

WA'S PARKS, WILDLIFE AND CONSERVATION MAGAZINE

# LANDSCOPE

Volume 38 Number 1 Spring 2022 \$7.95

## SAVING SEA LIONS

Creative conservation

**True blue**  
Colours of the  
kangaroo paw

**Fauna and fire**  
Managing the risk

**Augmented reality**  
AR in Kings Park

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ON THE COVER

**Front cover** Australian sea lion (*Neophoca cinera*) at Jurien Bay Marine Park.  
Photo – Matt Kleczkowski

**Back cover** Penguin Island, Shoalwater Islands Marine Park.  
Photo – Ian Beattie/Alamy

Western Australians are custodians of an extraordinary diversity of native plants and animals. While we strive to protect this wealth of biodiversity, addressing the threats and pressures our wildlife faces can pose a challenge due to existing gaps in knowledge. This is where scientific research plays a critical role as it provides the information that underpins conservation management decisions.

The value of science in supporting complex decisions is well illustrated in 'Fauna and fire' on page 12. The influence of fire on our native fauna can be both positive or negative, and responses to fire can vary widely between species, so it is important that we get the balance right. It is equally important that conservation decision-making is appropriately inclusive.

Partnerships with Traditional Owners and Indigenous rangers, and numerous other organisations, have facilitated the implementation of recovery actions for many of our culturally significant and threatened animals (see 'Working together on rock-wallabies' on page 22). Surveys undertaken collaboratively have improved our understanding of isolated populations of black-flanked rock-wallabies and ensuing translocations have improved the conservation outlook for this eye-catching and agile species.

The benefit of working together is also evident in 'Saving sea lions' on page 46, an initiative that combines science, fashion, education and art to help conserve endangered Australian sea lions. This innovative project has raised awareness of the plight of this marine mammal by educating high school students about the species and encouraging them to explore their creative side.

DBCA scientists are passionate about conservation and, while they work hard to support management decisions, they cannot do it alone. By fostering partnerships and engaging with the broader community, they can better ensure WA's unique biodiversity is both valued, and adequately protected, for future generations to also appreciate.

**Dr Lesley Gibson, Program Leader, Animal Science**  
Department of Biodiversity, Conservation and Attractions



**Contributing** **Dr Laura Skates** is a botanist and science communicator, with a passion for exploring and creatively sharing the stories of people and plants. She recently completed her PhD on the ecology and nutrition of carnivorous plants, and now works with the Kings Park Science team and the Friends of Kings Park on various environmental communications and research projects.



**Digby Grown** is the senior plant breeder at Kings Park and Botanic Garden. He manages breeding programs with *Anigozanthos*, *Boronia*, *Chamelaucium*, *Corymbia*, *Eremophila*, *Eucalyptus*, *Grevillea*, *Leptospermum* and *Scaevola*. He has worked for many years developing Australian native plants for horticulture. He leads research into new technology developments in plant tissue culture, biotechnology and plant breeding.



**Marnie Giroud** is a conservation educator with a background in media, teaching and arts. She has held various roles within DBCA working in community engagement, citizen science and conservation education. Her conservation efforts include volunteering for non-profit conservation organisations, designing education programs, caring for wildlife, managing volunteers and citizen science fauna monitoring projects both locally and in the Amazon jungle.



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**This page** Black kangaroo paw (*Macropidia fuliginosa*), Badgingarra National Park.  
Photo – Cliff Winfield



Department of Biodiversity, Conservation and Attractions

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**Snap  
shot**



## READER'S PIC

### **Sandstone grevillea (*Grevillea miniata*)**

Photo and words by Eddy Wajon

"I photographed this sandstone grevillea (*Grevillea miniata*) at the Bloodwoods in Purnululu National Park on my first trip to the Kimberley in July 2021. The trip was the first of several planned to write the 5th book in my series of *Colour Guides to Spring Wildflowers of Western Australia – Broome and the Kimberley*. This is a Priority 4 plant, meaning it is naturally rare but considered not currently threatened. For such a rare plant, I did not expect to see them present in their hundreds. While reported elsewhere, I did not see any others on my trip, so felt privileged to see this population."

**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](mailto:landscape@dbca.wa.gov.au).

## New agreement for Pila Nature Reserve

In a nationwide first, the McGowan Government recently realised an historic on-Country native title agreement with Traditional Owners in the Gibson Desert region.

The new agreement follows an amendment to the Commonwealth *Native Title Act 1993* and reinstates the native title rights and interests of the Yarnangu people over the reserve.

The Gibson Desert Nature Reserve Compensation and Lurrtjurrululu Palakitjalu Settlement Agreement covers approximately 19,000 square kilometres of land in the Gibson Desert, located roughly 1800 kilometres north-east of Perth. *Lurrtjurrululu Palakitjalu* translated into English means 'we will do it together', reflecting the intention of the State Government and Traditional Owners to jointly manage the Country covered by the reserve.

'Pila' was chosen as the name for this reserve, a word in traditional language that describes the geography of the reserve area, which when translated into English means plains/flat country.



A new, \$2 million initiative is set to improve disability access in national parks and across Western Australia's conservation estate.

Accessible Parks WA is a partnership between the State Government, Nature Play WA and Break the Boundary Inc to improve amenities including trails, paths, ramps, boardwalks and activity hubs, as well as improve visitor information.

The funding will provide for infrastructure accessibility improvements in parks including Perth Hills, Walpole-Nornalup, Lake Kepwari, Yanchep and Dryandra, and will also develop in-park access experiences and allow for the creation of two regional activity hubs. It will also connect children of all abilities to the conservation estate via an app through the 'Every Kid in a Park' initiative, and provide for information accessibility improvements on the Explore Parks WA website.

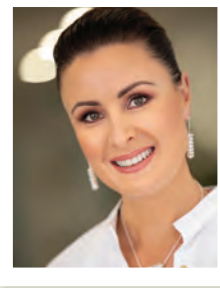
Nature Play WA will also deliver events, lesson plans for schools, and employ innovative methods to share WA's unique ecology and Aboriginal culture, so that families of children of all abilities can enjoy areas including nature reserves, marine parks and national parks.

**Above** Making trails more accessible for the community.

Photo – DBCA

Guest column

**Melissa Cook**  
Managing Director,  
GIROUD Pty Ltd



I always love it when a waitperson brings me water with a wedge of lemon at a cafe—I am guilty of not consuming the wedge and I stare at it as it makes its way to the bottom of my glass.

I often think, what about the lemon, its tree, where it was grown, who picked it from its branch and how many days did it grow on that tree so I could have a wedge in my glass?

Clothes are much the same. It's easy to become numb to their production and the time and cost of making them. Unfortunately, like the lemon, we often discard them. Just as a lemon offers a refreshment to our water, so too does our clothing offer our character a sense of refreshment. But at what cost?

A stitch pops, and a garment is returned. The colour is not quite right, and the garment is returned. That's ok, but it's important to become aware of our consumption.

There are so many small changes we can make as individuals that will lead to a more sustainable future.

When it comes to clothes, there are arguments over what fabric is more sustainable than another. They all have their strengths and weaknesses. Cotton is one of the most water intensive fabrics to create; polyester can be recycled but it also uses a lot of chemicals in the process.

The answer is quite simple—less is more.

If we just consumed less, there would be more for everyone, and it would be less taxing on this beautiful planet of ours.

That responsibility for consumption lies with us as consumers and with the businesses that create the garments.

Over-production is not a planet-friendly business model. A just-in-time manufacturing policy and shortened supply chain would make the world of difference and go a long way to helping us reduce garment wastage and invest in a more sustainable future.

Being more patient and taking the time to consider what we buy and where we buy it would also help to sow the seeds for a brighter fashion future.

After all, lemons need time to grow.



## Spectacular new John Forrest plans released



New schematic designs showcase the proposed upgrades for John Forrest National Park, including a new park hub and a spectacular elevated walkway over Glen Brook.

The park hub will include an interpretation space embracing local Aboriginal history, a food and beverage offering, and a function space suitable for a range of events. The buildings, gardens, car park and paths around the hub will be accessible to a broad range of park visitors.

Improved hiking trails, new off-road cycling trails and viewing facilities at Hovea Falls are expected to be completed by mid-2023, with the overall project expected to be completed during 2025. The national park will remain open, with upgrades undertaken in stages to minimise disruption for visitors.

Local architect Gresley Abas designed the new facilities, working closely with Traditional Owners to ensure cultural heritage values, stories and sites of significance were incorporated into the designs.

View the designs at [dbca.wa.gov.au/parks-and-wildlife-service/john-forrest-national-park-improvement-project](http://dbca.wa.gov.au/parks-and-wildlife-service/john-forrest-national-park-improvement-project)

**Above** Artist impressions of the new park hub at John Forrest National Park.  
Photo – DBCA

## New partnerships boost climate science capability

The State Government has joined two new partnerships to boost climate science capability and assess how the State's climate may change over the next century.

WA has joined the next generation of the New South Wales and Australian Regional Climate Modelling Project (NARClIM 2.0) to ensure projections by the Climate Science Initiative are consistent across Australia. The initiative will translate the latest findings from the Intergovernmental Panel on Climate Change into local projections for WA, and are expected to be delivered in 2024.

The second partnership will see the State Government team up with Murdoch University to produce detailed climate change projections for WA, and co-fund two new research scholarships to advance scientific knowledge and build local expertise of WA's climate.

Updated climate projections for WA will help government, industry and the community understand and adapt to the changing climate.



## Beeliar Regional Park

*Beeliar is the traditional lands of the Nyoongar Aboriginal people and a natural habitat and refuge for wildlife. Water birds come to nest and feed in the wetlands, making it a great spot for nature watching and photography.*

Beeliar Regional Park, a 3400-hectare park south of Perth, protects banksia woodlands, coastal cliffs, 26 lakes and many associated wetlands in two main chains of swamps and lakes. One of the lakes, Thomsons Lake, is recognised as an internationally important wetland under the Ramsar Convention because of its bird habitat. The wetlands there attract a riot of migratory birds, many of which have travelled from as far afield as Russia and China.

**Above** Boardwalk near the bird hide at Bibra Lake.

*Photo – Andy Milner/DBCA*

### HISTORY

The park's name is a local Nyoongar Aboriginal word for the area, which was used by a tribal group of 58 people led by Midgegooroo. The eastern chain of lakes was an important camping and ceremonial place for Nyoongar people as well as a major source of food. The chain of wetlands was a part of a major trade route between Aboriginal people in the Swan and Murray river areas. At Booragoon Lake, the Western Australian Museum has found evidence that the western side of the lake was used as a Nyoongar camp site and food source for at least 38,000 years.

European interest in the area started in 1830 when Thomas Peel developed the

Clarence settlement. Settlers were attracted by the abundance of water and good soil. However, it was not until the late 19th century that intensive agriculture began, coinciding with the 1890s gold rush.

### NATURAL ATTRACTIONS

Each year in mid-summer, some 10,000 waterbirds flock to the area before returning to their northern hemisphere homes. These include species such as greenshanks (*Tringa nebularia*), red-necked stints (*Calidris ruficollis*) and sharp-tailed sandpipers (*Calidris acuminata*). The park also supports a myriad of bush birds, reptiles and amphibian species and mammals such as the quenda (*Isoodon fusciventer*), western grey kangaroo



“The park’s name is a local Nyoongar Aboriginal word for the area, which was used by a tribal group of 58 people led by Midgegooroo. The eastern chain of lakes was an important camping and ceremonial place for Nyoongar people as well as a major source of food.”



Learn more about Beeliar Regional Park

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



Clockwise from top left Firewood banksia (*Banksia menziesii*); View of Garden Island from Mt Brown lookout. Photos – Andy Milner/DBCA; Gould’s monitor (*Varanus gouldii*) at Kogolup Lake. Photo – Ezgi Perincek/DBCA; Yellow-billed spoonbills (*Platalea flavipes*) at North Lake; Australian reed-warbler (*Acrocephalus australis*). Photos – Ian Wallace; The Spectacles wetland. Photo – Philip Karstadt; View of Bibra Lake. Photo – Elizabeth Given/Alamy

# Parks for people Beeliar Regional Park



**Top** Bird hide at Bibra Lake.  
Photo – Andy Milner/DBCA

**Middle** Henderson Cliffs lookout.  
Photo – Peter Nicholas/DBCA

**Above** Frog Swamp at North Lake.  
Photo – Ezgi Perincek/DBCA

(*Macropus fuliginosus*) and western brush wallaby (*Notamacropus irma*).

The park contains a range of wetland and coastal vegetation. Many of these vegetation types were once widespread across the Swan Coastal Plain but have now been significantly cleared. The park also has several maintained grassed parklands, as well as limestone cliffs along the coast.

