esperance you come past where one of our great grandmothers was born, I’ve always known about that story and it feels humble and good that I’m actually out protecting and caring for country that my grandmother and pops fought hard to get back. Makes me feel sense of belonging and that I’m accomplishing something.” *Esperance Tjaltjraak Ranger*

“There is a lot of things but just being out there on country and feel at home and in your heart feel good. Just love being out on country everywhere. Everything, the ocean, the land is a part of me.” *Esperance Tjaltjraak Ranger*



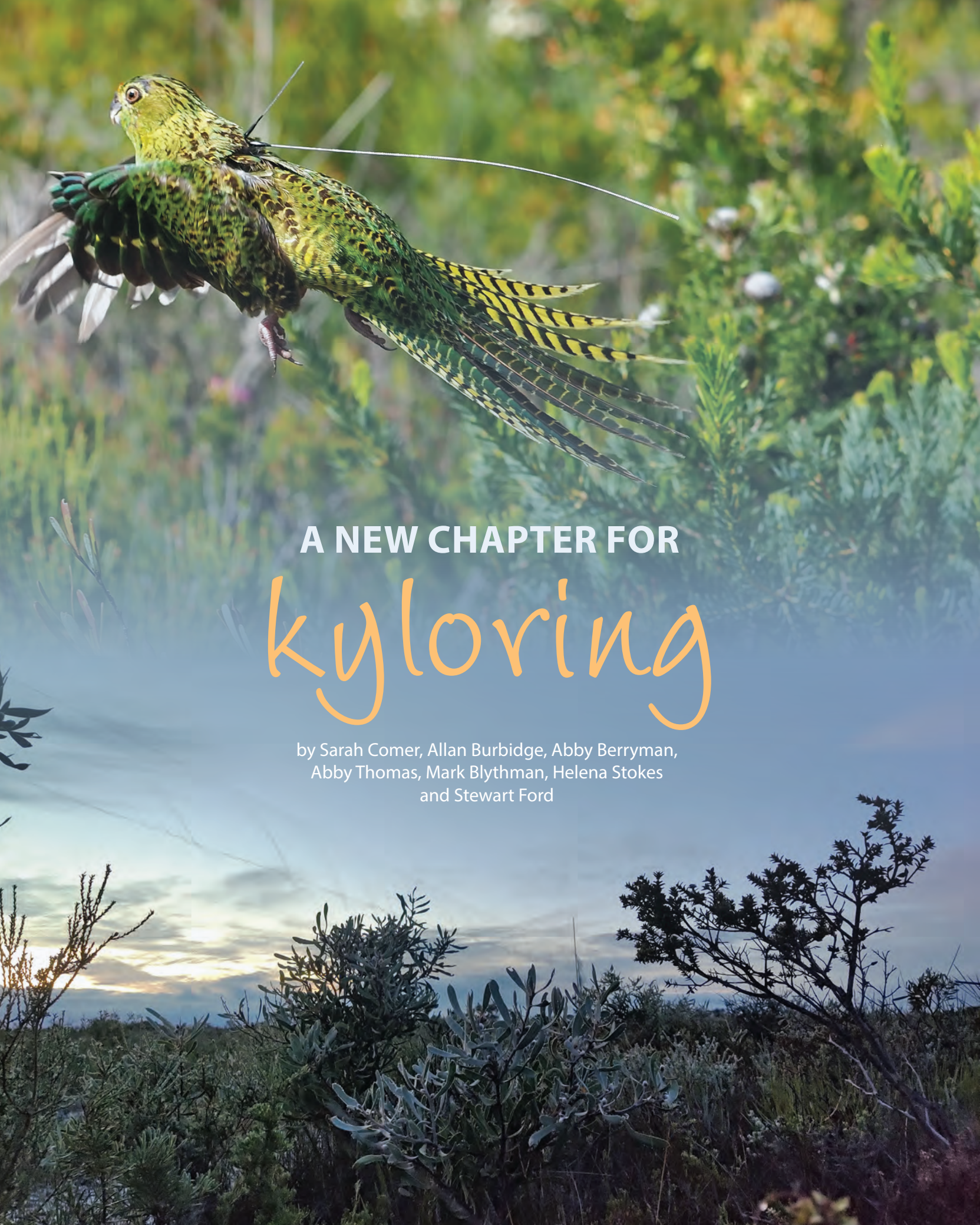
From top Sandy Bight, Cape Arid National Park. Photo – Marie Lochman; Traditional tools; Duke of Orleans Bay. Photos – Shem Bisluk/DBCA

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The authors thank the **Tjaltjraak Rangers** for contributing to this research, sharing their knowledge and taking them out on country.

Anonymity of those quoted has been maintained in line with social research best practice.



A NEW CHAPTER FOR
kyloring

by Sarah Comer, Allan Burbidge, Abby Berryman,
Abby Thomas, Mark Blythman, Helena Stokes
and Stewart Ford

The western ground parrot or kyloring (*Pezoporus flaviventris*) is critically endangered and is restricted to just one small population of around 150 birds in Cape Arid National Park and the adjacent Nuytsland Nature Reserve. More than a decade after it was first considered, the first ever wild-to-wild translocation is providing hope for the conservation of the species.

The western ground parrot, known as kyloring to the local Nyungar Aboriginal people (see Connection to Boodja, page 12), is an iconic species and is now known only from one location at Cape Arid and Nuytsland on the south coast. Protection and recovery of the last remaining population of western ground parrots from bushfire and introduced predators has been a focus of conservation efforts by Department of Biodiversity, Conservation and Attractions (DBCA) and partners for more than a decade (see 'Heeding kyloring's warning' *LANDSCOPE*, Spring 2010).

A healthy ground parrot population is symbolic of a healthy ecosystem and improved fire and predator management also has significant benefits for other species. In particular, the integration of feral cat control into the DBCA's *Western Shield* program, has been a critical step in this process and has benefited a wide range of native fauna. Scientific endeavours have also led to improvements in monitoring and detection of western ground parrots across the remaining occupied habitat making it easier to monitor these elusive birds (see 'Kyloring, cats and conservation' *LANDSCOPE*, Summer 2014).



Since 2015, bushfires caused by lightning have burnt around 80 per cent of the known habitat of the bird. In 2016, DBCA held a workshop facilitated by the IUCN to prioritise immediate and long-term conservation actions to guide the future recovery of the western ground parrot or kyloring (see 'From the ashes,' *LANDSCOPE* Winter 2016). Participants created a vision for the future, and establishing an additional population is considered an important step in improving the long-term security of the species and realising this vision.

In recent years, monitoring of kyloring has found that the number of birds in the last population has been maintained and translocation is considered an achievable action for conservation of the species.

GETTING READY

The threat from bushfire is ever present in Cape Arid and Nuytsland, and establishing a second population is the best chance of providing long-term security for the species. However, to ensure success, much preparation was required, and this work was completed over several years.

DBCA, with support from the South Coast Threatened Birds Recovery Team (SCTBRT), undertook the necessary planning, including assessment of the size

and distribution of the source population, planning the translocation strategy, assessing the risks, selecting a translocation site, and ensuring that potential threats were adequately managed at the new site.

With western ground parrots usually only calling in the hour before sunrise and after sunset, autonomous recording units (ARUs) have become an indispensable tool for monitoring trends in populations over longer time periods and are supported by human listening surveys.

ARUs have been used on grids in core habitat since 2013 and data are used to derive an index of calling activity. The distribution of parrots across the wider landscape is determined by a solar-powered ARU grid network that covers just under 70,000 hectares of potential western ground parrot habitat.

The combination of human listening surveys and ARU data provided confidence that the birds were responding positively to intensive habitat management (both fire regimes and introduced predator management) and that a trial translocation of a small number of birds would be possible.

WHERE TO

Selection of sites was informed first by a predictive climate model for the south coast of WA developed in collaboration with scientists from Edith Cowan University. This model helped in determining which areas would be likely to remain climatically suitable in coming decades, taking into account the ongoing and predicted changes to the climate in the area.

A short list of sites was then assessed for the threat posed by introduced predators and bushfire, DBCA's capacity to manage these threats, whether the site had adequate food, shelter and nesting areas for

.....
Opposite page

Main top A released western ground parrot (*Pezoporus flaviventris*), with its transmitter and logger antennas visible.

Photo – Alan Danks/DBCA

Main left Mist nets set and ready for capturing western ground parrots.

Photo – Helena Stokes/BirdLife

Above right A western ground parrot in a temporary holding box, on its way to a new home.

Photo – Arthur Ferguson/DBCA



translocated birds, and that the vegetation structure and floristic diversity was comparable with areas currently occupied by western ground parrots in Cape Arid National Park.

Once selected, the release area was subjected to increased management for feral cats and foxes, pre-suppression bushfire mitigation, and a network of ARUs established to monitor for western ground parrots following release.

RISK ASSESSMENT

With a release site chosen and management commenced, a risk assessment was undertaken, considering all aspects of catching, moving and releasing birds (the actual translocation), to determine potential risks to success and actions to mitigate these elements. This assessment was fundamental to developing a best-practice translocation strategy that follows the internationally recognised IUCN guidelines for translocations.

The development of the translocation strategy drew on the knowledge of a

range of experts in western ground parrot ecology, capture, transport, captive management and biosecurity, as well as veterinary expertise, to ensure that the methods used during the translocation gave the greatest chance of success.

A disease risk analysis was also undertaken to assess and minimise the risk of introducing disease into the western ground parrot population, and to minimise the risk of introducing disease to other animals or humans during the translocation process.

The disease risk analysis process carried out by vets from Perth Zoo and Murdoch University developed biosecurity protocols, and recommendations were made for disease screening any ground parrots captured to ensure they were healthy.

CATCH AND RELEASE

Following extensive reviews, the necessary approvals and permits were in place, and after months of planning to anticipate and overcome the logistical challenges of catching and relocating such

rare birds in a remote landscape the actual capture and moving of birds could begin.

Located approximately two hours' drive east of Esperance, the team set up a completely self-contained bush camp for 26 staff and skilled volunteers. The camp had a temporary holding and veterinary facility to process and hold birds before they were translocated, and a field office to process data and help plan each day's events.

To help identify areas with high parrot activity, the data from 120 ARUs deployed throughout the landscape weeks earlier were collected to review calling activity and inform targeting of specific areas for capture.

Mist nets were set up in flyways between roosting and feeding sites. Once caught, the birds were extracted by licenced A-class bird banders and transported to the camp holding facility.

There, Perth Zoo staff conducted health checks, the birds were sexed and measured and then placed into temporary holding boxes to await transport to their new home.

.....
Above Setting up mist nets.
Photo – Arthur Ferguson/DBCA

Above right Servicing an autonomous recording unit (ARU).
Photo – Allan Burbidge/DBCA

“ ...ten years of vision and preparation leading up to the first wild-to-wild translocation of western ground parrots was realised when the first four birds were transported to the release site.”



Conditions were favourable during the first few capture sessions, and three male and two female birds were caught over two days.

In their temporary holding boxes, they were fed a mixed diet of native plants and commercial seed and monitored by zoo staff using CCTV. In general, the ground parrots adjusted well to their temporary holding, and made the most of the abundant supply of food.

On 20 April 2021, ten years of vision and preparation leading up to the first wild-to-wild translocation of western ground parrots was realised when the first four birds were transported to the release site.

They travelled well and were heard feeding in their boxes during the long car trip. The birds were fitted with radio transmitters and released the next morning about an hour after sunrise, allowing them to feed in their boxes prior to release and to avoid releasing the birds during the coldest part of the morning.

The team's remarkable luck with the weather continued, and they experienced perfect capture conditions over the next ten days. A further four birds (three male and one female) were captured from different sites and by 26 April 2021, seven western ground parrots had successfully been released into their new home.

UNEXPECTED CHALLENGES

Health screening of all the birds captured revealed no health issues, and all birds appeared to be in good to very good condition.

Sadly, one bird died before release. The injury appeared to have occurred during capture, and this is being investigated with input from Perth Zoo and other experts. One thing that has become clear is that some aspects of the skeleton are unusual amongst parrots, and this may be a key to understanding this issue and informing future management actions.

A second bird travelled really well and was noted to be feeding consistently along the way to his new home but was found to be injured when released. The bird was taken to Perth Zoo for treatment and has fully recovered. He is now part of the captive population at the zoo, where it is hoped that he will make a significant contribution to efforts to breed the species in captivity.

A NEW HOME

In the four weeks following release of the seven ground parrots, their movements were closely monitored in their new home, with the aid of VHF transmitters and GPS loggers that were fitted before release.

Above left Conducting health checks.
Photo – Arthur Ferguson/DBCA

Above Temporary holding box CCTV footage.
Photo – Sarah Comer/DBCA

Below A wild western ground parrot in Fitzgerald River National Park.
Photo – Brent Barrett/DBCA



Discover more about saving the Western Ground Parrot

Scan this QR code to watch the video or visit ABC's Landline website.





The transmitters were fitted to the birds with a weak-link rubber band harness to ensure they fall off before the end of the transmitter battery life (approximately three months).

While one bird's transmitter came off within days of release (likely chewed off by the bird), the other six were still being followed in early July. One of the females settled into a nearby area of wonderful habitat, while some of the others have moved long distances exploring the country around the release site.

All of the birds are now within a radius of less than 20 kilometres of the release site. The project team is busy tracking these birds and will continue to do so until the transmitters come off or batteries run out.

At that stage, listening for calls will be the best way of detecting birds. In addition to the network of ARUs in the release area, staff and volunteers will conduct listening surveys in the hope of hearing the calls of kylloring, indicating the first stage of the translocation has been a success.

Above A transmitter being fitted to a western ground parrot.

Photo – Helena Stokes/BirdLife

Above right Western ground parrots being released into their new home.

Photo – Jennene Riggs/Riggs Australia

Right Some of the capture team in Cape Arid National Park after a morning's work.

Photo – Sarah Comer/DBCA

WHAT'S NEXT?

Translocations can be risky, but in this case a risk worth taking given the ongoing and real threat of bushfire having a significant impact on the western ground parrot population in Cape Arid and Nuytsland.

In the coming months, the DBCA-led team, along with volunteers, will continue to implement introduced predator control and monitor both the translocated birds

and the source population in Cape Arid and Nuytsland.

If the birds continue to persist in the release area, it is hoped that more birds could be translocated to strengthen the new population over the coming years.

If successful, the vision of the song of the western ground parrot once again heralding the start of the day in the rich heath ecosystems to the east of Albany will be realised.

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Stewart Ford, Mark Blythman, Abby Thomas, Abby Berryman (DBCA) and **Helena Stokes** (BirdLife) also work on the western ground parrot project team and are based on the south coast.

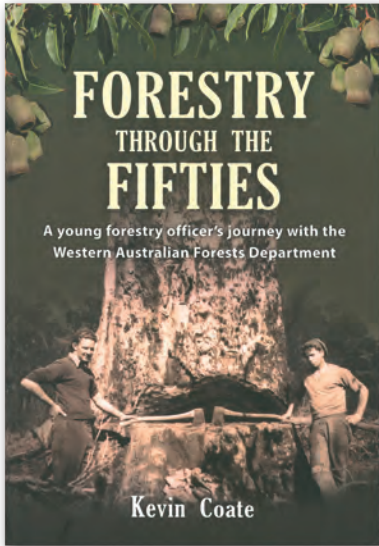
Other authors include **Greg Mair, Deon Utber, Stephen Butler, Emma Adams** (DBCA South Coast Region), and **Arthur Ferguson** (DBCA Perth Zoo).

Acknowledgements

Numerous individuals and organisations have collaborated to support the first wild to wild translocation of western ground parrots through providing funding, volunteering time, managing habitat and threat abatement, and assisting with planning and reviewing project activities. DBCA is grateful for the support of everyone who has contributed to this ambitious project. Shaun Molloy completed the climate change modelling and Adrienne Markey provided botanical expertise for the final selection of sites. The South Coast Threatened Birds Recovery Team members have continued to support and review all aspects of the project. Funds to support the first phase of the translocation were provided by DBCA, BirdLife, the Friends of the Western Ground Parrot and the Australian Government. Other support for the recovery program has been provided by South Coast NRM and the Commonwealth Government Bushfire Recovery Program.



FORESTRY THROUGH THE FIFTIES



Life in WA's south-west looked different in the 1950s — a time when technology was not yet the norm, and power saws had only just begun to take over from handheld axes.

Readers interested in being transported back to this time in WA's beautiful woodlands will be delighted to flick through the pages of *Forestry through the fifties*.

Written by career-forester Kevin Coate, this book looks at forestry management and the natural environment in WA's south-west through a different lens.

Coate relies on his own journals and records to paint a picture of what the industry looked like from the perspective of a young trainee field forester.

Complemented by authentic documents and photos, these pages provide an interesting insight into how forestry management in one of WA's favourite regions has evolved and developed into what it is today.

But what makes this book special are the first-hand anecdotes that are intertwined throughout, adding a personal touch to historical community milestones.

If you're familiar with WA's south-west, you'll likely relish in reading the first-hand histories of all your favourite places.



Forestry through the fifties is published by Hesperian Press and is available for \$45.00 from hesperianpress.com

AUSTRALIA'S KIMBERLEY COAST



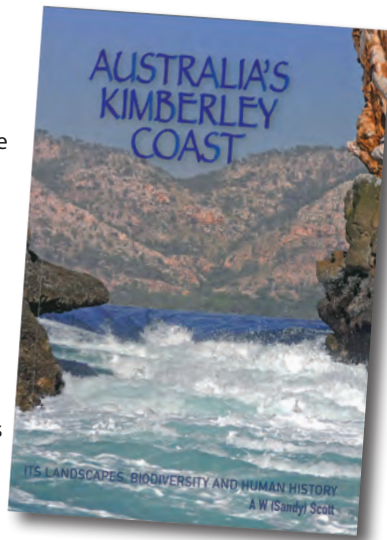
Scenes of glorious red dirt, rocky landscapes and clear blue oceans come to mind when the Kimberley coast is mentioned. These stunning landscapes and the associated biodiversity are unique to the Kimberley region, and scientists have long explored and studied the many untouched islands, bays and estuaries.

Dr. Alexander (Sandy) Scott's book *Australia's Kimberley Coast* will help readers understand a little more about formations and landscapes that travellers regularly admire.

This book is the culmination of Dr. Scott's 18 years of travel throughout the region, and takes a deep dive into how human history has interacted with the landscapes, while also incorporating interesting tidbits about the biological and ecological features. It's clear Dr. Scott is well-travelled and highly experienced within the region. In fact, this is the second book he has penned about the Kimberley, following 'A Traveller's Guide to the Kimberley Coast' in 2012.

Australia's Kimberley Coast is packed with helpful maps and pictures and has a comprehensive glossary to help you look up specific information with ease.

If you are a regular visitor to the area, you might find this a helpful resource when you visit a particular landmark or area — it will give you a well-rounded look into how the region's landscapes, biodiversity and human history intertwine.



Australia's Kimberley Coast is published by Axiom Publishing and is available for \$59.95 from shop.axiompublishing.com.au

FUEL MAP



If you're anything like me, planning a road trip does not involve petrol stations, but there is nothing worse than seeing that dreaded yellow light come on when the next town is kilometres away.

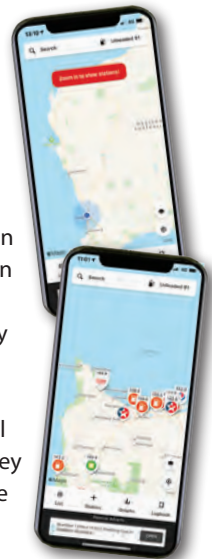
The *Fuel Map* app has station locations and petrol prices all in the one spot.

The app is very user-friendly and simple to use. Using your location, it will bring up a map that displays all the local petrol station brands, the distance they are from you, facilities available and the most recent price.

Besides the price-matching benefits, this app would come in handy on a road trip if you need to stop for facilities like toilets.

The price data are pretty reliable as it's collected from FuelWatch and can also be submitted via other app users. So if you're on the road, do your fellow travellers a favour and make updates to the map by adding any new stations, facilities available or updating prices.