## EXPLORING THE PARK

Beeliar Regional Park provides a relatively undisturbed area within an urban

environment. You can observe the many bird species found at Thomsons Lake by setting out on a six-kilometre trail around the lake. Bird lovers should also head to the bird hide, walk trails and boardwalks at The Spectacles.

For a family day out, try Bibra Lake or Manning Lake, which have grassed picnic areas, toilets and walk and bike trails.

Or head to the coast at Henderson Foreshore lookout, where you can stand on a limestone cliff and take in views of Garden Island.

## Do it yourself

**Where is it?** Southern suburbs of metro Perth

**What to do** Cycling, walking, bird watching, on-leash dog walking

**Facilities** Playgrounds, walk trails, lookout

**Nearest Parks and Wildlife Service office**  
Regional Parks Unit, Swan Region,  
(08) 9443 0300

## WINGSPAN



In a first for *In review*, we've reviewed a boardgame. The nature-themed, engine-building boardgame, *Wingspan*.

In this aesthetically pleasing game designed by Elizabeth Hargrave, between one and five players (bird enthusiasts) aim to attract the best collection of birds to different habitats.

Points are accumulated over four rounds by playing birds, laying eggs, catching food, via bonus cards and by completing goals.

The bird cards are beautifully illustrated and include interesting facts about each bird. The original version features 170 birds of the Americas. But the Oceania expansion, published in late 2020, adds 95 birds from Australia and New Zealand to the game, including many popular Western Australian species. A European expansion was also published in 2019.

My friends and I found the game quick to learn and enjoyable to play. It was well-balanced, appeared to have been well tested and different on subsequent plays.

Officially, the game takes 40-70 minutes to play, but my group of five took about two and a half hours.

All up, a fun game for bird-lovers but, due to its clever design, equally enjoyable for those with minimal interest in birds.

*Wingspan* is published by Stonemaier Games and can be purchased online. Prices vary between retailers.



## PERUP/BOYUP BROOK FLORA & FAUNA



This easy-to-use app does what it says on the box—identifies flora and fauna found near Perup: Nature's Guesthouse and the Shire of Boyup Brook.

At the time of review, it included information on 178 species of flora and 48 species of fauna, with users able to view flora and fauna via an A-Z list or filter by subset.

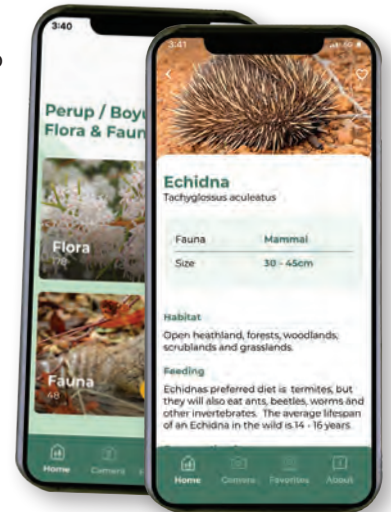
Fauna can be filtered by birds, mammals, marsupials and reptiles, and flora can be filtered by growth form, flowering period or flower colour.

While designed to be used in Perup and surrounds, as much of the flora and fauna of that region is found

across many parts of the State, the app does have broader appeal.

It even incorporates a small amount of extra information about local walks and Perup: Nature's Guesthouse.

Perup/Boyup Brook Flora & Fauna can be downloaded for free from the Apple Store and Google Play.



## STEPPING OFF: REWILDING AND BELONGING IN THE SOUTH-WEST



Thomas M. Wilson has written the book he wishes his parents gave him while growing up in suburban Perth.

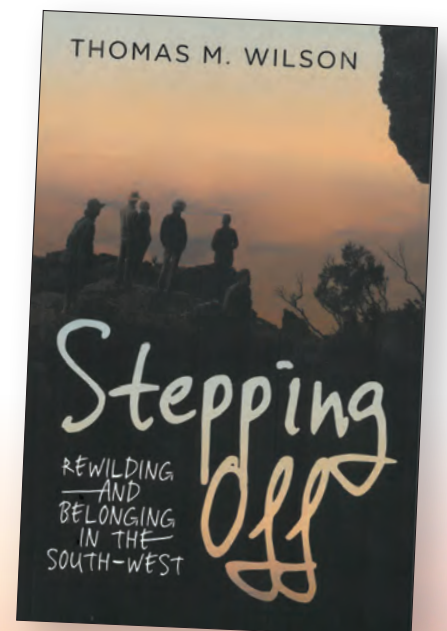
It's a lofty goal, and his novel—part history, part memoir—covers significant ground including geology, flora and fauna, colonisation, Aboriginal history, Wilson's own family history, the development of Perth and surrounding towns, biodiversity and conservation.

In a chapter devoted to the 'rewilding' in the title, Wilson suggests keeping native animals as pets could be beneficial to humans and some endangered native species, and that we should incorporate more native foods and products into our everyday lives.

It is an offence to capture or keep wildlife without a licence, a fact Wilson later acknowledges. Being more mindful of the history and ecology of our surroundings and integrating more native ingredients into our diet and lifestyle is, however, an admirable and achievable goal.

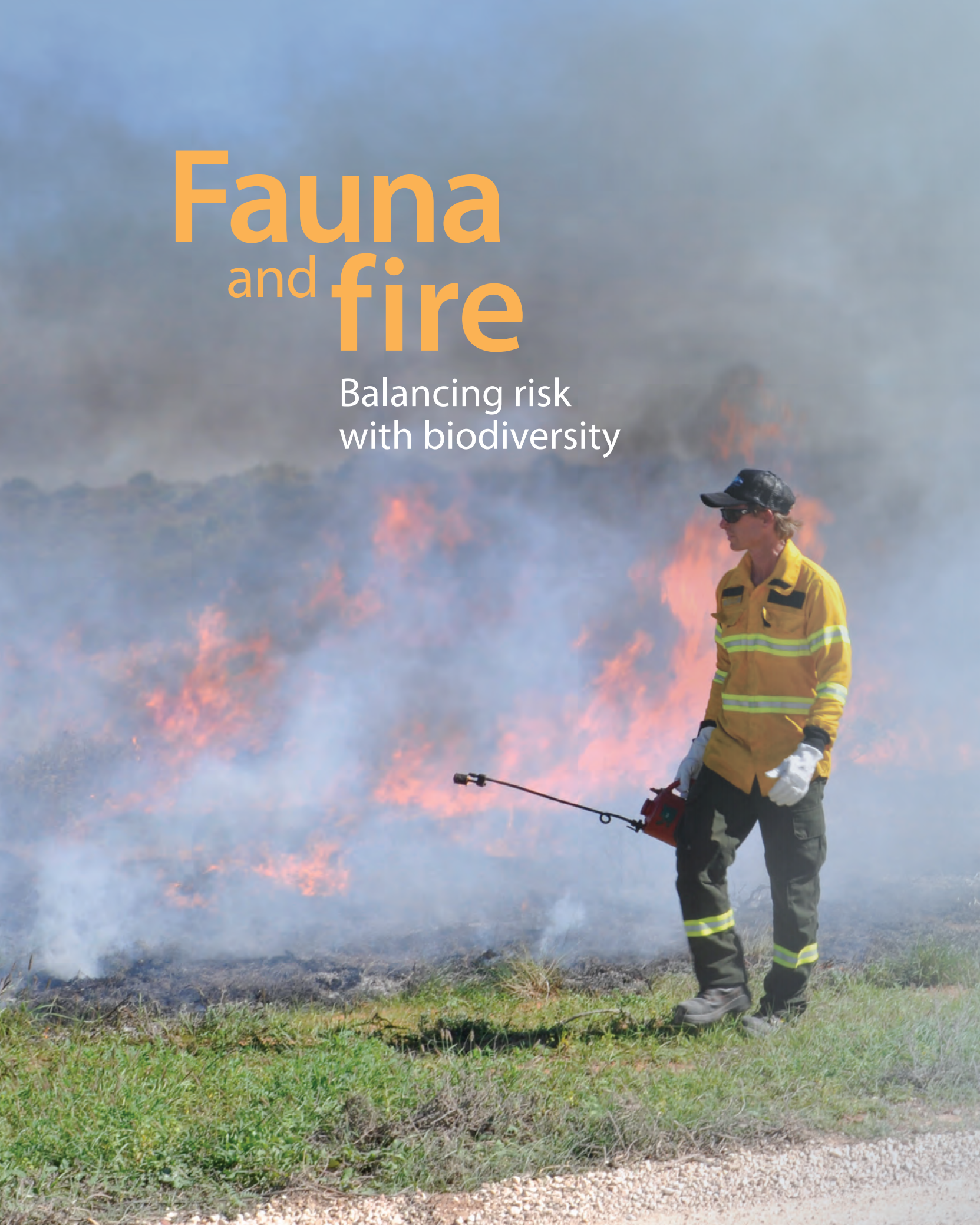
*Stepping Off* is an entertaining read, and a good reminder that our own existence is but a small part of a much bigger story.

*Stepping Off: Rewilding and Belonging in the South-West* retails for \$29.99 and can be purchased from Fremantle Press and some bookstores.



# Fauna and fire

Balancing risk  
with biodiversity





Fire is a part of the south-western Australian landscape and many native plants, animals and ecosystems respond to and recover from fire with some level of flexibility and adaptability. However, large and intense bushfires have the potential to have long-lasting impacts on biodiversity, so land managers in Western Australia are continually learning and improving methods to minimise the impacts.

by **Chenée Kett**





**N**ative Western Australian animals depend on their environment for food, water, shelter and space to live and reproduce. However, fire is an extremely effective force in not only destroying and recreating these resources but changing the patterns, places and times that they occur.

Intense summer bushfires can often be extreme in both rate of spread and intensity, and the impacts to biodiversity can be severe and long-lasting in the landscape.

Prescribed burning is Western Australia's principal strategy for protecting the community and the environment from the devastating impacts of large bushfires. The aim is to reduce fuel loads so that when bushfires occur, as they inevitably do, their speed, intensity and impact on the environment is reduced.

Some native animals have behavioural, ecological and physiological ways to respond to fire in bushfire-prone environments. Some are highly mobile and can move out of the path of a bushfire. Others are able to burrow, climb or take refuge in hollows and other sheltered sites.

While animals can evolve to suit their environment over time, all species have a tolerance threshold for changes to their environment. Their capacity to survive a disturbance such as fire depends on the amount and rate of change to their environment.

## MANAGING FIRE

Fire has a fundamental role in generating and maintaining biodiversity

and can also provide positive biodiversity conservation outcomes.

Managing bushfire risk is challenging and complex, and land managers do not always get it right. Sometimes things don't go to plan but having sound science and professionals that are always willing to learn and improve is essential to delivering best practice.

Biodiversity conservation is the science and art of achieving 'the right balance' with respect to working within the tolerance thresholds of plants and animals within a highly modified and changing environment.

From a biodiversity perspective, prescribed burning is undertaken to maintain a range of wildlife habitat types through the creation of low-fuel areas in a mosaic across the landscape.

Prescribed burns are carried out under more favourable conditions than intense summer bushfires, providing more opportunities for animals to safely move into areas of unburnt vegetation and various plant species opportunities to regenerate. The impacts of low intensity burns benefit animals by leading to fewer plant deaths and fewer hollow logs and tree hollows lost that are used as habitat for animals.

Changed fire regimes are one of the greatest threats to many threatened species. Interactions with other factors such as climate change, feral predators and other forms of disturbance also play an important part in biodiversity conservation outcomes.

*Previous page*

**Main** Prescribed burning in Kalbarri.

*Photo – DBCA*

**Right** Female Carnabys cockatoo (*Zanda latirostris*) in a tree nesting hollow.

**Inset left** Brush-tailed phascogale (*Phascogale tapoatafa*).

*Photos – Jiri Lochman*

**Inset right** Quokka on the mainland (*Setonix brachyurus*).

**Above** Prescribed burning in the Perth Hills.

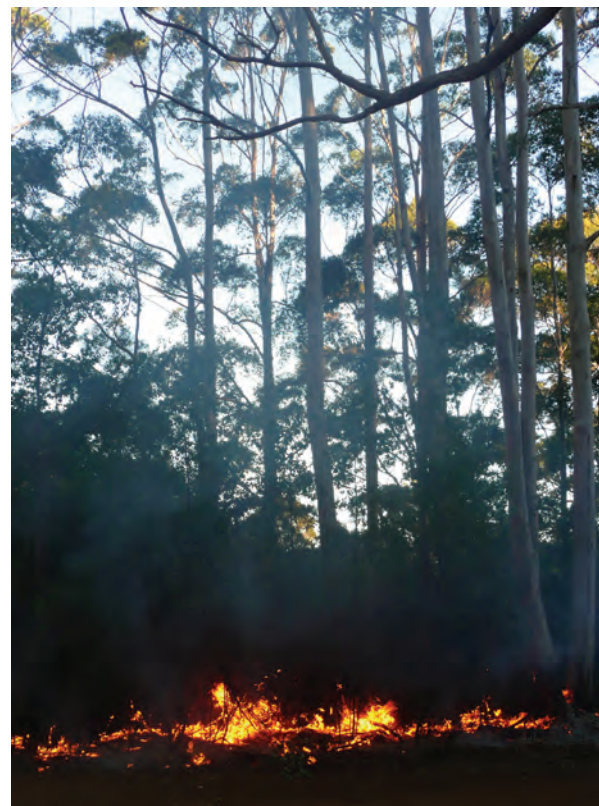
*Photos – DBCA*

## BALANCING BIODIVERSITY

Plant species and communities vary in their response to fire and the frequency of bushfire is a critical factor in their life cycle and regeneration. The plant response to fire is fundamentally linked to fauna survival as plants provide shelter and food. Some wildlife recover quickly following a low intensity, patchy fire but are slower to recover after high intensity, large fires that can burn the entire landscape.