Be aware, the app does require a network connection or WiFi to work.



Fuel Map is available to download for free on the App Store and Google Play.

Adventure out



Big Kids Campout

Ten-year-old Felix loves adventures in the bush. He takes us through the highs and lows of his fourth Big Kids Campout at the Perth Hills Discovery Centre.

by Felix Steinwandel, age 10



I always love going adventuring in the bush, especially when I am accompanied by my friends — and no parents! This is my fourth time at a *Nearer to Nature* Big Kids Campout.

What is a *Nearer to Nature* Big Kids Campout you might ask? In the school holidays *Nearer to Nature* puts on a very fun camp for kids from 7–11 years of age. Kids can experience nature and learn new things about the bush that surrounds us. And this is how my last adventure begins:

day one

My mum's car is pulling up to the *Nearer to Nature* campground in Mundaring. I can't wait to go to the Big Kids Campout. We are parking the car and I run to the boot, grab all my things and gear, and sprint to the campsite. Then I set up the tent with my friend who is joining me on this camp. Thirty minutes later, all the kids are called to the fire pit near our tents. We are introduced to the leaders and the other kids.

CITIZEN SCIENCE

One of my favourite activities is trapping. In the evening, we go with the leaders into the bush to set up our traps. We can catch brushtail possums, magpies (not intended) and the occasional chuditch. To catch these animals we prepare bait, which is a disgusting mix of sardines for the carnivores, oats for



the herbivores and peanut butter for omnivores. The bait goes into Sheffield traps.

We do the trapping for *Western Shield* research to help find out which animals are thriving in the area. For example, many years ago chuditchs were frequently found here but sadly now, they are hardly found at all.

Another example would be the brushtail possums, which were very rarely seen a few years ago. Nowadays we can find them much easier and more often.

After setting out the traps, we walk back to the campsite with our tummies growling and ready to tuck into dinner. But we all must cook our own (brought from home) with the help from the *Nearer to*



Nature team. I use the barbecue and roast a sausage.

PLAY TIME

Once everyone has finished their dinner and the washing up is done, we gather in the camp shed to decide which game to play. And yay! We play spotlight, my favourite game!

This goes on for a while, until we all have had enough and are keen on roasting some delicious marshmallows over the campfire. Lots of chatter and stories are being told by us and the leaders.

At 9pm we all must get ready for bed and snuggle into our sleeping bags. Some of the *Nearer to Nature* team sleep in tents very close to the kid's camp, so we all feel safe.



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Previous page

Main Camping at Perth Hills Discovery Centre.

Photo – Dom Lim

Inset from left Setting up camp; roasting marshmallows over the campfire; common brushtail possum (*Trichosurus vulpecula*); weighing fauna.

Photos – DBCA, Jiri Lochman

Above left Felix in a tent he set up with a friend.

Above Checking fauna traps.

Left Having fun with Bec from *Nearer to Nature*.
Photos – DBCA



● Perth Hills Discovery Centre

day two

It's a very short night at the camp because early at 5am we are woken up by the leaders to get ready for our now very quiet trapping session.

We go and find our trap and see if the door is closed. Mine was closed and I snuck quietly towards the trap with Mr C (one of the wonderful *Nearer to Nature* helpers).

He saw that in my trap was a magpie (*Gymnorhina tibicen*) and quickly opened the trap so it could go and be free again. My friend was more successful with her trap. She caught a brushtail possum (*Trichosurus vulpecula*). Mr C checked if it had a microchip. It already had one. He then measured and weighed the possum, and checked if there were joeys in the pouch. After that, he set the possum free.

Now we rush back to the camp kitchen and have breakfast (also brought from home). Sadly, that's the time our parents arrive, and we have to pack our belongings and say goodbye to our newly-made friends and the *Nearer to Nature* team.

In the car driving home I tell my mum all about my adventures and I can't wait for the next camp! This was fun!

.....
Top Checking traps with Richard from *Nearer to Nature*.

Inset above Roasting marshmallows.
 Photos – DBCA

Above right Perth Hills Discovery Centre.
 Photo – Lauren Cabrera/DBCA

Do it yourself

Where is it? *Nearer to Nature* provides opportunities for children of all ages to take part in hands-on, experiential learning in the natural environment.

Programs are on offer from diverse locations in the Perth metro area, the south-west, and Valley of the Giants Tree Top Walk to teach kids to become advocates for the nature of Western Australia, to ensure it is protected and conserved.

Contact: The Perth Hills Discovery Centre ,
 380 Allen Road, MUNDARING WA 6073
 Ph (08) 9295 2244

Wellington Discovery Forest and Margaret River,
 Cnr South West Highway and Dodson Road, BUNBURY WA 6230
 Ph (08) 9725 4300

Visit: pws.dbca.wa.gov.au/n2n



Nearer to Nature

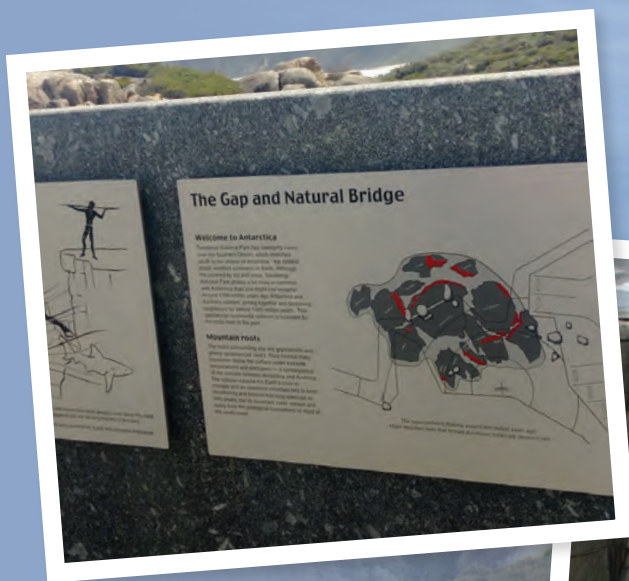


Bridging the gap

The art of interpretation and its importance in geology

We can connect with nature by immersing ourselves in the outdoors, but we can elevate this connection to a whole new level by understanding the value of the landforms around us, their history and cultural significance.

by Professor Ross Dowling AM and Dr Steve Crawford



Be safe. Stay on paths.





Western Australia is home to some of the world's most impressive landforms. We look in awe at wonders like Mount Augustus or The Gap and can appreciate them for their natural beauty and their sheer size and scale. How we respond and connect to that visual experience is enhanced by understanding what we are seeing. This is where geological interpretation plays a key role.

Interpretation is more than just information. Interpretation in national parks is about engaging visitors with storytelling and the use of subtle themes that enable visitors to understand and appreciate the value of our history, environment and culture. Effective interpretation helps visitors connect with a place on both an intellectual and emotional level.

In places where the geology is interpreted, it is generally presented in the three basic elements — form, process and time.

'Form' refers to what you can see — the shape of an area including its landscape and landforms. 'Process' describes how the landscape and landforms originated and were modified through astonishing processes such as volcanism, plate tectonics and erosion. 'Time' refers to when and how long these processes occurred.

GEO INTERPRETATION

It is common to see information about flora and fauna on signage in our national parks, often with messages about the importance of conserving biodiversity. Geological interpretation on the other hand, informs visitors about the landscape and landforms, which are literally the foundation of the biotic (living) aspects of any park.

While geological interpretation is important, it can be complex and on a scale in time and space that is difficult to relate to. This may explain why geo-interpretation is not as commonly seen in parks.

CREATING CONNECTIONS

While sharing information and knowledge is an obvious outcome of interpretation, the underlying motivation is to help visitors appreciate the significance of an area so they will value it and want to protect it. Some might argue it is difficult to feel emotional about rocks, while others are able to feel a deep connection with our ancient landforms (see, 'Rocking the patterns', *LANDSCOPE* Winter 2021).

To help visitors make meaningful and ongoing connections to the landscape, geo-interpretation ideally includes aspects

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Previous page

Main Torndirrup National Park.

Photo – Kevin Smith

Insets from top Signage detail showing rock types and The Gap viewing platform.

Photos – Emma Banks, Sally Treasure

Above and below Interpretive sign at Fitzgerald River National Park and detail of sign artwork.

Above right Interpretive signage at Canal Rocks, Leeuwin-Naturaliste National Park.

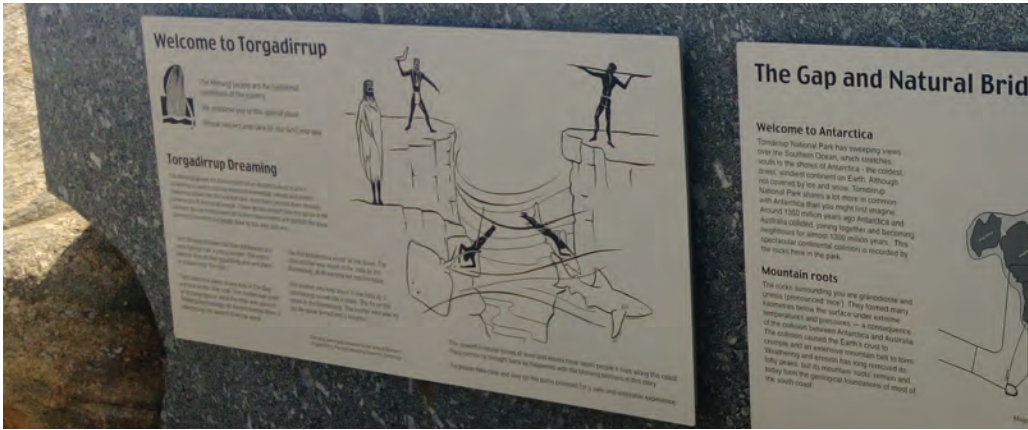
Photos – Ann Storrie





Listen to more about the art of interpretation

Scan this QR code or visit Parks and Wildlife Service's podcast.



Above left and left Dreaming story of the Menang People at Torndirrup National Park.
Photos – Lorna Charlton, Emma Banks

Above Interpretive signage at Torndirrup National Park.
Photo – Kevin Smith

of the ‘head’, ‘heart’ and ‘hands’. This includes *learning* about the geology of an area (head), *connecting* the visitor to the landscape in an engaging way (heart) and inspiring the visitor into *doing* something for the geological environment (hands).

When done well, interpretation also provides different perspectives that allow visitors to see something in new and surprising ways. The Gap and Natural Bridge near Albany is a great example of geological interpretation in action.

HIGH EXPECTATIONS

The Gap and Natural Bridge is in Torndirrup National Park, 18 kilometres from the centre of Albany. The park

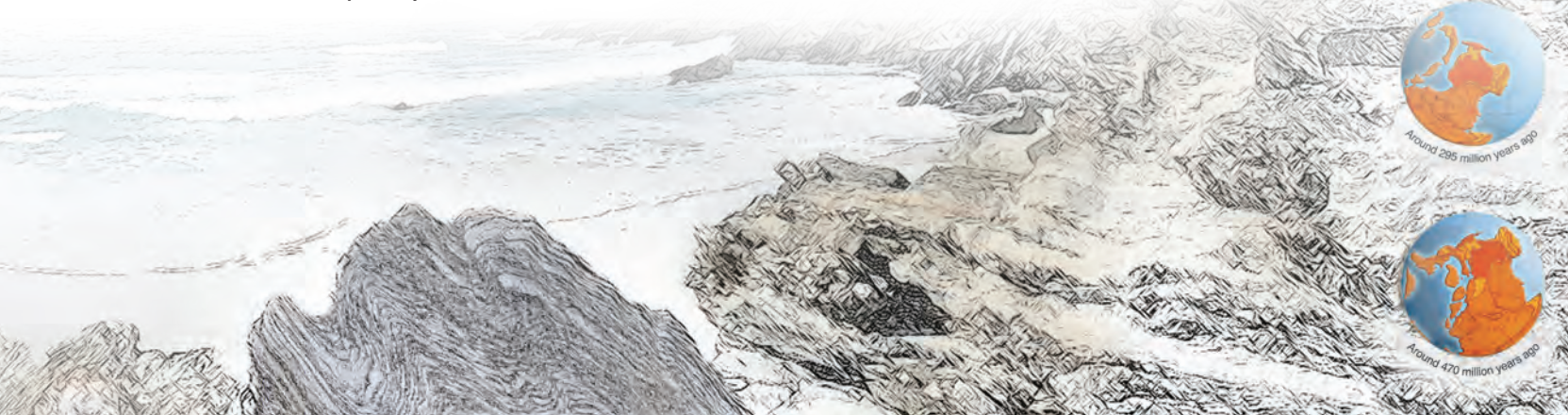
was gazetted in 1918, one of the first in Western Australia, and its remarkable coastal feature and popular park attraction, The Gap, is now firmly established as a world-class geotourism experience thanks to a park rejuvenation project completed in 2016.

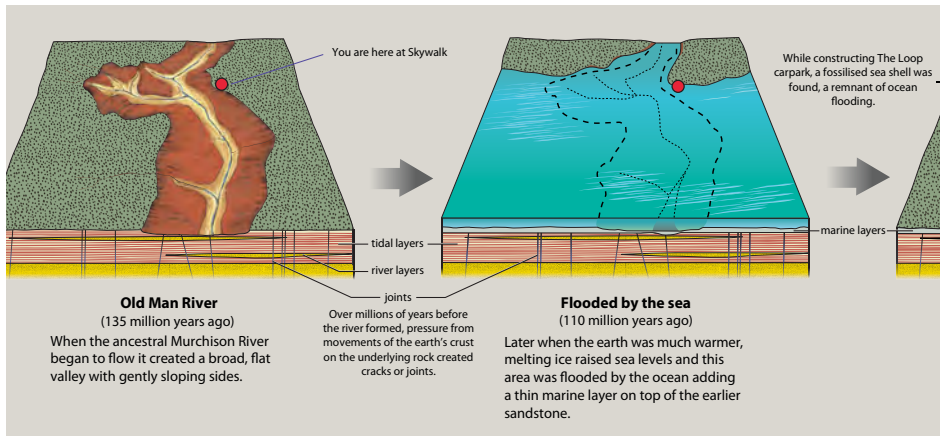
Visitors to The Gap can venture out onto a cantilevered platform almost 40 metres above the Southern Ocean, while the solid pathway and viewing area of the Natural Bridge provides a less adventurous but still remarkable window to one of Australia’s most impressive coastlines. The edgy design of the site allows visitors to venture over a previously inaccessible precipice so that they can safely experience the awe and excitement

of dramatic coastal geology and spectacular scenery in all weather conditions.

“There’s nothing like the sight, sound and feel of giant ocean waves crashing against massive granite cliffs as they shape the coastline. On a good day you can even taste the salt spray,” Parks and Wildlife Service’s visitor communications and marketing manager, Steve Crawford said.

“These days we aim to provide visitors with deeply immersive experiences that deliver both emotional and insightful outcomes,” Steve said. “At The Gap and Natural Bridge, those insights are created with the stories that we tell on our interpretive signage.”





TORNDIRRUP ROCKS

Through simple, easy to understand language coupled with clever interpretive design, the geological story of how the impressive rock formations were created is revealed to visitors. Samples of granodiorite and gneiss, two distinctive rock types, are featured on the signs so that visitors can better understand the formations they are looking at.

A massive map, set in the pathway that leads to the viewing areas, depicts the world's landmasses as they are thought to have appeared around 900 million years ago. It reveals that at the time Australia was part of the supercontinent 'Rodinia' and located near the North Pole. Rodinia endured for 300 million years before it broke apart, scattering smaller continents in its wake. The enormous scales in time and space over which these processes have occurred is something that invariably leaves us in awe.

In addition to the geological stories of The Gap and Natural Bridge is the cultural response to this landscape and in particular the way in which people's lives have been shaped. The Menang people are the Traditional Owners of this area

and their Dreaming story explains the cultural significance of the rock formations and how this place and its story are the basis of a deep and ongoing spiritual connection to the land and sea. The Dreaming story allows visitors to see this landscape from a different perspective and gain a greater appreciation of Menang culture.

By combining the exhilaration of the viewing platform with clever interpretation, this experience will leave everlasting memories of how the Earth's geology and our world have been, and continue to be, shaped by powerful forces.

KEEPING IT LOCAL

In April 2016, a multimillion-dollar rejuvenation project at The Gap and Natural Bridge included significant improvements to visitor facilities.

"Prior to the investment in new facilities, visitation hovered around the 150,000 visitors annually but now we consistently see around 250,000 visitors," Steve said.

"The estimated spend from visitors who are attracted to the Albany area to experience the natural environment,

including The Gap and Natural Bridge is around \$24 million annually."

The art of interpretation is also the art of value-adding and geotourism is now delivering an enhanced economic opportunity to the local community.

As you travel around the State visiting our national parks, start looking out for more informed and engaging interpretation about the land beneath your feet.

Top left and above left Interpretive signage at Kalbarri skywalk.

Photo – Kevin Smith

Top and above Interpretive signage at Granite Skywalk, Castle Rock.

Photos – Tiffany Taylor

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Western Australia is rich in biodiversity. For tourists, this means there are fields of wildflowers and other natural wonders to enjoy. For locals, this means you don't need to go far to be immersed in nature. And for taxonomists, it means there are many, many new species to discover, name and document.

Taxonomists — the scientists who name and classify species — come across new species in many different ways. Sometimes they are discovered through careful and painstaking study of the dried, pickled or preserved scientific specimens in the Western Australian Herbarium or Western Australian Museum. Sometimes poring over gene sequences reveals new species. Sometimes specimens are brought into the Herbarium or Museum by members of the public, environmental consultants or colleagues and are recognised as new species, either immediately or after careful comparison with known species.

And sometimes, new species are discovered when least expected.

So it was, with the discovery of a new and unusual species of *Hibbertia* (or guinea flower) found at Easter 2018 while I was on an extended camping holiday with my wife in the remote Plumridge Lakes Nature Reserve.

Plumridge Lakes is spectacular — a large and varied nature reserve of woodlands, lake systems and dunes on the western edge of the Great Victoria Desert. Plumridge Lakes is also well beyond Western Australia's south-west, where almost all of our species of *Hibbertia* are found.

So when my wife and I drove past a large, prickly-leaved, flowering *Hibbertia* at the base of a dune at the western edge of the reserve, I was immediately curious. Without even needing to open the car door, I took one look, and realised that here was another likely new species.

Of course, careful work ensued back in the Herbarium to make sure that this was not perhaps a first Western Australian record of a known South Australian species, or an unusual range extension of a species I was unfamiliar with. Careful comparisons showed that my first guess — that this was



Guinea flower (*Hibbertia proberae*)

a brand new species — was correct. It also had some quite unusual features, meaning that it's not clear what it's most closely related to.

Even better, a few more specimens turned up in the Herbarium's collection from the same general region, collected decades earlier and filed as unidentified. A picture began to emerge of a possibly rare species scattered in the unusual habitat of the Great Victoria Desert. A few weeks later the scientific paper describing the new species was ready.

With this paper, one more species was added to our State's flora, and one more piece to the jigsaw puzzle of our biodiversity. *Hibbertia* is a significant plant genus. It's currently the fifth largest genus in Australia (and is probably about to overtake the orchid genus *Caladenia* to become the fourth largest) and is amongst the most species-rich genera in Western Australia. New species are being discovered all the time, and not only in the Great Victoria Desert. One currently unnamed species is common in Kings Park and other suburban bushlands, while others are

Above A chance encounter led to the discovery of a new species of *Hibbertia*.
Photo – Kevin Thiele

common amongst the spring wildflowers on the Darling Scarp. And many are rare and threatened, making their discovery and recognition doubly important.

One of the joys of taxonomy is deciding what name to use for a new species, whether to use a Latin or Greek word describing some feature of the plant, whether to name it after the location in which it grows, or perhaps to honour a worthy colleague or other significant figure. In this case I decided to honour Suzanne Prober, my ecologist wife and companion on many field trips and holidays alike, who also happens to be a great lover of the desert landscapes that the new species calls home. So it was that the new species *Hibbertia proberae* was added to Western Australia's rich inventory of biodiversity.