Native animal species' response to fire varies over space and time depending on the timing, intensity, frequency, size, history and landscape of the fire, as well as the innate and unique characteristics of the individuals and populations.

When Department of Biodiversity, Conservation and Attractions' (DBCA) Parks and Wildlife Service officers plan burns, their knowledge of life histories,



Learn more about native wildlife and fire

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



traits, sensitive periods (seasons), tolerable intervals and the habitat needs of native plants and animals are essential considerations.

It's a combination of more than 60 years of operational experience, local knowledge and risk management, underpinned by good science—a delicate balancing act and something that isn't taken lightly.

### ALL IN THE TIMING

Increased levels of moisture in the soil and vegetation are particularly advantageous in protecting animal habitat, which is why prescribed burns are mostly conducted in autumn and spring when the weather is mild and fire behaviour is moderate and easier to manage.

"The hollows of logs and trees won't keep burning when there is enough residual moisture in the wood," said

DBCAs Fire Management Services Manager, Stefan de Haan.

"It means that the flames will go out without consuming the entire log, which provides habitat for native animals. In summer, everything is so dry that often the entire habitat is lost when a high intensity bushfire comes through."

Years of planning can go into each prescribed burn, with careful consideration given to the burn location, vegetation type and biodiversity values. Wind direction and forecast conditions are evaluated in consultation with the Bureau of Meteorology prior to ignition.

"For specific plant and animal values we might also look at some areas being excluded from the burn or only burning those areas at certain times of the year," Stefan said.

"With the benefit of years of planning, ultimately we're dealing with a living, changing ecosystem. We look at specific

**Top left** Western brush wallaby (*Notamacropus irma*).  
Photo – Jiri Lochman

**Above left** Planning for a prescribed burn.  
Photo – Jennifer Eliot/DBCA

**Top** Recovery is slow after a devastating bushfire.

**Above** Low intensity prescribed burn in the karri forest.  
Photos – Bron Anderson/DBCA

## Minimising the impact

Eight thousand hectares of forest were impacted by the 2021 bushfires near Leeuwin-Naturaliste National Park. In the middle of the burnt landscape is a patch of green coastal heath. It's the only area that wasn't impacted by bushfire thanks to a prescribed burn that had been carried out five years earlier. Side by side, the before and after photos illustrate the benefits of reducing fuel loads to minimise the impact of intense summer bushfires.



biodiversity values of threatened plant and animal populations associated with the burn and whether there are certain conditions that we have to burn under, or actions we need to take prior to commencing.”

In the south-west corner of the State, in places like the damp forests near Denmark, prescribed burning is undertaken in summer.

“Summer is the only time that the karri forests are dry enough to allow for the effective and safe use of prescribed burning to manage fuel loads and biodiversity values,” District Fire Coordinator Ed Hatherley said.

**Above** Firefighters battling a bushfire near Leeuwin-Naturaliste National Park.

**Inset above** Patch of green coastal heath previously prescribed burnt in 2016 protected from bushfire.

Photos – DBCA

**Above right** Quokka (*Setonix brachyurus*).

Photo – Jiri Lochman

“Compared with large-scale summer bushfires, prescribed burning is conducted in smaller areas, at a lower intensity, resulting in a mosaic of burnt and unburnt patches that allow animals to move to safety or find refuge,” he said.

“We also commonly undertake additional feral animal baiting after the burn to ensure any impacts on native species are minimised.”

## FRIEND NOT FOE

For some species, like the mainland quokka (*Setonix brachyurus*), prescribed burns can have benefits. The persistence of quokkas on the mainland relies on feral animal control efforts and the use of prescribed burning to manage their habitat.

Quokkas use dense vegetation in the moist parts of the landscape, and it is important that these areas are not frequently burnt. When vegetation cover is removed by fire, quokkas are vulnerable to predation due to increased hunting efficiency of cats and foxes.

“It has to be the right amount of fire,” DBCA’s senior research scientist Dr Adrian Wayne said.

“If a bushfire comes through and wipes out all the vegetation, the quokkas are left exposed and vulnerable,” he said.

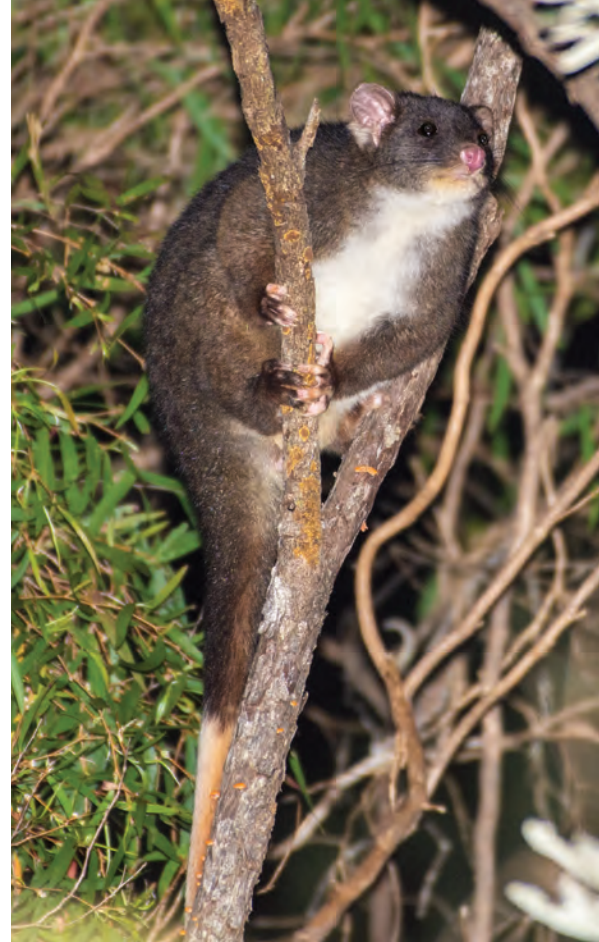
“But without fire, the habitat becomes too thick and dense, meaning they’re unable to move around to source food. Prescribed burning allows us to find that happy medium.”

In 2015, the mainland quokka population was severely impacted by a bushfire in Northcliffe, in WA’s south-west. The bushfire covered an area of approximately 98,000 hectares and damaged a large area of known quokka habitat. Surviving quokkas sought refuge in swampy vegetation within the fire-affected areas, or in unburnt sites near the fire edge.

When determining a burn location, fire officers exclude habitat deemed healthy and utilised by quokkas prior to prescribed fire being introduced.

## TAKING CARE

There are many complex factors at play that aren’t predictable when it comes to prescribed burning and there is always an element of risk associated with it. There are some fauna species that are more sensitive to fire, such as the western ringtail



possum, also known as ngwayir, pronounced n-wa-yir (*Pseudocheirus occidentalis*). To accommodate more sensitive species, fire managers vary the frequency, intervals, seasons, intensities and scales of prescribed burns so these more vulnerable species and their habitats are maintained.

Specific flora and fauna considerations, in particular threatened species, are factored into all stages of planning. Depending on the specific values identified, existing datasets can be used to confirm known population locations, liaise with adjacent property owners, ground truth known locations within and adjacent to the planned burn site, carefully preparing sites ahead of time.

In the case of species such as numbats, burns are undertaken outside of the periods where their young are in their dens, which is typically from winter through to November. This timing ensures that younger animals are mature enough to access refuge areas during and after the burn period.

## AFTER THE FIRE

DBCA scientists and conservation staff are developing tools to map the variation in fire intensity, fuel consumption and unburned fuels remaining after patchy

fires, as well as collaborating with other organisations to better understand patterns of soil dryness and fuel availability.

Techniques such as camera surveillance are used for monitoring specific fauna populations. Following a prescribed burn that was conducted near Perup in the Upper Warren area in autumn 2021 that resulted in some areas being burnt at a higher intensity than planned, a post-burn fauna monitoring program was put in place. Recent surveys show several recordings of numbats as well as woylies (*Bettongia penicillata*), tammar wallabies (*Notamacropus eugenii*), quenda (*Isoodon fusciventer*), western brush wallaby (*Notamacropus irma*) and brush-tailed phascogale (*Phascogale tapoatafa*).

To help protect these species, DBCA is continuing to conduct post-burn fox baiting and fauna monitoring in the area as part of its broader native fauna management program in the Upper Warren area.

## MOVING FORWARD

Bushfire is an inevitable part of life in Western Australia, whether through

ignition by lightning, accidental activities or arson.

What is important for biodiversity conservation is that the fire regimes that our plants and animals experience are within their tolerance ranges that allow their populations and ecosystems to thrive. It is vital that firefighters continue to manage fuel loads in ways that conserve our wildlife and keep our communities safe.

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**Above left** Fauna monitoring is conducted by Parks and Wildlife Service conservation staff before and after a prescribed burn.

Photo – DBCA

**Above** Western ringtail possum (*Pseudocheirus occidentalis*).

Photo – Jiri Lochman

**Chenée Kett** is a communications officer with DBCA and was previously a reporter with Channel 7's *Today Tonight* program. She is a published author, host of *Writers off the page* podcast and is passionate about storytelling. She can be contacted at [chenee.kett@dbca.wa.gov.au](mailto:chenee.kett@dbca.wa.gov.au)



Talking  
Circle

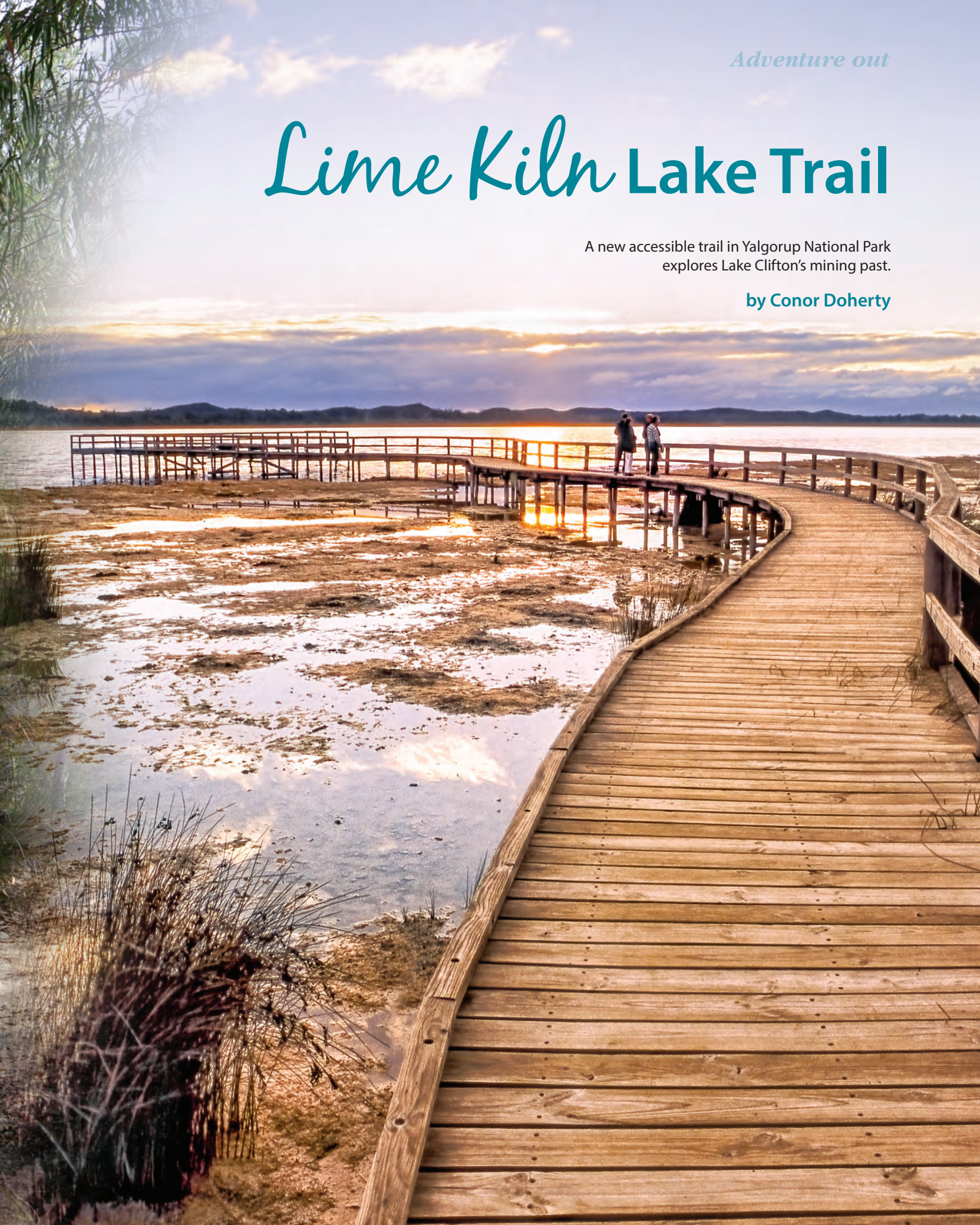


*Adventure out*

# *Lime Kiln* Lake Trail

A new accessible trail in Yalgorup National Park explores Lake Clifton's mining past.

by **Conor Doherty**





Until recently, I only knew of Yalgorup National Park, south of Mandurah, for the Lake Clifton thrombolites—the living rock-like formations found in only a few places in the world.

On hearing of a newly opened, short walking trail and picnic area further south at the site of the Historic Lake Clifton Lime Kiln, I was keen to visit, walk the trail and learn more about the area's interesting and important history.

The Historic Lake Clifton Lime Kiln day-use area and Lime Kiln Lake Trail are a short, 10-minute drive south of the iconic

thrombolites in Yalgorup National Park. Located on the traditional Country of the Bindjareb Noongar people, the site is home to the remains of an original lime kiln that was part of the Western Australian Portland Cement Company's lime project that operated between 1919 and 1923.

From 1919, lime marl was pumped from the bottom of Lake Clifton through a series of pipelines into settling ponds before being transported to cement works in Burswood—initially by truck then later via a railway line opened in 1921.

The lime kiln is one of the only remaining structures from the former townsite of Lake Clifton, developed as a company town by the WA Portland Cement Company in 1920.

The kiln itself was constructed onsite in 1922, allowing lime to be processed prior to transport. The kiln's operation was short-lived as it was discovered the lime marl from deeper in the lake was of unsuitable quality for cement manufacture and the mine closed in 1923.

## HOW IT CAME ABOUT

President of the Lake Clifton Herron Residents Association, Jenny Rose, stumbled across the abandoned kiln while walking in the area in 2015 and, following

some research, realised its history and significance were too important to remain hidden.

A management plan had previously flagged the site in the mid-1990s and a concept plan for a trail prepared in 2002, were able to form the basis of new plans for the lime kiln site.

Jenny Rose and the Department of Biodiversity, Conservation and Attractions worked closely to source grants and funding partnerships and encourage community involvement to bring the vision to reality.

This hard work saw a day-use area including picnic tables, parking and interpretive signage open in May 2019, and the second stage of the project—the 1.2-kilometre-return Lime Kiln Lake Trail and talking circle—in May 2022.

## LIME KILN TO LAKE

While the day-use area would undoubtedly have made for a very pleasant place to take a break while in the area, the Lime Kiln Lake Trail makes it a worthy destination in its own right.

As I meandered along the gentle, Class 1 trail among the peppermint and melaleuca trees, I was struck by how calm and serene the location was.

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**Left** Lime Kiln Lake Trail.

*Photo – Conor Doherty*

**Right** The iconic boardwalk at Lake Clifton is a 10-minute drive from the Lime Kiln Lake Trail.

*Photo – Sallyanne Cousans*

**Above** Lime kiln remains.

*Photo – Marie Lochman*

**Above right** Remnant rail and pipe.

*Photo – DBCA*

**Inset above** Historic lease of Lake Clifton 1916.

*Photo – Department of Justice*



The area has naturally regenerated over the last 100 years, however evidence of the settling/drying ponds and pipeline remain, and remnants of infrastructure can be seen at points along the trail.

About 100 metres along is the turnoff to the talking circle—a small clearing flanked with wooden seating and six stunning artworks by local artists Gloria and Karrie-Anne Kearing that represent the six Noongar seasons.

Continuing towards the lake, the trail passes through the former settling ponds. Those with a keen eye will notice the raised pond banks forming a distinct, square pattern.

The trail is accessible for people of all abilities and there are several spots along the way with benches—perfect for taking a break or simply taking in your surroundings.

On the May morning of my visit, I was excited to discover white bunny orchids (*Eriochilus dilatatus*) in bloom and am told the area is a prime location for wildflower spotting in spring.

The current trail ends just short of the lake's edge, but the good news is that the Lime Kiln Lake Trail is only going to get better with plans for a viewing deck that will offer outstanding views across Lake Clifton.

The lake still holds vestiges of its short but significant mining past—a row of sticks that were used to moor pontoons protrudes across the lake and with the water level low on my visit some remnants of the dredging operation were visible along the shoreline.

From above, the irreversible damage to the lakebed caused by the dredging can still be seen.

Lake Clifton is now a Ramsar protected wetland—one of Australia's

65 Ramsar sites. It is a breeding, moulting and feeding ground for many species of endemic and migratory birds, so bird lovers should keep their ear to the ground for news of Lime Kiln stage three which will include a viewing deck at the lake's edge.

## MORE HISTORY

The Lake Clifton Herron Residents Association website—[lakeclifton.com.au](http://lakeclifton.com.au)—and the Waroona Historical Society hold a wealth of information about the history of the lime kiln site and mining venture, the former Lake Clifton gazetted townsite and the natural attractions of the area.

**Top left** Protruding sticks once used to moor pontoons.

*Photo – Conor Doherty*

**Right** Thrombolites at nearby Lake Clifton.

*Photo – Sallyanne Cousans*

**Below** Lime Kiln Lake Trail talking circle.

*Photo – Marie Lochman*

## Do it yourself

**Where is it?** Yalgorup National Park stretches from just south of Mandurah to north of Myalup and covers 12,888 hectares.

The lime kiln site is located off Newnham Road, adjacent to Old Coast Road, east of Lake Clifton.

**Planning your trip:** The historic Lake Clifton Lime Kiln is about a 90-minute drive from Perth, a 30-minute drive from Mandurah, and a 45-minute drive from Bunbury.

**Facilities:** Parking and picnic tables are available off Newnham Road.

There are no toilet facilities at the site and rubbish must be taken away with you.



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*The author would like to acknowledge the resources, knowledge and passion of Jenny Rose in creating this article.*

# Working together on rock-wallabies

Recent translocations of black-flanked rock-wallabies from the Wheatbelt and Cape Range to new homes along the Murchison River gorge are yielding positive results. These translocations are the culmination of earlier research and are just one of many conservation actions underway to benefit WA's rock-wallabies.

by Dr David Pearson







**R**ock-wallabies are one of the few small macropods that can be reliably seen, if you know where to look. While mostly nocturnal, rock-wallabies do have a fortunate habit of basking on sunny ledges during the cooler months; and they have become tolerant of people.

Visitors to Kununurra and Lake Argyle often sight short-eared rock-wallabies (*Petrogale brachyotis*) at local lookouts; in Cape Range National Park, black-flanked rock-wallabies (*Petrogale lateralis*) are stars of Yardie Creek cruises; and increasingly in Kalbarri National Park, they are being observed by lucky visitors at the Skywalk and at Hawks Head Lookout.

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**Main** Black-flanked rock-wallabies (*Petrogale lateralis*) at Cape Range National Park.

*Photo – David Bettini*

**Inset left** A captured rock-wallaby is released after it has been weighed and measured.

*Photo – Christine Drayton/DBCA*

**Inset right** DBCA staff descending into a gorge for an early morning check of rock-wallaby traps.

**Above** A pair of rock-wallabies groom each other before heading out to graze.

*Photos – David Pearson/DBCA*

## BUILDING ON PAST RESEARCH

Their relaxed sunbaking belies the recent history of some rock-wallaby species. Localised extinctions have occurred across many areas of their known range and several species remain threatened. The black-flanked rock-wallaby has been the focus of research and conservation actions over many decades. Thankfully, timely research identified the causes of its decline and solutions have been developed resulting in the strong recovery of the species.

But challenges remain as black-flanked rock-wallabies are scattered in small populations across a vast area—many in remote locations. In recent years, collaborative work between the Department of Biodiversity, Conservation and Attractions (DBCA), World Wide Fund for Nature (WWF), and Indigenous communities and ranger groups has dramatically improved knowledge about where rock-wallabies live, the status of populations and what threats they face.

### ‘ROCKIES’ OR ‘WOBLIES’

All Australian rock-wallaby species are currently in the genus *Petrogale* and five species and three subspecies occur in WA. They have distinctively shaped bodies with strong hind legs and long tails that provide balance when navigating cliffs at speed.

Sheltering in caves and crevices in their rocky habitat allows rock-wallabies to escape the dual hazards of predators and hot weather. They have low metabolic needs and this, combined with their selective grazing and nocturnal activity, allows them to survive without access to drinking water for long periods.

In 1986, two WA government scientists, Andrew Burbidge and Norm McKenzie, published a paper that focused attention on the extinction and decline of native Australian mammals in the size range of 35 grams to five kilograms. These declines commenced in the early 1900s, were most pronounced in desert areas, and included rodents, bandicoots, possums and small wallabies.

Numerous reasons have been suggested to explain this disturbing phenomenon including habitat damage by rabbits and introduced stock, changes to Aboriginal burning patterns, disease, hunting and the impact of introduced predators such as the fox and feral cat. Fast forward to today, and subsequent research has shown that these factors do not work in isolation and their importance varies between species.

## THE PREDATION PROBLEM

Pioneering research led by the late Jack Kinnear in the 1990s revealed that the fox was a very serious predator of



**“But challenges remain as black-flanked rock-wallabies are scattered in small populations across a vast area—many in remote locations.”**



black-flanked rock-wallabies in southern WA. Their control resulted in a spectacular recovery of teetering populations.

The impact of feral cats has been revealed by subsequent research. The role of the dingo is more controversial. Some scientists believe that dingoes exert substantial control of fox and cat numbers. However, certainly in the case of desert rock-wallaby populations, dingoes do not appear to sufficiently control foxes and cats to prevent ongoing rock-wallaby declines and extinctions.

While dingoes have been present in Australia for around 4000 years and rock-wallaby populations were able to tolerate their predation, the landscape is now more hazardous with the addition of foxes and cats.

DBCA undertakes predator control operations around several threatened rock-wallaby populations using both

ground and aerial baiting, and this has resulted in both their persistence and recovery. The effectiveness of these techniques means that it has been possible to return rock-wallabies to their former habitat.

### PROBLEMATIC ‘ISLAND’ HOMES

The black-flanked rock-wallaby is the most widespread rock-wallaby species in WA, distributed from islands off the southern coastline to the southern Kimberley and across the deserts into the NT and SA.

Despite this massive range, its populations are effectively on islands of widely separated hills and ranges. The species was once much more abundant and movement between populations was easier. The remoteness and small size of populations now pose challenging problems for conserving the species and all its genetic diversity.

**Top left** A black-flanked rock-wallaby carrying a large joey surveys a gorge for any threats.  
*Photo – Geoff Taylor/Lochman Transparencies*

**Top** Nyikina Mangala rangers carry rock-wallaby traps into the Erskine Range.  
*Photo – David Pearson/DBCA*

**Inset above** Kurt Wright, a Nanda ranger, sets up a Thomas trap in Kalbarri National Park.  
*Photo – Anthony Desmond/DBCA*



**Top** A rock-wallaby examines a trap before entering, but the temptation of the apple bait usually works.

Photo – David Pearson/DBCA

**Inset above** Motion-sensitive cameras are very valuable tools to find and monitor rock-wallabies.

Photo – DBCA

**Below** Nyikina Mangala rangers prepare to release a rock-wallaby fitted with an ear tag.

Photo – David Pearson/DBCA



Genetic diversity can be rapidly lost from small populations, so an important goal of rock-wallaby conservation is to maintain sizeable populations over as much of their range as possible.

## FINDING POPULATIONS

It is perhaps surprising that we continue to locate ‘new’ populations of rock-wallabies. No doubt these populations were well known to Aboriginal people prior to European settlement. In recent years communities and ranger groups have been searching for rock-wallabies as part of their On-Country activities and are rediscovering populations.