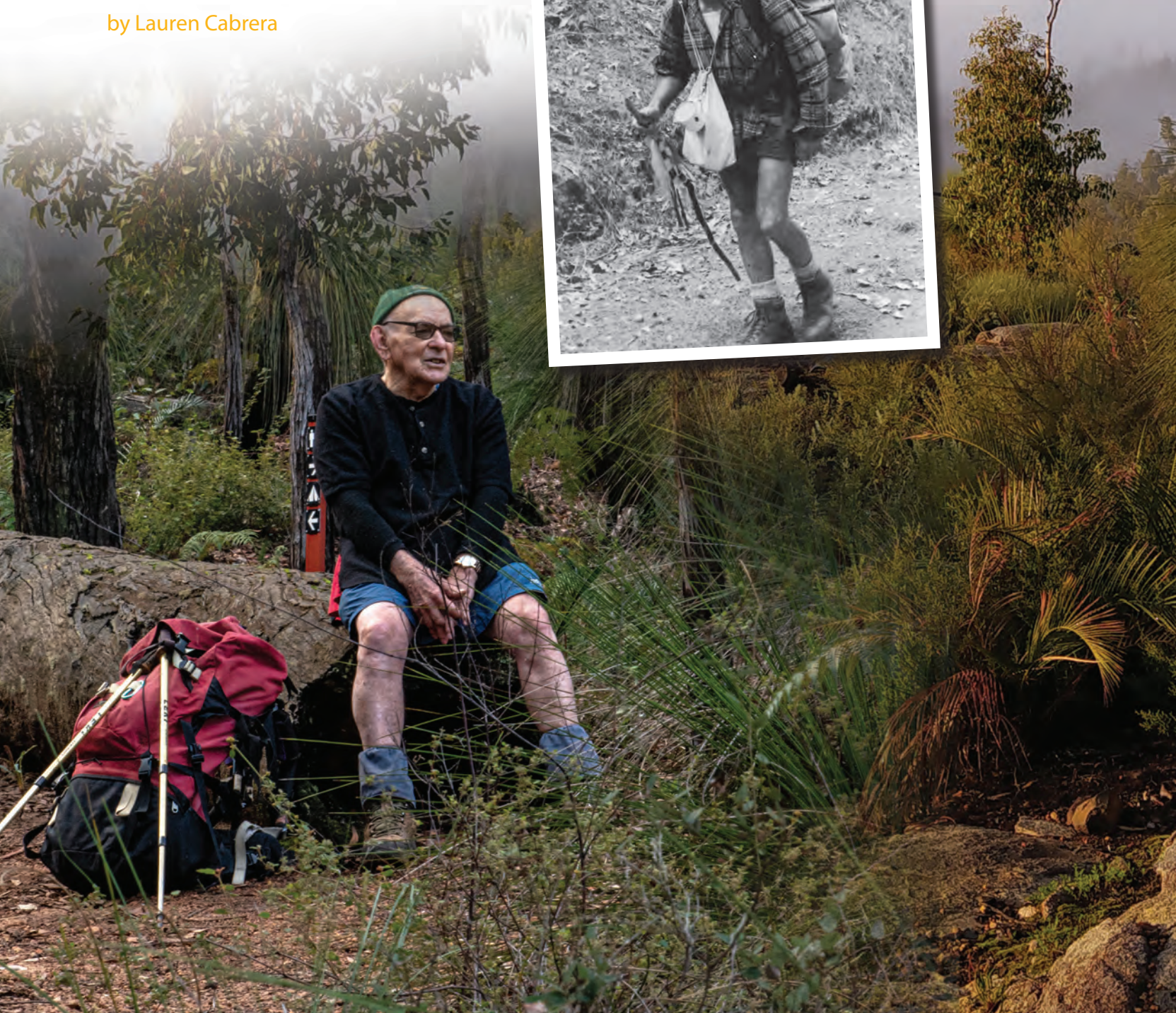
As a postscript, luckily, Suzanne has forgiven me for naming a very prickly shrub after her!

Jim Freeman

the Bibbulmun bushman

In 1976, Jim Freeman drove past a large log on the side of Brookton Highway with the words 'Bibbulmun Track' carved into it. A few weeks later, he and his son Robert set off on the track for five days and he hasn't looked back since. Today, Jim is a well-known, loveable character who will forever be connected to WA's famed long-distance walking trail.

by Lauren Cabrera



Touched by nature



WELL TO LAKE MARAGIPE
THE WATER WAS HIGH, RIGHT
AFTER WOOLBALLE THE WATER LET

Bush poets Banjo Patterson and Henry Lawson painted a picture of an Australian bushman, tough and independent, resourceful and down to earth. These ideal qualities that underpin the national character are alive and well in Jim Freeman.

Born and raised in rural WA, Jim spent his childhood on farms and timber mills, and is most at home in the bush. He can turn his hand to anything and doesn't need or want for much, instead enjoying the simplicities of life.

In 1976, in the car with his son Robert, driving from Merredin to Perth, he noticed a big log on the side of Brookton Highway with the words 'Bibbulmun Track' carved in it. After some investigation and minimal planning, he bought a backpack and decided to walk the track with his son, over five days, from Brookton Highway to Whittakers Mill.

Forty-five years later, he has completed the track in its entirety 14 times, walked every alignment and was the first person to do a double end-to-end in 1996.

SECOND HOME

Jim moved to Dwellingup in 1956 and married his sweetheart Mavis, who was a school teacher in the local area, in 1960. Together they have completed four end-to-ends of the Bibbulmun Track and have four children — Robert, Ian aka 'Sam', Jenny and Paul — all born locally in WA's south-west

The Bibbulmun Track is indeed a second home for Jim and while he has been accompanied by one of his sons or Mavis, although he admits to enjoying solitude on his walks.

"I much prefer walking by myself," Jim said. "It's a lot quieter and I can stop where and when I like, much more peaceful. I like waking up and getting going."

"Forty-five years later, he has completed the track in its entirety 14 times, walked every alignment and was the first person to do a double end-to-end in 1996."



Previous page

Main Looking out over the Darling Scarp from Mount Helena campsite.

Photo – Liz Grant/DBCA

Inset right Jim walking the track in 1976.

Photo – The Freeman family

Inset left Jim at Dookanelly campsite.

Above Jim takes a break at Dookanelly campsite.

Photos – Peter Nicholas/DBCA

Right Jim speaking at an end-to-enders picnic in 2006.

Photo – Bibbulmun Track Foundation



CHANGING TIMES

In the early days of Jim's walking career, it was easy to get lost on the track.

"The yellow markers were simple equilateral triangles with no waugal, which made picking direction an interesting choice, rather than a definite guide," Jim said.

"I had to backtrack and find my way around heavy flooding or impassable rivers so many times!"

On his first walk in 1976 he wore his work boots and a backpack with an external frame that he carried for 22 years until it physically fell apart.

Jim would get ready for a long trek by walking to work with up to 30 kilograms of lupins in his backpack to build up some walking strength.

"The equipment has changed so much since then. Backpacks and tents are now half the size and weight — but three times the price!" he said.

Executive Director of the Bibbulmun Track Foundation, Linda Daniels said there have been vast improvements since Jim's first walk.

"The original Bibbulmun Track followed forestry roads and tracks and had



Jim stats:

- 45 years on the track
- 14 end-to-ends
- 12 Team Challenge events at five days per event
- 16 days per year conducting trail maintenance since 1998
- 53 days — average time for an end-to-end including a handful of rest days
- 4 backpacks
- 6 pairs of boots



Above left Finding your way on the track is now easier thanks to directional markers

Left There are 49 shelters along the Bibbulmun Track.
Photos – Peter Nicholas/DBCA

no facilities. It has undergone a couple of major realignments onto purpose-built walking track taking in the most scenic locations. Additionally, the campsites offering shelter and water have made the experience far more accessible and appealing to people of all ages.

Improved signage, maps and technology such as smartphones and Personal Locator Beacons have greatly reduced risks without taking away from

the experience of being on a wilderness track,” Linda said.

Multiple access points mean people can walk the track for as long as they want — from a couple of hours to a couple of months. The Foundation website is packed full of itineraries and suggestions for new and experienced walkers alike. Many end-to-enders have completed their journey over a number of years walking short sections at a time.

Jim completed his first end-to-end in 1979 as part of the official opening of the track as well as Western Australia’s 150th year celebrations. Back then, the track was only about 550-kilometres long, starting in Kalamunda and finishing near Northcliffe. It was divided into 38 stages, 15 to 25 kilometres apart with a spot to pitch your tent and often a toilet and water at the end of each stage.

Today the track is 1000-kilometres-long with 49 campsites. It still starts in

Jim's top tips:

- Carry your fuel and water in different looking bottles
- Carry your water in an aluminium bottle so it doesn't break
- Keep your water bottle on the outside of your pack so you have to stop to take a drink
- Carry two extra meals
- Start practising walking a year before your end-to-end
- Get your backpack properly fitted (Jim has used the same backpack since getting it properly fitted in 1998)
- August is the best month to walk the track
- Don't pack too many clothes, you won't need them



Kalamunda but now finishes in Albany, sharing a southern terminus with the long-distance mountain biking trail, the Munda Biddi.

GIVING BACK

Jim was once asked what his favourite section of the track was.

"Aw, somewhere between Kalamunda and Albany," was his

Above Jim takes a rest on the track.

Photo – The Freeman family

Top right Crossing the suspension bridge at Long Gully.

Photo – Peter Nicholas/DBCA

Above right Jim and his wife Mavis.

Photo – The Freeman family

reply, with his usual cheeky, dry humour.

To give back to the track that he feels has given him so much, Jim has spent 16 days of every year (in between walking trips) since 1998 undertaking track maintenance activities in the Perth Hills and Donnelly districts. For 20 years, he focused on a section of the track that starts near Murray River and finishes at Dookanelly campsite.

Jim, like hundreds of other track maintenance volunteers, does everything from trimming back bushes and trees to clearing the path after storms.

One year, after a bushfire that had burnt tree stumps below ground level, Jim had to find the track without any markers and put up new ones.

"Part of the problem is you know the track so well you could follow it without

markers, so you have to put yourself in the boots of someone walking it the first time, when placing signs," Jim said.

The Bibbulmun Track Foundation ran a Team Challenge event for 12 years, concluding in 2014, that brought teams of four 'city folk' onto the track over four days completing activities and challenges, some of the props for which were built by Jim.

Jim was the 'tail end Charlie' on the Team Challenge events, which brought out not only his skills as a guide, but his ability to entertain all with his humour, bush poetry, and stories.

"In the bush, everyone is equal," Jim said. "It's always interesting to see people you think would have trouble actually breeze through the challenging aspects of the track and the opposite is



Jim's bush poetry:

*Farewell to Lake Marringup, Dog Pool and Mount Chance
Where the water was high, right up to my pants
I hope after Woolbales the water level falls
Otherwise I'm afraid I might wet my....shirt.*

true as well. You can't pick a walker, they come in all shapes and sizes."

END OF THE ROAD

"The beauty of the track is that it tells the stories from the past, like when you come across old farm fences and burnt bridges," Jim said.

"You can see how it has changed and adjusted through the foot traffic and the impacts of extreme weather. The track has changed just like I have changed, and in a way, I feel like we've grown up together."

Jim has never been injured on the track, save for a few blisters, and he intends to keep it that way for the next two years until he officially retires from his duties.

"I reckon 25 years is a good number, so I'll keep maintaining my section of the track for another two years to round it off."



Top Jim reciting bush poetry.

Above Clearing the track of dangerous branches.

Above right Volunteers do a Christmas clean up.
Photos – Bibbulmun Track Foundation

Right The Bibbulmun Track near Mount Helena.
Photo – Liz Grant/DBCA



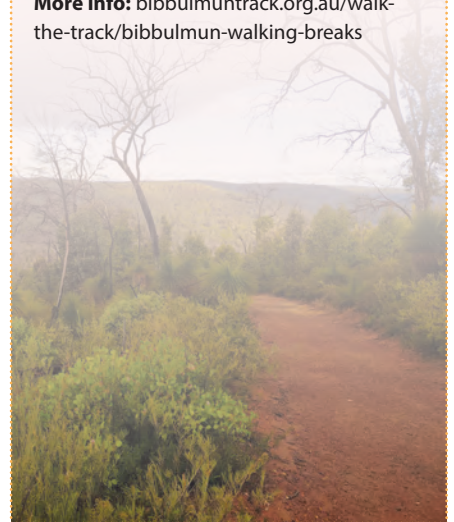
Do it yourself

Where is it? The Bibbulmun Track starts at the Northern Terminus in Kalamunda, 24 kilometres east of the centre of Perth, and finishes at the Southern Terminus in Albany near the new visitor centre on York Street.



Itineraries: Bibbulmun Walking Break itineraries range from two to six days and include suggestions for day-walks as well as interesting sites and attractions to visit, in and around Track Towns.

More info: bibbulmuntrack.org.au/walk-the-track/bibbulmun-walking-breaks



Lauren Cabrera is a *LANDSCOPE* editor and completed the last Bibbulmun Track Team Challenge in 2014 with Jim. She can be contacted at (08) 9219 9903 or lauren.cabrera@dbca.wa.gov.au





Life down under: the mysterious world of subterranean fauna

by Dr Lesley Gibson

Can you imagine living in a world completely devoid of light? A world below the surface of the earth that has only tiny spaces to squeeze through, and perhaps even filled with water? Dr Lesley Gibson explores the world of subterranean fauna and the efforts that are being made to better understand them.





Although it sounds terrifying to your average claustrophobe, a spectacularly diverse group of predominantly minute invertebrates thrives in a dark 'under' world beneath the surface of the earth.

Collectively termed subterranean fauna, they are either aquatic, living in the groundwater (stygofauna), or air-breathing, living in rock voids above the water table (troglofauna). Stygofauna consist mainly of crustaceans but there are also beetles, snails, worms and mites. Troglofauna include a variety of taxonomic

groups such as isopods, springtails, insects, diplurans, myriapods and arachnids.

There are also at least three Australian species of fish (including the blind cave eel) and one blind snake. Like deep sea creatures, evolutionary adaptations to this extreme environment have resulted in similarities in their unusual appearance, such as reduced or non-existent eyes, loss of body pigmentation, loss of wings, and elongated sensory structures.

In Australia, subterranean fauna are relics of the past, evolving from ancient surface-dwelling creatures that migrated underground to escape an increasingly arid continent. They differ from their Northern Hemisphere counterparts in that most known Australian species occupy small underground cavities (< 500 millimetres), rather than cave systems.

Knowledge about this cryptic fauna began to rise when, in the mid-1990s, a number of natural resource developments in the Cape Range region of Western Australia prompted research into their significance. Since then, much has been learnt about their taxonomy, diversity and evolutionary history, but our understanding of their basic biology and ecology remains rudimentary.

Seemingly simple questions like how long they live and how many young they produce currently remain unanswered.



We do know that their limited ability to disperse and resulting small ranges and high level of endemism (i.e., only occur in a single defined geographic location), combined with their adaptations to life below ground, are likely to make subterranean fauna highly vulnerable to disturbance of their habitat.

WA HOTSPOT

Hot spots of diversity (estimates of > 4000 species) in arid WA coincide with areas of extensive, or planned, mining activity, such as in the Pilbara region. Mining operations, like excavation and drawdown of the groundwater can have significant consequences for subterranean fauna. Changes to hydrology, humidity, nutrient inputs and water quality are added threats.

Mainly due to their world being hidden from us, how resilient subterranean fauna are to these disturbances is difficult

Previous page

Main Cape Range - Cave system.

Photo – Geoff Taylor/Lochman Transparencies

Inset left A troglobitic spider from the Linyphiidae family.

Inset right A subterranean isopod from the Pilbara region.

Photos – Jane McRae/Bennelongia/DBCA

Above The aquifer supplying Weeli Wollie Creek in the central Hamersley Range of the Pilbara supports endemic stygofauna.

Photo – Adrian Pinder/DBCA

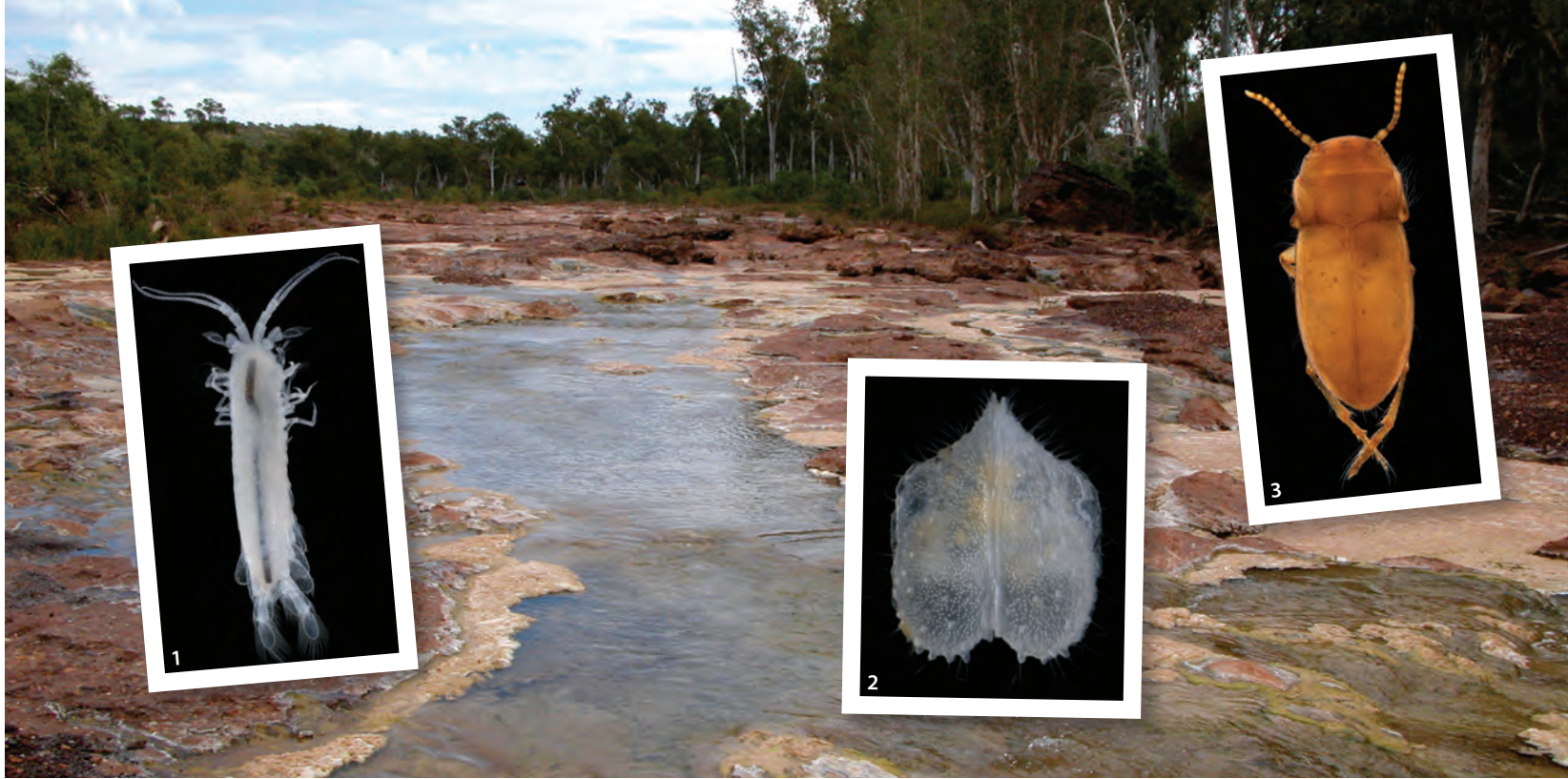
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1) An ostracod species detected during a survey of the Pilbara.

2) An amphipod species from the Pilbara.

3) A gastropod species from the Pilbara.