Back in the 1990s, Department of Conservation and Land Management (now DBCA) staff worked with the Ngaanyatjarra Council and Central Desert communities to visit numerous ranges along the WA-Northern Territory border to capture and document where black-flanked rock-wallabies existed. Since then, many more surveys in other parts of the Goldfields, Pilbara and Kimberley regions have been conducted with Indigenous communities.

Most recently in 2021, DBCA worked with the Nyangumarta rangers

to investigate reports of new rock-wallaby populations on the edge of the Great Sandy Desert. Several were captured and genetic samples collected to investigate the relationship of this population to others. Large bushfires and feral cats appeared to be imminent threats to these small populations.

## SMILE FOR THE CAMERA

The advent of reliable automated camera traps has provided a valuable tool that has been widely used by Aboriginal ranger groups to locate rock-wallaby populations and to monitor their numbers.

Since 2012, the Nyikina Mangala rangers in the southern Kimberley have worked with WWF to locate remaining populations of the Wiliji, an endangered subspecies of the black-flanked rock-wallaby (*lateralis* subsp. *kimberleyensis*). Camera traps have been the primary means to monitor populations and their predators.

DBCA assisted this ranger group with some live trapping and ear tagging to better assess the Erskine Range population. This was followed by Charles Darwin University researchers using a thermal drone to estimate the size of the population. The use of different monitoring techniques allows researchers to arrive at more accurate



population estimates and guides decisions about the best monitoring techniques for a particular site.

## BRINGING THEM HOME

In some areas where rock-wallabies have disappeared, it has been possible to return (reintroduce) them once the threats (such as predators, or competitors like goats) have been adequately controlled.

Translocations of black-flanked rock-wallabies have been carried out at a number of sites including in the Avon Valley, Cape Le Grand and the Durba Hills (Jilikurru) in the Little Sandy Desert. Between 2016-2018, several translocations of rock-wallabies were made into Kalbarri National Park. These translocations were complex logistical exercises, with numerous DBCA regions involved as well as WWF, Aboriginal ranger groups, air charter staff and the Kalbarri Bush Ranger cadets.

Rock-wallabies were captured by teams at outcrops in the Wheatbelt and at Cape Range and then flown to Kalbarri. Each rock-wallaby was then fitted with a radio-collar and carefully released in their new homes in the Murchison River gorge. Trapping in May 2022 found that there

had been good survival of the original released rock-wallabies; that their young were now producing joeys; and that the population was expanding to reclaim vacant cliffs along the gorge.

Working co-operatively with various agencies and Aboriginal rangers has delivered effective conservation outcomes for threatened rock-wallaby species. Researchers have learnt where they occur, what threats they face and joint actions such as predator control and translocations have ensured the persistence of populations and the establishment of new ones.

The future is looking brighter for these graceful wallabies.

**Above left** Roberta Hunter (Nyangumarta rangers) and Lucy Clausen (DBCA) rebaiting a trap.

*Photo – David Pearson/DBCA*

**Above** Measurements are taken from captured rock-wallabies to monitor population health.

*Photo – Christine Drayton/DBCA*

**Right** Black-flanked rock-wallaby.

*Photo – David Pearson/DBCA*



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*The author would like to acknowledge the pioneering research of the late Jack Kinnear, and the work and commitment of Merrill Halley, Chris Greenwood and Leigh-Ann Woolley (WWF), as well as Yamatji Marlpa, Walalakoo and Ngaantjarra Aboriginal Corporations and their ranger groups and DBCA regional staff, especially Anthony Desmond, Lucy Clausen and Mike Paxman.*





# True blue

## Colours of the kangaroo paw

The iconic Western Australian kangaroo paw has dazzled the world with its unique flowers and form. Delve into the colourful world of kangaroo paws and catspaws and the launch of the 'Masquerade' blue kangaroo paw (*Anigozanthos*) developed by the Botanic Gardens and Parks Authority.

by Alan Gill and Digby Growns





It would be difficult to name more iconic Western Australian wildflowers than kangaroo paws with the red and red species (*Anigozanthos manglesii*) being the State’s floral emblem. Although kangaroo paws are endemic to Western Australia, they can be found in gardens across the world.

There are (to date) 12 species of kangaroo paws and catspaws—11 in the *Anigozanthos* genus, while the black kangaroo paw (*Macropidia fuliginosa*) is in a genus of its own. Despite their variety and diversity across WA, kangaroo paws are vulnerable to diseases (*Pythium*, *Phytophthora*), ink spot

(*Alternaria anigozanthi*) and rust (*Puccinia haemodori*).

Plant breeders at the Kings Park and Botanic Garden have been tackling the plant’s susceptibility to diseases through a program of cross-pollination, developing hardier varieties for home gardens and expanding the colour-range through a process known as hybridisation. One variant emerged in 2013 that had the team excited—this one was blue.

“The new ‘Masquerade’ kangaroo paw came from cross-pollinating green and red-green varieties over many years,” Digby said. “What makes this so remarkable is that the genes to produce blue flowers have been sitting there all this time yet have never been expressed. We just needed to find the right hybrid to bring it to the fore.”

## BIRDS NOT THE BEES

Kangaroo paws and catspaws rely on nectar-feeding birds for pollination, not insects such as bees and wasps.

“Pollination success plummets without native birds feeding on nectar in kangaroo paw flowers,” DBCA’s Biodiversity and Conservation Science principal research scientist Siegy Krauss said.

“Birds like wattlebirds and other honeyeaters play a key role in reproduction and hybridisation of kangaroo paws.”

Hybrids can naturally occur when pollen from one species is transferred to another. In addition to needing to be co-located, plants must also be flowering at the same time for the opportunity of hybridisation to arise.

“A few things have to go right for hybrids to occur in nature and there’s a range of barriers that reduce the likelihood,” Siegy said.

“Kangaroo paw flowers can differ in length, depth, height: these physical differences change pollen deposition and retrieval sites on a bird’s beak, head or neck when feeding on nectar. This means

## INTO THE BLUE

A teal blue kangaroo paw started flowering from a cross-pollination conducted by plant breeders in 2012 in their quest to find a more robust variant.

“It had an absolute wow factor,” Kings Park’s senior plant breeder Digby Growsn said. “I knew we had to target this one.”

The plant breeding process typically involves the creation of hybrids: the cross pollination of similar species with a view to combine desirable traits and forms, such as colour, size, disease tolerance or drought-resistance.

“We want to breed plants that use less water, have less disease and provide habitat for local fauna,” Digby said.

“Plants that have unique colours or forms and an extended flowering season are attractive to gardeners and can continue to increase the popularity of native plants.”

Blue flowers are rare in bird-pollinating flowers and have never been seen before in kangaroo or catspaws.

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**Main** ‘Masquerade’ blue kangaroo paw.  
Photo – Kings Park and Botanic Garden

**Above** Red and green kangaroo paw detail.  
(*Anigozanthos manglesii*).  
Photo – John Huisman

**Above right** Tall kangaroo paw (*Anigozanthos flavidus*).  
Photo – Marie Lochman



Discover more about kangaroo paws

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



## Enigmatic emblem

The red and green kangaroo paw (*Anigozanthos manglesii*) was proclaimed as WA's floral emblem in 1960.

In announcing the choice, then Premier Sir David Brand said: "The kangaroo paw is so outstanding that it was the logical choice. It has grace and beauty, striking colour and distinctive outline, and it grows naturally only in Western Australia".

The kangaroo paw was incorporated into the Coat of Arms of the State of Western Australia by Her Majesty Queen Elizabeth II in 1969, framing the Crown.

It is truly a unique flower, and its scientific name reflects this: French botanist J.J.H de Labillardière coined a genus name that loosely translates to 'irregular flower' when describing the genus in 1800.



## Known distribution of kangaroo paws



Left Red and green kangaroo paw. (*Anigozanthos manglesii*).  
Photo – Rob Davis

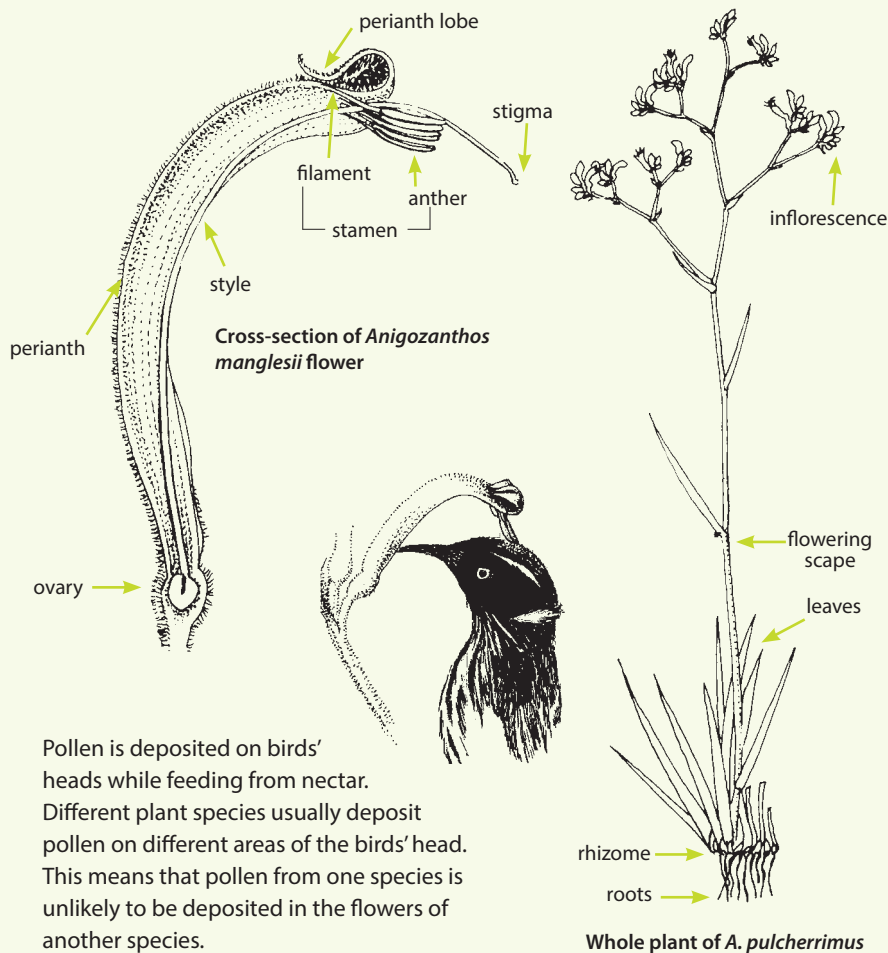
Below left Black kangaroo paw (*Macropidia fuliginosa*).

Below Catspaw (*Anigozanthos humilis*).  
Photos – Marie Lochman





**Parts of the kangaroo paw plant**



Pollen is deposited on birds' heads while feeding from nectar. Different plant species usually deposit pollen on different areas of the birds' head. This means that pollen from one species is unlikely to be deposited in the flowers of another species.

pollen isn't necessarily delivered to the right location on the receiving flower.

"If there is a successful pollen transfer, there is no guarantee seeds will set or even germinate. A lot has to go right."

Even the birds themselves have a say in the success of hybrids. Researchers have observed birds choosing to feed from one species of kangaroo paw over another during its peak in flowering, despite others being available in the same landscape.

"Pollinators are in it for the nectar so they will choose to feed from flowers that will give them the most reward for effort," Siegy said.

"The opportunity for hybrids to occur naturally is limited if birds are choosing to feed exclusively from one species at a time."

In a botanic garden hybridisation and crossbreeding can occasionally be highly successful, resulting in the evolution of new lineages and species over large timescales. Plant breeding programs seek to speed up

**Top left** Brown honeyeater on kangaroo paw. Photo – Cliff Winfield

**Above** Kangaroo paw cross pollination. Photo – Kings Park and Botanic Garden

**Left** Parts of the kangaroo paw plant and bird pollination. Illustrations – Margaret Pieroni as featured in Kangaroo paws and catspaws by Stephen D. Hopper



**Top left** Digby inspecting *Anigozanthos* hybrids.

**Top** Foliage affected by rust.

**Above** Newly potted *Anigozanthos* hybrids.  
Photos – Andy Milner/DBCA

**Below** ‘Masquerade’ blue kangaroo paws.  
Photo – Kings Park and Botanic Garden



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crossbreeding and bring about hybrids that would be unlikely to occur in nature.

“Hybrids and cultivars can bring about varieties and traits that are unlikely to emerge in the wild such as this blue colouration,” Siegy said.

“Accelerating these natural processes can bring about exciting developments in plant biology and provide glimpses into the genetic diversity these plants harbour.”

## GENOME LAID BARE

A research project inspired by the ground-breaking blue kangaroo paw development has been awarded an Australian Research Council grant to uncover the mysteries behind kangaroo paw flower colour expression.