Photos – Jane McRae/DBCA



“Seemingly simple questions like how long they live and how many young they produce currently remain unanswered.”

to establish. A poor understanding of subterranean ecosystems more generally, and the role of the fauna in them, can make decision-making for both impact assessment and conservation planning challenging.

CLOSING KNOWLEDGE GAPS

In 2017, the Western Australian Biodiversity Science Institute (WABSI) was engaged to develop a coordinated statewide research program to improve on the current state of knowledge of subterranean fauna. A diverse range of participants from the scientific and resources sector, policy makers, potential funders, and environmental consultants came together in a series of workshops to identify key knowledge gaps and develop a strategy to close these.

The agreed objective was to dramatically improve assessments of the impacts of resource developments

and threat mitigation strategies on subterranean fauna by transforming our knowledge of patterns and processes in subterranean ecosystems. Four broad areas to research were identified, along with capture and consolidation of fauna records.

WHAT'S IN A NAME?

The rate of species discovery in Australia is high, and many subterranean fauna species are yet to be formally named. However, telling individual species apart based on appearance alone has proved to be challenging. This is because of convergent evolution, whereby distantly related organisms independently evolve similar characteristics as a result of having to adapt to a similar environment.

More recently, identifying species based on their DNA has become a useful approach. But this also brings challenges as there can be considerable variation in DNA sequences within species, the degree of distinctiveness between species varies among taxonomic groups, and practically, it can be tricky to extract DNA from these tiny and delicate organisms.

Taxonomists are now relying more on multiple lines of evidence including a combination of sophisticated morphological and molecular genetic

techniques to tease species apart. To increase certainty about the identity of subterranean fauna species, one of the key focus areas identified is the development of a standardised best practice approach for recognising species appropriate to each taxonomic group.

WHAT LIES BENEATH

Adequate survey is essential to understanding both the species present within an area and to determine their distribution (or range size). Access to the subterranean world is via existing drill (or bore) holes created for minerals exploration or water supply. When sampling in bores, capturing stygofauna usually involves hauling a net through the water column, or using baited traps for troglifauna.

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Above Weeli Wolli Creek, Pilbara.
Photo – Adrian Pinder/DBCA

This page

1) *Mangkurtu kutjarra*. A crustacean species found in the eastern Pilbara.

2) *Gomphodella yandi*. A stygofaunal species of ostracod crustacean found in the Hamersley Range.

3) *Limbodessus bennetti*. A subterranean diving beetle.

Photos – Jane McRae/DBCA



However, both the restricted sampling access, and generally low capture rates, mean that many species may not be detected even though they are present. There is also some ambiguity around how many times a bore should be sampled to adequately detect the diversity of species at that location. As such, research has been proposed to refine survey and sampling protocols to ensure contemporary methods are efficient, repeatable and effective.

A relatively new approach involving collecting DNA in the groundwater that has been shed from an organism (environmental or eDNA), has shown much promise in

detecting subterranean fauna. As there is no requirement to capture the animals, this technique may be an improvement.

WHERE ARE THEY?

The added complexity of the third vertical dimension of subterranean environments challenges our understanding of local scale habitat availability. Micro-habitat requirements such as the size, degree and distribution of interconnected void spaces within the rock formations are likely to be important as they influence movement patterns.

On a broader scale, while we understand general geological associations with subterranean fauna, the location of suitable habitat in the landscape, both above and below ground, is difficult to predict.

To increase our understanding of preferred habitat for subterranean fauna, an area of research involving the development of a standardised approach for characterising subterranean fauna habitat in three dimensions was identified.

Three-dimensional models of the sub-surface can already be produced by integrating geophysical data collected for minerals exploration. Similar approaches are also likely to be applicable to characterising subterranean fauna habitat.

CAN THEY PERSIST?

There is also much to be learnt about the influence of human-induced changes on subterranean fauna habitats. For example, in response to groundwater extraction, can stygofauna migrate to deeper depths in an aquifer, or will they be outcompeted by species already adapted to these depths?

This question, and many others, such as the influence of toxic substances and changes in the groundwater flow and nutrient inputs, are important to understand when assessing the potential impacts of mining developments.

Clearly, complete removal of habitat has severe consequences for both stygofauna and troglofauna, and

.....
Above Millstream Chichester National Park in the Pilbara.

Photo – Steve Dillon/DBCA

This page

- 1) A species of troglobitic beetle.
- 2) *Scolopendra* sp. A species of centipede.
- 3) A species of troglobitic silverfish.

Photos – Jane McRae/Bennelongia



alterations in humidity levels can be potentially fatal to the latter. The ability of this underground fauna to respond to restoration of their habitat is also unknown.

We have learned from European studies that their life history characteristics, such as longer life cycles and lower reproductive rate compared to related surface water species, may limit their ability to recolonise an area, along with their poor ability to disperse. Laboratory and field experiments specifically designed to address these questions are clearly needed. Now, how do you keep them alive in captivity?

OUT OF SIGHT, OUT OF MIND

Given their 'invisibility', it is quite possible that some subterranean fauna species will go extinct before we even get to know them. Aside from the intrinsic value of these ancient and unique creatures, subterranean fauna are likely to play an important role in maintaining the health of our groundwater.

Above right Bundera Sinkhole, home of the Cape Range Remipede Threatened Ecological Community.

Photo – Tiffany Taylor/DBCA

This page

1) *Indohya* sp. A species of pseudoscorpion.

2) *Billibathynella* sp. Undescribed species of syncarid crustacean.

3) *Nocticola* sp. A species of cockroach.

4) *Palpigrade caramulla*. A palpigrade species or microwhip scorpion.

Photos – Jane McRae/Bennelongia

LOOKING AHEAD

The research program is currently being implemented under the guidance of the Subterranean Fauna Research Program Steering Committee, with projects funded under each of the core areas above. The initial focus has been on identifying 'quick-win' short-term projects with the aim to leverage from the success of these to commence addressing the more complex, long-term and resource demanding issues.

Dr Lesley Gibson led the development of the Subterranean Fauna Research Program when on secondment to the Western Australian Biodiversity Science Institute. She currently chairs the steering committee and is the Animal Science program leader with DBCA. Lesley can be contacted at lesley.gibson@dbca.wa.gov.au or (08) 9219 9069.

Further information is available at wabsi.org.au/our-work/programs/subterranean-fauna/ and check out the subterranean fauna display at the Western Australian Museum, Boola Bardip.



Feeding wildlife

doing more harm than good

Many Western Australians have fond memories of packing up a picnic and gleefully tearing up bits of crusty old bread, excited to provide the ducks and swans with the sustenance they thought they needed. While this scene likely paints a familiar picture for many of us and is a well-intentioned and beloved pastime, feeding wildlife does not do any good.

by Kaylee Martin



Western Australia is home to diverse and unique wildlife. Many residents and tourists enjoy the privilege of observing these animals up close in their own habitats.

Take the western grey kangaroo (*Macropus fuliginosus*) hopping along the beach at Lucky Bay in Esperance, the Australian pelican (*Pelecanus conspicillatus*) snoozing on light poles along the Canning Highway bridge, or the quokkas (*Setonix brachyurus*) wandering about our feet on Rottnest Island.

These examples of animals living in proximity to humans are quintessentially Western Australian. The interactions have become part of our history and form some of our favourite memories.

It's not uncommon for communities to develop a sense of ownership around the local wildlife, where feeding and interacting with the animals is a legacy that has existed for years.

But DBCA's Parks and Wildlife Service is firm on the rules around feeding wildlife. Put simply, members of the public should always refrain from doing so.

THE NUTRITION

Human food just does not cut it for wildlife. It is often highly processed and lacks the species-specific nutritional requirements needed to help that animal thrive. Even unprocessed fruits and vegetables are not good for wildlife since it is not their natural diet.

Food commonly fed to wildlife — such as mince, bread, shredded cheese or pet food — can lead to health complications, devastating nutritional imbalances and even cause life-threatening issues.

'Natural' protein sources like raw meats and sausages might seem like a viable choice, but these are full of saturated fats and do not have enough calcium to meet nutritional requirements.

Particularly for magpies, a diet that relies on mince will lead to weakened bones, rotting beaks and poor overall body function.

Founder of Bluegum Rescue and Rehabilitation and authorised wildlife rehabilitator Sue Turner said her facility



“Particularly for magpies, a diet that relies on mince will lead to weakened bones, rotting beaks and poor overall body function.”

had seen some birds so badly impacted by this diet they were unable to hold their own heads up.

“Well-meaning people might provide human-grade mince to the families of magpies that come into their gardens begging for food, but mince on its own is not a substantial diet for magpies,” Sue said.

“Adult magpies who are fed this diet may go on to have calcium deficiencies in the eggs, meaning the babies are born with deficiencies.

“Some babies suffer such major calcium deficiencies they can't hold their heads up, cannot stand up, and their legs and necks are malformed.

“It's very sad and unfortunately we see many cases like this each year. In less severe cases, birds can be fed additional calcium supplements to aid rehabilitation, but in very severe cases the birds have to be euthanised.”

Bread is another commonly fed human food for birds, particularly water-dwelling species.

While a popular pastime, feeding bread to ducks provides the animals with surplus energy and can even stick to their beak, causing it to rot from the inside out.

Similarly, feeding bread to swans causes an intense nutritional deficiency in essential vitamins and minerals. This leads to a condition called 'angel wing' where the wings twist unnaturally outward, and the birds are rendered flightless.

Beyond the vitamin and mineral deficiencies, many species have considerably smaller energy requirements

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Previous page

Main Western grey kangaroos in Lucky Bay can become very ill from eating human food.

Photo – Tourism WA

Inset Carnaby's black cockatoos at a small backyard bird bath.

Photo – Ann Storr

Above Feeding friendly quokkas on Rottnest Island can lead to aggressive behaviour or result in death.

Photo – Tourism WA



Learn more about the impacts of feeding wildlife

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



than human food provides, leading to fatty build-ups around vital organs and premature death for individuals.

Depending on the species, providing any kind of wildlife even a small portion of human food can be equivalent to loading a person up with a few cheeseburgers and numerous slices of pizza in one sitting.

THE NUMBERS

Most native animal species are opportunistic and will congregate wherever they can find easy food in abundance.