Blue flowers are so rare in bird-pollinated flowers that the unique hybrid has begun an interdisciplinary collaboration to map the first entire kangaroo paw genome.

The project is a collaboration between the Botanic Gardens and Parks Authority, Department of Biodiversity, Conservation and Attractions and Edith Cowan University, along with other collaborators and funding from the Friends of Kings Park.

“Mapping the genome of Western Australia’s floral emblem would open up the possibilities for kangaroo paw research for years to come,” Digby said.

“Nobody’s ever done work to uncover the science behind colours in *Anigozanthos* and therefore we don’t know how to

expressed,” he said. “This is really globally significant science that we’re about to undertake that will further our world-leading native plant development program.”

Edith Cowan University Chief Investigator Dr David Field said the project would use cutting edge genomic sequencing technology integrated with biochemical analysis to uncover the genes behind the colours.

“The project aim is to assemble the first kangaroo paw genome, identify the genomic regions’ driving colour variation in cross-breeding programs, identify some of the biochemical compounds responsible and, lastly, describe the genetic sources of these flower colour genes in nature,” Dr Field said.

“The complete genetic blueprint held in the sequence of the DNA molecules directs all the biochemical processes required for life and biological diversity.”

This project will not only develop new scientific techniques but also inspire more research into native Western Australian plants.

“We’re using techniques that have never been used before in Australia,” Digby said.

“There are many questions that can be answered once we map the genome, including the impact of variable colours on pollination and biodiversity.”

The ‘Masquerade’ blue kangaroo paw is now available in commercial nurseries across Western Australia.



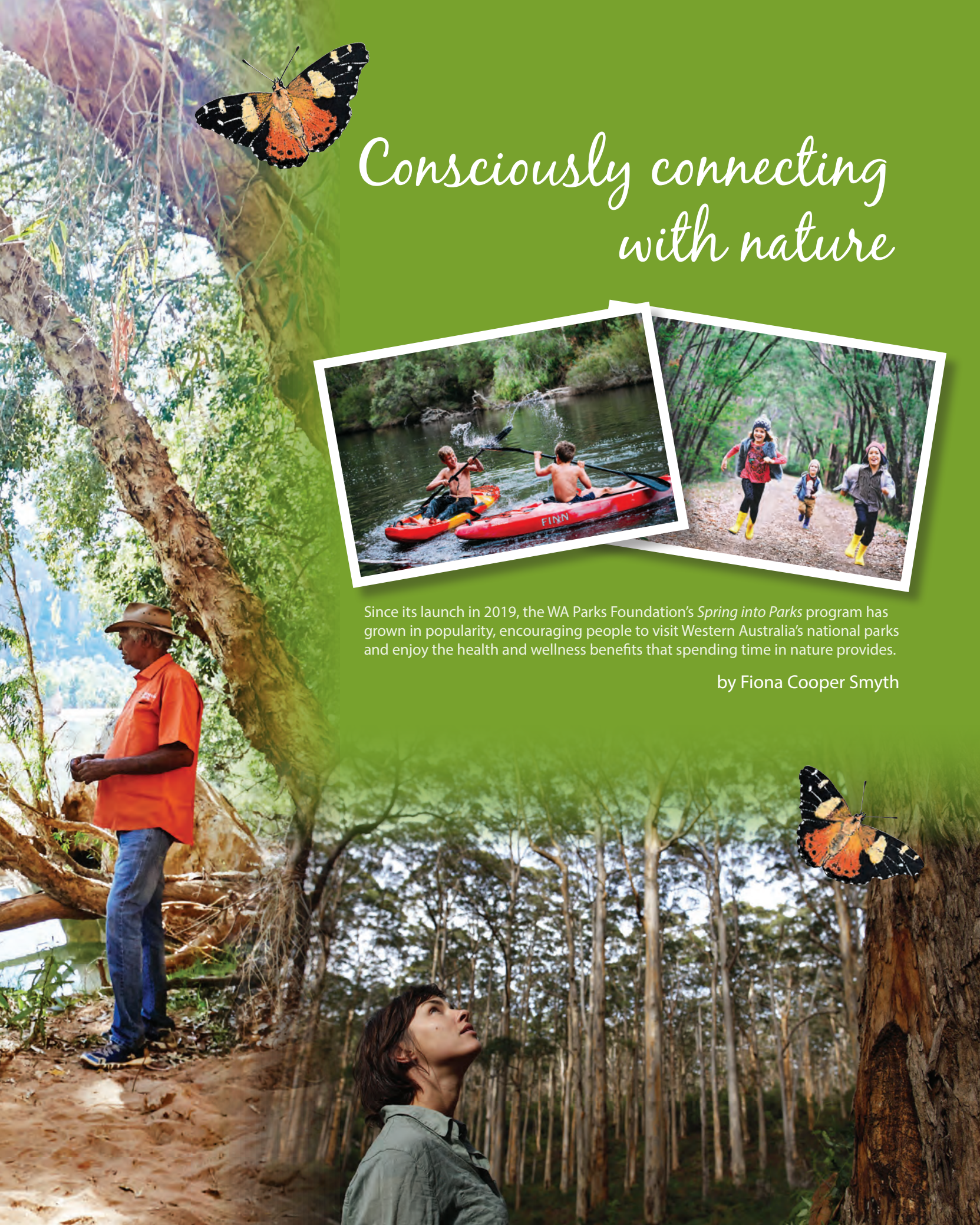


# Consciously connecting with nature



Since its launch in 2019, the WA Parks Foundation's *Spring into Parks* program has grown in popularity, encouraging people to visit Western Australia's national parks and enjoy the health and wellness benefits that spending time in nature provides.

by Fiona Cooper Smyth



The core philosophy of the WA Parks Foundation focuses on encouraging a love for parks and enjoying spending time in nature. As the charity partner for Western Australia's national parks, the Foundation developed an annual program in 2019 promoting the health and wellness benefits of connecting to nature.

The *Spring into Parks* program, featuring a calendar of activities and events in parks, has been renewed for a fourth year and is gaining traction and popularity with every passing year.

Throughout the months of September and October, the WA Parks Foundation, in partnership with the Department of Biodiversity, Conservation and Attractions (DBCA), presents an online events calendar—building on its *30-Day Wellness Challenge* held in June—that is filled with events and activities in park locations across WA.

“*Spring into Parks* celebrates WA's spectacular wilderness and connects people to nature through a diverse range of events and activities—from scavenger hunts to stargazing, hut building and flag making, arts and crafts and even yoga in an ancient cave,” Hon Kerry Sanderson AC CVO, WA Parks Foundation Chair and former Governor of Western Australia said.

“Other events in the past have included birdwatching in Broome, sky walking in Kalbarri, learning about bush tucker, guided bushwalks, forest bathing and hiking in the hills. There is something for everyone.”

.....  
*Previous page*

**Main** Storytelling at Bandiilingan National Park (Windjana Gorge).

**Right** Boranup Forest, Leeuwin-Naturaliste National Park.

**Inset left** Kayaking on the Warren River near Pemberton.

**Inset right** Exploring trails near Margaret River

**Above** Lucky Bay, Cape Le Grand National Park.

*Photos – Tourism WA*



“We encourage everyone to get involved and ultimately become stewards of nature for WA.”

### CONSCIOUSLY CONNECTING

‘Consciously connect with nature’ is the theme for the 2022 *Spring into Parks* program. As well as focusing on the benefits of spending time in nature for improved mental health and wellbeing, the campaign highlights the cultural and environmental significance of the land, promotes WA's incredible biodiversity and highlights the importance of conserving our parks and reserves for present and future generations.

Funded recently by Lotterywest, the program showcases WA's national parks and encourages everyone to ‘spring into parks’ by spending time outdoors, getting creative, getting active and consciously connecting with nature.

Over the past three years, linking with government, corporate and community-based organisations, *Spring into Parks* has featured more than 600 activities, across more than 200 park locations state-wide. Its associated digital campaign has created more than two million social media impressions.

### MAGICAL MOMENTS

“A highlight this year will be the ‘Moments in Nature’ photographic competition in October, encouraging

amateur photographers and nature-lovers to capture memorable moments in nature and celebrate the beauty of WA's magnificent national parks, marine parks, reserves and forests,” Mrs Sanderson said.

“Magical moments are made when people ‘wander out yonder’.”

“Everyone who has a smartphone, has a camera. We encourage people to submit their favourite, most memorable or picturesque photos taken recently for their chance to win a prize and be featured online,” she said.

“It's wonderful to capture a moment in time when the light is just right and the scene just perfect! It becomes a precious memento of an outdoor experience.

“The scope is wide open as long as the image is taken in one of WA's national parks or marine parks, forests or reserves.”

### GET INVOLVED

The WA Parks Foundation is keen to engage with outdoor and nature enthusiasts and collaborate with organisations to make *Spring into Parks* even bigger and better.

Registrations are open for licensed tour operators to sign up to be a part of the program and have trips, tours, events and activities featured on the online calendar of events.



## Moments in Nature photographic competition

Submit your favourite, most memorable or picturesque photos taken recently in a national park, forest, reserve or marine park for your chance to win a prize and be featured online. (terms and conditions apply).

Prizes include:

- \$300 voucher for RAC Parks & Resorts accommodation
- \$300 voucher for the Matagarup Zip and Climb
- \$200 voucher to spend at Camera Electronic in Perth
- Two Feet and a Heart Beat Tour for two
- Mindful In Nature Forest Therapy (Shinrin-yoku) in Kings Park voucher for two.

Runners up will receive a national park pass for access to WA's national parks, provided by DBCA. Visit [ourwaparks.org.au/springintoparks](http://ourwaparks.org.au/springintoparks)

“Programs like Spring into Parks aim to increase our knowledge, enhance our connection to Country, help protect our flora and fauna and improve conservation outcomes for the long term.

“The south-west of WA is home to one of the world’s 36 global biodiversity hotspots. We have 103 national parks, 17 marine parks, three natural World Heritage areas, and our State is home to 70 percent of Australia’s mammals, many of which are endangered or threatened so they need our help,” Mrs Sanderson said.

“We encourage everyone to get involved and ultimately become stewards of nature for WA.”

Licensed tour operators can sign up at [ourwaparks.org.au/spring-into-parks-registration](http://ourwaparks.org.au/spring-into-parks-registration)

.....  
**Top** Sugarloaf Rock, Leeuwin-Naturaliste National Park.

**Above** Cape Range National Park.

**Right** Warren River near Pemberton.

Photos – Tourism WA



**Fiona Cooper Smyth** is the marketing and partnerships manager at the WA Parks Foundation. She can be contacted at [fiona@ourwaparks.org.au](mailto:fiona@ourwaparks.org.au) or 0438 933 635.

**T**axonomic knowledge is essential for meaningful studies in biological diversity, ecology and biogeography. Whilst biological diversity is severely threatened by many hazards including anthropogenic habitat loss, pollution, invasive species and pathogens, overexploitation of natural resources, inappropriate recreation or tourism activity and global climate change, there is an urgent imperative to describe species before they become extinct. To quote the Taxonomy Decadal Plan Working Group: "Trying to manage the Earth sustainably without an adequate taxonomy is like trying to manage the world's largest, most complex corporation without an adequate inventory of stock, and with no real idea of what most of the products look like or do."

The daisy family Asteraceae (a.k.a Compositae) is the largest family of plants in the world. The family is subdivided into subfamilies and tribes, one of which, tribe Gnaphalieae, contains the paper daisies. Australia is endowed with an abundance of paper daisies. The genus *Xerochrysum* is concentrated in the eastern states of Australia with only three species recorded in WA out of 13, prior to my research.

In 2017 I started a PhD project examining paper daisies in the genera *Xerochrysum*, *Coronidium* and the closely related species *Helichrysum leucopsideum* based at the University of New England with co-supervision at CSIRO Centre for Australian National Biodiversity Research. The genus *Xerochrysum* has been 'taxonomically difficult' for over 100 years. Like many groups of Australian native plants, it's relatively easy to recognise a specimen belongs in the genus, but it becomes much harder to confidently identify the species.

I was intrigued by occurrence records in biodiversity hotspots of the Pilbara and the Stirling Range. My fieldwork enabled me to visit the Pilbara to collect disjunct populations of *X. interiore* Paul G.Wilson and to the south-west to collect *X. macranthum* (Bent.) Paul G.Wilson and look at herbarium specimens of *X. boreale* Paul G.Wilson from the Kimberley.



## Paper daisies (*Xerochrysum wilsonii*)

That name, Paul G.Wilson, appears regularly throughout the botanical literature as Paul, a former botanist at the WA Herbarium, has named six species of *Xerochrysum*, as well as the genus *Coronidium* and worked extensively on other Australian Gnaphalieae and the families Chenopodiaceae and Rutaceae.

My project used DNA sequence data to show the genetic similarities and differences between populations from around Australia. With these insights we were able to examine herbarium specimens and glasshouse-grown plants for correlating morphological characteristics. Populations of *Xerochrysum* that were genetically and morphologically distinct were described as new species. Overall we described 12 new species.

Along the way we discovered that the colourful cultivars long thought to be crosses between east coast *X. bracteatum* and African species of *Helichrysum* are hybrids from crosses with Western Australia's *X. macranthum*.

The Pilbara populations were confirmed as *X. interiore* and those herbarium specimens from the Kimberley were

**Above** *Xerochrysum wilsonii* growing in Porongurup National Park

**Inset** The white and pink paper bracts or phylaries of *Xerochrysum wilsonii*  
Photos – Dr Tim Collins

identified as *X. boreale*. The widespread annual or short-lived perennial *X. macranthum* was confirmed as mostly having white and pink papery bracts though there are some populations east and north of Perth where the papery bracts are entirely golden-yellow.

The intriguing plants from the summits of the Stirling, Porongurup and Mount Manypeaks ranges were found to be perennials, genetically and morphologically distinct from the mostly annual *X. macranthum*. Surprisingly, populations on southern coastal headlands and tall forests also clustered with the mountaintop plants. Finding a suitable name for these rare and beautiful plants was a simple decision, and so *Xerochrysum wilsonii* T.L.Collins is a newly discovered component of the Western Australian flora.



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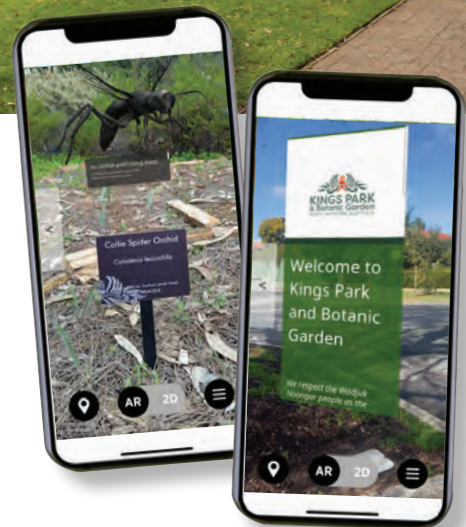


# Augmented exploration

Exciting technologies such as 'augmented reality' provide new opportunities by combining the natural world with the virtual world. Through engaging visitor experiences, botanic gardens play an important role in connecting people with nature while educating on biodiversity and conservation.

by Dr Laura Skates  
and Emily Denham





Augmented reality, or the merging of the real world with the virtual world, has come a long way since the first hardware was developed in 1968. With smart devices often on hand, augmented reality apps are an excellent modern storytelling choice for a tourist destination, with the ability to overlay digital media to points of interest through GPS technology.

The technology has been recognised as a next step in visitor experiences in botanical gardens across the world, providing the opportunity to enrich the visitor's knowledge of flora, culture and history in an engaging and immersive way. Visitors are taken on a journey through the gardens to learn the stories of landmarks, areas of cultural significance and flora of interest.

**“The stories shared through *Markr* in the Conservation Garden celebrate Kings Park's efforts in conserving and restoring WA's environmental treasures”.**

In Western Australia, visitors to Kings Park and Botanic Garden can explore some of Western Australia's rarest and most threatened flora through an augmented reality experience using the newly developed, free *Markr* app. Users can discover behind-the-scenes stories of plants growing in the park's Conservation Garden.

Kings Park's Conservation Garden is a safe haven for around 400 of WA's rare and threatened plant species. These plants are grouped according to region or type of country, from granite outcrops, to sand plains, and arid zones. Few people have the opportunity to see these plants growing in the wild, so this garden provides a unique experience for visitors.

The stories shared through *Markr* in the Conservation Garden celebrate Kings Park's efforts in conserving and restoring WA's environmental treasures. An introductory *Markr* describes how plants are conserved behind-the-scenes, from seed banking to tissue culture and cryopreservation.

From tiny seeds and plant tissues, the horticulture team at Kings Park propagate threatened plants for display in the gardens and also for translocation into the wild in collaboration with other staff in the Department of Biodiversity, Conservation and Attractions (DBCA).

## MARKR APP

The *Markr* app was created in Perth by a team of local entrepreneurs, as an innovative way to explore and learn about the world. The augmented reality signs fit in the palm of your hand and pop up on your phone as you get closer to the featured plants in the Conservation Garden. With in-built text translation services, visitors can read the digital signage in the language set in their mobile devices, increasing accessibility for multicultural audiences.

### Previous page

**Top** The 3D pollinator is a fascinating feature on the *Markr* app.

*Photo – Markr Systems*

**Below** Using the *Markr* app.

*Photo – Andy Milner/DBCA*

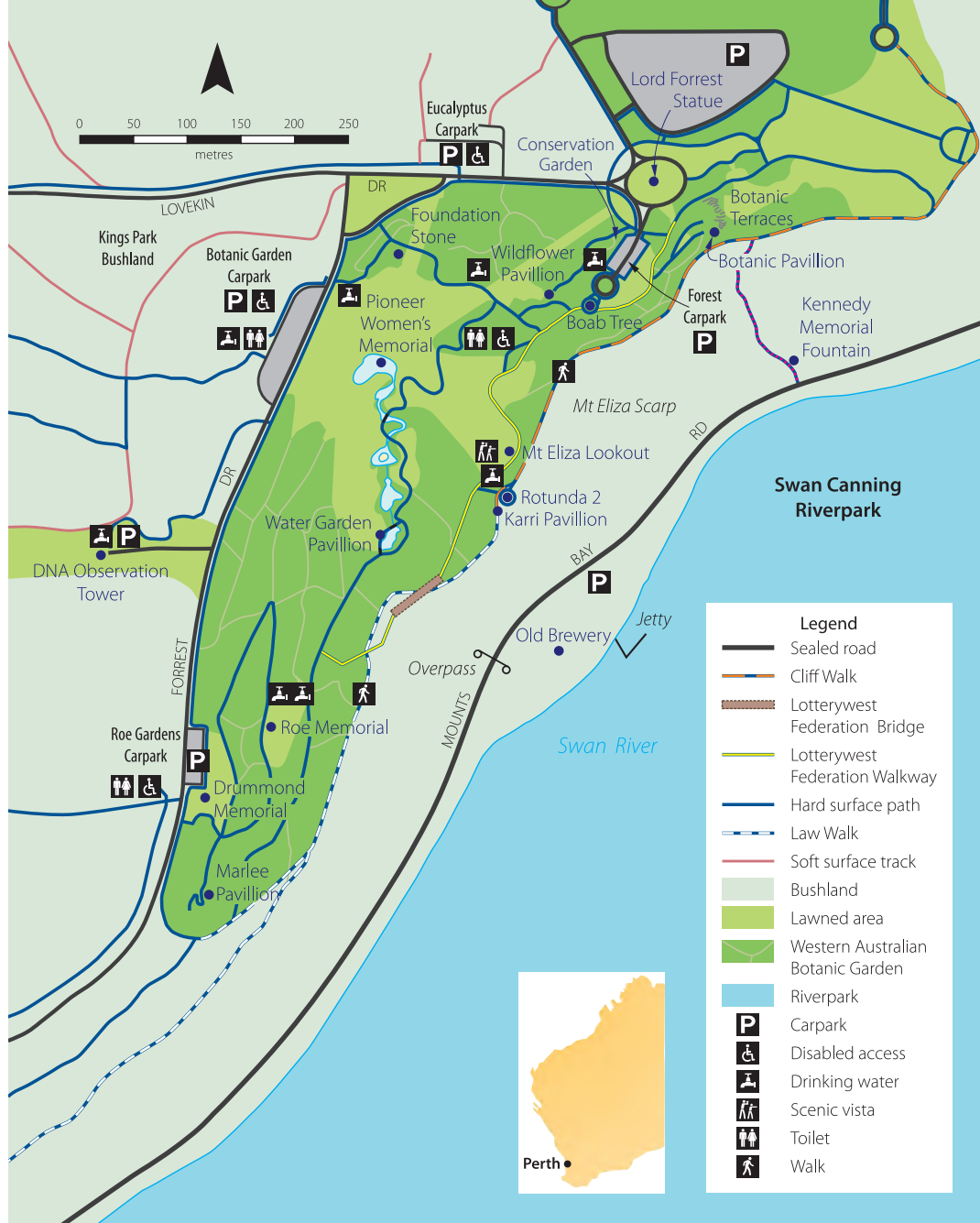
**Above** Conservation Garden, Kings Park.

*Photo – Jiri Lochman*

**Above right** Fraser Avenue, Kings Park.

*Photo – Marie Lochman*

**Inset left and right** Snapshots from the *Markr* app.



## FOUR PLANTS

Four plants have been profiled across the Conservation Garden with virtual signage appearing on mobile devices alongside the physical plants. Starting at the entrance near the roundabout, you'll find a *Markr* celebrating the diversity of *Darwinia* (mountain bell) species on display and sharing some of the key threats facing the mountain bells in the Stirling Range.

As you explore further into the Conservation Garden, you'll spot the purple flowered *Tetradthea aphylla* (pink eyes) with a matching virtual sign. This *Markr* shows the natural rocky habitat of

a related species *Tetradthea erubescens* and shares stories of scientific research to restore this plant in the wild. These plants are 'born to rock', growing straight out of banded ironstone with their roots winding through narrow cracks in the search for life-sustaining water and nutrients. If the plant isn't in flower at the time you visit, the *Markr* app will also show you a 3D virtual flower that can be zoomed in on and spun around to see how the flower looks from every angle.

Not far from there, you'll find a relatively recent addition to the Conservation Garden—the Collie spider orchid (*Caladenia leucoxchila*). Discovered

in 2008, the Collie spider orchid is known from approximately 800 individuals in a very restricted area and has seen a significant increase in population through conservation work conducted by DBCA scientists including Kings Park Science orchid expert Dr Belinda Davis. In 2021, the Collie spider orchid was planted into the Conservation Garden to be enjoyed by all.

.....  
**Top left** QR codes can be scanned to download the *Markr* app.  
*Photo – Jiri Lochman*

**Above left** Conservation Garden, Kings Park.  
*Photo – Marie Lochman*



**Above** Pink eyes (*Tetrateca aphylla*).  
Photo – Emily Denham



**Above right** Collie spider orchid (*Caladenia leucochila*).

**Right** Silky eremophila (*Eremophila nivea*).  
Photos – Andrew Brown



**Far right** This *Markr* sign encourages native gardening at home.  
Photo – Emily Denham



“People love WA’s unique orchids for their diverse and beautiful flowers and their quirky interactions with fungi and pollinators,” Dr Belinda Davis said.

“The Collie spider orchid provides the perfect vehicle to engage the public in understanding the conservation challenges faced by WA’s flora and tell stories about the considerable research effort that goes into protecting it,” she said.

“The orchid was chosen for the *Markr* app to help educate people about the ecology of the species and how their actions can contribute to conservation. The Collie spider orchid was also the first

orchid species to be put on display in the Conservation Garden, and its planting provided a prime opportunity to engage the park’s visitors with the *Markr* project.”

The *Markr* app shows what the tiny dust-like orchid seeds look like up-close and features a virtual 3D wasp pollinator.

“I think the virtual 3D pollinator is amazing,” Dr Davis said. “I love being able to zoom in and see the detail.”

“The wasp has only recently been named and is very difficult to see in the wild, so it is great to share the experience of seeing this thynnid wasp up close.”

Last on the trail, if you are familiar with native gardens in Western Australia, you might be surprised to spot the silky eremophila (*Eremophila nivea*) near the western-most entrance of the Conservation Garden.

The soft silver foliage and purple flowers make it a popular garden plant, but unfortunately this beautiful shrub is critically endangered in the wild.

The *Markr* signage explains the important role that gardeners can play in conserving native plant species, and also links to the Friends of Kings Park website



## United Nations Decade on Ecosystem Restoration

The stories shared through the *Markr* app are of particular importance now, during the United Nations Decade on Ecosystem Restoration (2021-2030), which the Botanic Gardens and Parks Authority signed on to last year. The aim of this UN Decade is to prevent, halt and reverse the degradation of ecosystems on every continent and in every ocean.

Kings Park is uniquely placed to be part of the solution. A special issue of the Friends of Kings Park's *For People and Plants* magazine showcases Kings Park's involvement in ecosystem restoration within Kings Park and Bold Park, and other delicate and fragile ecosystems across Western Australia. You can read these stories online at [friendsofkingspark.com.au/un-decade-on-restoration](http://friendsofkingspark.com.au/un-decade-on-restoration)

where you can purchase native plants for your home garden.