Parks and Wildlife Service wildlife officer Riley Carter said people who

provide an artificial food source may be unintentionally upsetting the balance of delicate ecological systems.

“Well-intentioned community members often supply seed in their backyards for birds as they think it’s a more natural diet, but this is not varied enough to provide the full nutritional balance needed,” Riley said.

“Our wildlife has also come to learn how to best source food from the community, whether at local schools, shopping centres, wheelie bins or unguarded pet food.

“By taking the time to simply ensure bins are secured, litter is off the ground

and pet food is not left out, wildlife will learn to source their food by natural means.

“Unfortunately, if this is not done, fauna can become reliant on artificial food sources from rubbish, which pushes the ecological balances out, brings a higher volume of animals to the area and increases aggression and disease risks.”

An unbalanced ecological system can have a serious flow-on effect.

An increase in population to an area can put excessive pressure on the natural food sources, causing some plant species — including threatened species — to become

Above left Times have changed since the 1980s when tourists would regularly feed kangaroos.

Photo – Jiri Lochman

Above centre Feeding ducks and ducklings is common but can lead to malnutrition, disease and aggressive behaviour.

Photo – Matt Swan/DBCA

Above right Regular sources of human food result in over-population of seagulls causing a nuisance.

Photo – Rick Dawson

Right It’s best to limit interactions with quokkas for the safety and welfare of the animal.

Photo – Tourism WA

Feeding quokkas

Quokkas are primarily grazing herbivores, meaning their diet consists mainly of buds, leaves, seeds and roots, grasses and succulents.

Feeding quokkas human foods like bread, crackers and other processed items can cause disease and deformities.

Their gastrointestinal systems are built to digest plants, and other kinds of food are detrimental to quokka health.

Not only does it cause health issues, but it disturbs their natural foraging behaviours and can lead to an unhealthy reliance on humans as a food source.





Above Licensed wildlife rehabilitators feed joey kangaroos a specific formula.
Photo – Lauren Cabrera/DBCA

Above right Discarded bread in lakes and rivers cause the build-up of harmful bacteria that causes botulism in birds like magpies.
Photo – Native Arc

Below right Australian white ibis are considered a pest and often found looking for food in bins.
Photo – Matt Swan/DBCA

completely depleted. With a lack of natural food available, wildlife will become reliant on artificial sources provided by humans, or they will simply take from crops and gardens in order to survive.

This can quickly sour the rewarding experience of having wildlife up close, turning the animals from a privilege to a pest.

Birds and kangaroos attracted to an area for artificial food sources cause significant damage to crops on farmland, and possums can invade suburban roof spaces.

This unnatural concentration of these animals can also see a rise in the outbreaks of transmissible diseases, which can be fatal to the species or have a negative impact on humans.

Some diseases such as tuberculosis, salmonella, toxoplasmosis, psittacosis and *E. coli* infections are also zoonotic,

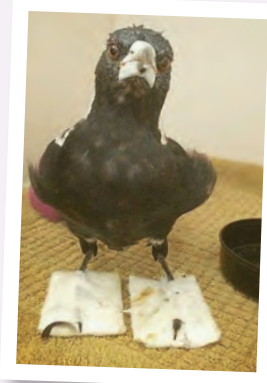
Botulism

Botulism is a bacterial disease that typically causes infected animals to suffer paralysis.

An infected bird may start to exhibit unusual behaviour such as being unable to fly, or hold its head up, dragging its wings or have an unusual gait or stance.

While it's commonly associated with waterbirds, botulism can occur in carnivorous birds like magpies if they ingest the toxin. This may occur when they ingest maggots that have been feeding on infected carcasses.

In the early stages, botulism can be effectively treated and birds have a chance of survival if they receive supportive care from a professional. Members of the public who notice birds with these symptoms should immediately call the Wildcare Helpline on (08) 9474 9055 for advice and to be put in contact with a wildlife rehabilitator or vet.



meaning they can be transmissible to humans through direct contact or exposure through faecal waste and urine.

SAVING THE SICK

With wildlife living in close proximity to metropolitan areas, there is always a chance a member of the community will come across an animal that is sick or suffering an injury.

At Bluegum Rescue and Rehabilitation, it's common for animals to be brought in for this reason.

And under current legislation, all wildlife must be released if healthy or handed in to a licensed rehabilitator or vet within 72 hours to ensure no further health damage is caused.

"One of the key issues we see is people trying to look after an animal they have found, but this needs to be handled by a professional as there could be a number of health issues that are not visible," Sue said.

"Sometimes kangaroos die on the roads with a live joey in their pouch and people try to save these, care for them and feed them cow's milk or formula.

"This can cause issues with the gut as their gastrointestinal systems will not cope with the sugar content, and it can even lead to the development of cataracts and cause the joey to become blind."

For long-necked turtles and birds living in suburban parks, botulism can cause grief in the warmer weather.

"In the summer months, we see a fair few cases of botulism, particularly in birds and long-necked turtles," Sue said.

"Many people may be unaware that attempting to feed bread can cause this illness. Discarded bread in lakes and rivers can support the build-up of harmful bacteria causing the disease."

MAINTAIN DISTANCE

For the welfare of our wildlife, it is always recommended the public remain respectful and enjoy wildlife from afar.

Next time you spot a native animal in its habitat, simply observe, enjoy and allow nature to take its course.



Kaylee Martin is a communications officer with DBCA's Public Information and Corporate Affairs branch. She can be contacted at kaylee.martin@dbca.wa.gov.au or (08) 9219 9813.

by Joselyn Juraszek

Sense - sational Spring

Spring has sprung, the sun is coming out and the days are getting warmer and longer. It is the time of year where everything is growing and bursting into life. Birds are singing, leaves are unfolding, butterflies are starting to be seen and reptiles come out to bask in the sun.

Spring is the perfect time to get outside, explore, tune into your senses and experience the natural wonder of what the world around you smells like, looks like, feels like, sounds like and even maybe tastes like!

Find your favourite spot in nature and tune into your senses.



Stand still and look all around you.



Close your eyes, what can you hear?



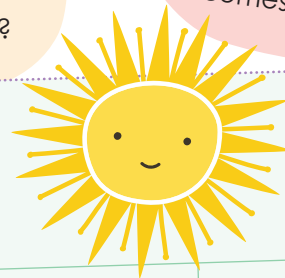
Take in a deep breath, what can you smell?



Pick up some soil, what does it feel like?



Think of something sweet and delicious that you love to eat that comes from nature.



Spring scavenger hunt

Get outside and explore your sense – sational backyard in spring and tick off all the things you see, find and do on the scavenger hunt.

 Watch a buzzing bee	 Find a yellow flower	 Look for a bird's nest	 Listen to a bird calling	 Find something prickly
 Watch an insect visiting a flower	 Find something orange	 Find a smell you like	 Search for worms in the soil	 Find an ant trail
 Listen for frogs calling at night	 Find a feather	 Find three different kinds of leaves	 Watch a flying insect	 Find a track or footprint
 Touch something smooth	 Count how many different kinds of flowers you can see	 Look for butterflies	 Touch the bark of a tree	 Smell a flower

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



Spinifex pigeon (*Geophaps plumifera*)

The spinifex pigeon is also known as the plumed-pigeon or gannaway pigeon and is identified by its distinctive long crest, rusty-brown plumage and black barring on its wings and back. It is one of four endemic Australian birds within the genus *Geophaps* and can be found in arid and semi-arid parts of northern and central Australia.

Its stony habitats include rocky hills and mountainous terrain, gorges and dry rocky creek beds, and where spinifex grasses are present near permanent water sources.

Illustration by Gooitzen van der Meer

Reference photo by Jiri Lochman

Nature's pin ups

PRINT COLLECTION

Artwork featured in *LANDSCOPE* magazine



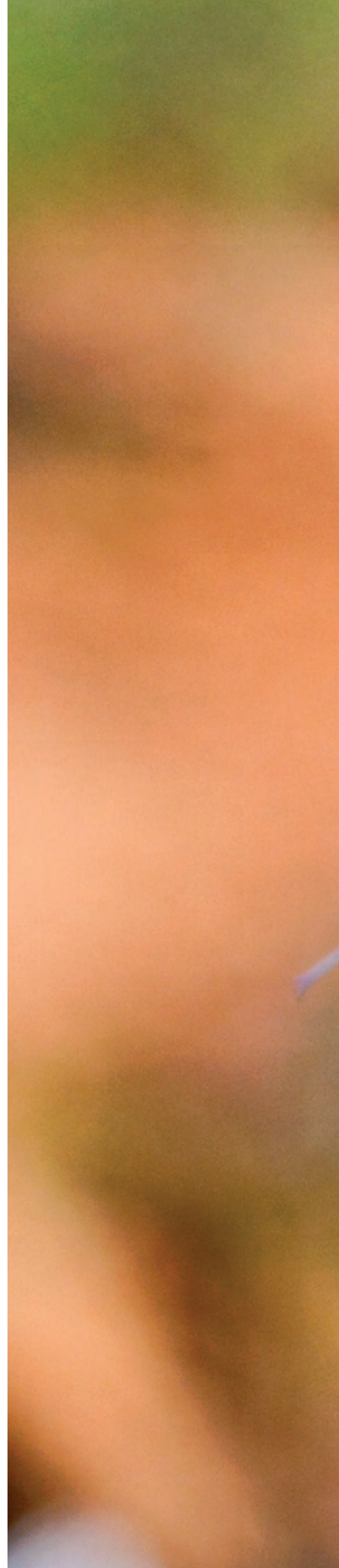
Artwork by Gooitzen van der Meer and Gwendolen Monteiro, as featured in Nature's pin-ups on page 54 in each edition of *LANDSCOPE*, is now available for purchase.

Using a water colour technique or acrylics, the pieces depict species featured in the magazine.

Prints of these beautiful pieces of artwork can now be purchased in A3 size (\$35), A4 size (\$25) or A5 size (\$15) plus \$3.30 postage for domestic large letters up to 250g. Printed on high quality art paper and delivered to your door, ready to be framed and hung somewhere special.

Proceeds from your purchase go towards managing and conserving WA's plants, animals and natural environment.

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