### AR WORLDWIDE

The opportunities presented by augmented reality are being explored across Australia and the globe.

The Royal Botanic Gardens in Victoria are currently utilising augmented reality in an exhibition called 'Seeing the Invisible'. Through a custom-made app, visitors can view artworks addressing themes of nature, the environment and sustainability. This exhibition is on display in 12 botanic gardens in six countries, including USA, the United Kingdom, Canada, Israel and South Africa.

Local Australian councils have also seen the benefits of engaging ratepayers with green spaces. The *Magical Parks* app transforms parks into fantasy spaces with educational games for children promoting a gentle message of conservation.

In Kings Park, the augmented reality journey has only just begun. Bringing together the wonder of discovery, rich educational content and visitor experience, augmented reality will continue to add another layer to Perth's number one tourist destination.

### PLUG IN

While opportunities to 'unplug' are still vitally important in Kings Park, virtual experiences like this can create new opportunities for engagement with native flora and foster an appreciation for the substantial work that goes on behind the scenes to conserve and restore Western Australia's precious biodiversity.

### SHARING THE STORIES

There are other *Markr* augmented locations in the park, including the State War Memorial and the Tobruk Memorial precinct on May Drive, that provide information about existing memorials and about new memorial projects commemorating the Korean War and the Battle of Crete. More augmented reality experiences are being considered for the future.

While you're exploring the augmented reality stories, spend some time enjoying all the spectacular species on show and be sure to share your photos online using the hashtag #kingsparkandbotanicgarden and consider planting native flora in your backyard for the protection of native species.

**Above left** Silky eremophila (*Eremophila nivea*).

Photo – Andrew Brown

**Above** Gilliam's Bell (*Darwinia oxylepis*).

Photo – Jiri Lochman

**Below** Other *Markr* locations include the State War Memorial.


Photo – Emily Denham



**Dr Laura Skates** is a botanist and science communicator working with Kings Park on environmental communications and research projects.

**Emily Denham** is a communications and marketing coordinator with the Botanic Gardens and Parks Authority. She can be contacted at [emily.denham@dbca.wa.gov.au](mailto:emily.denham@dbca.wa.gov.au)

The *Markr* app can be downloaded for free from Google Play or the Apple Store.

A group of seals is gathered on a sandy beach. In the foreground, a seal lies on its side, covered in sand. Several other seals are propped up on their flippers, looking towards the water. The background shows a clear blue sky, a calm sea, and a coastal town with houses and trees on the horizon. A small sailboat is visible in the distance.

# Saving sea lions

Creative conservation  
through science, art,  
fashion and education



Australian sea lions (*Neophoca cinerea*) are among the world's most endangered pinnipeds (seals, sea lions and walruses) and the only pinniped endemic to Australia. Unfortunately research shows their numbers continue to decline. A collaboration between scientists, a cartoonist, a fashion designer and students has resulted in a creative conservation fundraising and awareness program that is having continued success and growth.

by Marnie Giroud and Melissa Evans



However odd it may sound that a cartoonist, a fashion designer, a scientist and a teacher have come together, their combined passion for conservation has resulted in a successful, creative awareness and fundraising initiative based around Australian sea lions.

*Saving Sea Lions* involves Year 10 *Bush Rangers* at Rockingham Senior High School Education Support Centre. The students learn about the plight of the Australian sea lion, learn techniques to draw the animals and have their artwork printed on sustainable fabric, which is made into merchandise. Proceeds from the sale of the merchandise are then donated to the Australian Sea Lion Research Project.

.....  
*Previous page*

**Main above** Shoalwater Bay, Penguin Island.

*Photo – Marco Taliani de Marchio/Alamy*

**Main below** Australian sea lions (*Neophoca cinerea*).

*Photo - Sylvia Osterrieder*

**Inset top** Rockingham SHS Education Support Centre *Bush Rangers* viewing leggings.

*Photo – Helen Evans*

**Inset left** Kurt's drawing.

**Inset right** Dylan's artwork.

*Photos – Rachel Nixon*

**Top** Australian sea lion, Houtman Abrolhos Islands.

*Photo – David Bettini*

**Above right** Richard Campbell and Dr Holly Raudino assess a pup condition by size and weight at 6 Mile Island.

*Photo – Ross Anderson/WA Maritime Museum*

The *Saving Sea Lions* program has been so well received that it has been given the green light to run for a second year. The inaugural Year 10 *Bush Rangers* of 2021 are now Senior *Bush Rangers*, so the program is expanding to link with other conservation and education projects.

Given that Australian sea lions breed in colonies off the Western Australian and South Australian coast, the expanded program will include input from experts from both states.

## COMING TOGETHER

The concept for *Saving Sea Lions* came about after Marnie Giroud was speaking with *Bush Rangers* cadet leaders and education support teacher Rachel Nixon and education assistant Michelle Boyd from Rockingham SHS Education Support Centre to design an incursion for the *Bush Rangers* students around conservation on a local level.

Rachel and Michelle co-designed the sessions with Marnie to ensure that the content and activities were inclusive and achievable for students in the class who all have special needs.

“This working relationship with teaching staff and providers was an incredible experience for all involved as the students were able to fully engage with the project and not only learn about sea lions, but to also actively participate in an authentic learning experience that makes a real difference to our local patch,” Rachel said.



Marnie, together with Chandra Salgado-Kent who is a marine scientist, Associate Professor at Edith Cowan University and Director of Oceans Blueprint, and Melissa Cook, an international fashion designer from GIROUD, had been working on the *Sea Lion Tracks* project for two years prior to the *Saving Sea Lions* project.

The aim of the *Sea Lion Tracks* project was to combine science, fashion, education and art into a project to help conserve Australian sea lions led by female business owners based in Perth. When the opportunity to do something with a local school arose, the trio jumped at the chance to include students in the project and *Saving Sea Lions* was born.

## THE PROGRAM

Chandra introduced the biology and ecology of the Australian sea lion to



### Distribution of Australian sea lions



the students and explained her role as a research scientist studying them. Chandra has been conducting research with DBCA's Dr Kelly Waples, Dr Holly Raudino and Sylvia Osterrider among other contributors that aims to improve the conservation status of endangered Australian sea lions by gaining scientific knowledge on their critical habitat and behaviours.

Chandra showed examples of how scientific data is collected and the imagery of scientists and Department of Biodiversity, Conservation and Attractions (DBCA) marine rangers monitoring sea lions helped the students to understand their behaviours, which the students thoroughly enjoyed.

Chandra also highlighted a recent study co-authored by DBCA research scientists Dr Kelly Waples and Dr Holly Raudino with South Australian colleagues showing that Australian sea lion numbers

have fallen by more than 60 per cent in just four decades and scientists and managers are worried about the fate of the species.

With their minds full of information and their hearts wanting to do something to help, the students sat down with Marnie who showed them how to draw sea lion cartoons and illustrate the 'Be Seal Wise' conservation messages developed by DBCA.

Melissa Cook inspired the students with her message of sustainable fashion where 'made to order' clothes rather than mass production is cutting edge innovation in the world of fashion.

"The fashion industry produces between two and eight per cent of global carbon emissions," Melissa said.

GIROUD uses ethically-sourced fabric made from recycled plastics to make limited edition leggings featuring the students' designs.



Hear more about Australian sea lion conservation

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

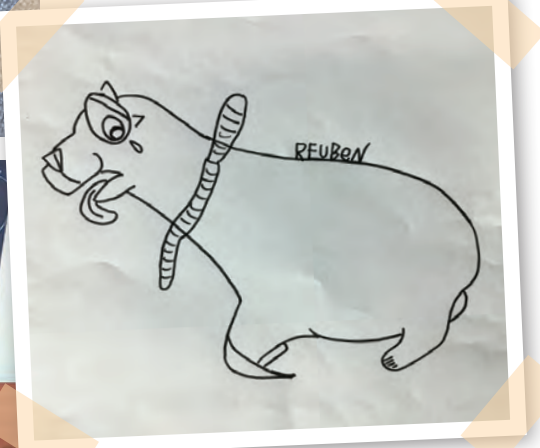


**Top** Australian sea lions.  
*Photo – Ruth Stephenson*

**Above left** Rockingham SHS Education Support Centre Bush Rangers and the *Saving Sea Lions* team.  
*Photo – Helen Evans*

**Above** Australian sea lion (*Neophoca cinerea*).  
*Photo – Alex Steffe/Lochman Transparencies*

Neuroscientist and former Chief Scientist of Western Australia Professor Lyn Beazley AO also spoke to the students at the final session on the importance of



**Top left** Leggings featuring the students' designs.

Photo – Marnie Giroud/DBCA

**Top right** Sarah and Kayde's artwork.

Photo – Rachel Nixon

**Above** Sea lion merchandise for sale.

Photo – Liz Grant/DBCA

**Inset** Reuben's drawing of an entangled sea lion.

Photo – Rachel Nixon

their creative work helping conservation and education and read a letter from Premier Mark McGowan congratulating the students on their efforts.

### KNOW YOUR PATCH

*Saving Sea Lions* is an opportunity for students from Rockingham SHS Education Support Centre to get to know their patch by participating in learning and action around threatened species. The project has been added to DBCA's popular *Know Your Patch* program of educational activities.

Joselyn Juraszek from *Know Your Patch* encouraged the students to continue investigating and caring for the local sea lions.

"The students should be congratulated for doing something about a local issue," Joselyn said.

"This is the first marine-based *Know Your Patch* project and is a great example of what the program is all about. Partnerships are really important in *Know Your Patch* projects, and we have a motto of working together, learning together, making a difference."

### GOING EAST

Sea lion research scientists around Australia were informed about the project last year through DBCA's marine science staff. Many sent words of encouragement to the students and purchased some of the products to show support for the education project.

These exchanges provided an opportunity for collaboration between the students and the scientific community.

Dirk Holman is a marine park manager for the Western Eyre Peninsula at the Department for Environment and Water and works in sea lion conservation and education in South Australia. His *Sea Lion Spotter* project is a citizen science project based on Dr Rebecca McIntosh's prototype 'seal spotter' enabling members of the public to count and classify pinnipeds in some of South Australia's most important breeding colonies.

# Be seal wise

Haul out sites in Perth waters are easily viewed by the public in the Shoalwater Islands and Marmion marine parks and, in some places, people can see the sea lions from mainland beaches.

When observing sea lions, it is important that you do so from a safe and legal distance. The *Biodiversity Conservation Regulations 2018* dictate the appropriate distances for viewing a sea lion in the wild. You must stay 100 metres from a sea lion if you are on a boat, 50 metres if you are in the water and 10 metres if you are on land. Avoid landing on islands where sea lions are resting as this can disturb them when they are taking a critical break between foraging bouts and breeding. Some islands are closed to people landing on them to ensure these refuges are reserved for sea lions to haul out.

**It's illegal to harass and disturb marine mammals. If you think an animal requires assistance, contact the Wildcare Helpline on (08) 9474 9055 and do not interact with the animal.**



## LET SEALS AND SEA LIONS FEED THEMSELVES

Feeding seals and sea lions may attract them to high risk areas where they can become entangled in fishing hooks and line. This can result in a lost ability to hunt for themselves, transference of disease and cause seals to become aggressive and harass people for food.



## TAKE YOUR RUBBISH HOME

Fishing lines, hooks, nets and rubbish can cause injuries to seals and sea lions. Pull your fishing line in until seals and sea lions have left and put your rubbish in a bin. Look out for our specially designed fishing line bins at various locations around the state.



## GO SLOW FOR THOSE BELOW

When boating, go slow especially over seagrass beds, shallow areas and in channels where marine wildlife feed. If a seal or sea lion approaches, slow down to avoid injury.

**DOGS AND AUSSIE SEA LIONS**

**DON'T MIX**



## DOGS AND SEALS DON'T MIX

If a seal or sea lion feels threatened, it may attack your dog. Some diseases may also be transferred between dogs and seals. If you come across a seal when walking your dog, put the dog on a leash and stay at least 10 metres away. If an unleashed dog is causing a problem, contact your local ranger for assistance.

Top Australian sea lion, Jurien Bay Marine Park.

Photo – Matt Kleczkowski

Background Seal Island, Shoalwater Islands Marine Park.

Photo – Rick Dawson

Insets clockwise from top

Australian sea lion with southern bailer shell (*Melo miltonis*).

Australian sea lion underwater at Jurien Bay Marine Park. Photos – Matt Kleczkowski;

Student artwork by Jaolyn. Photo – Rachel Nixon;

Australian sea lion caught in fishing net.

Photo – Dr Nick Gales/Lochman Transparencies



Senior students from Rockingham SHS Education Support Centre will be the first students in Western Australia to trial submitting their data for the *Sea Lion Spotter* project in class this year as part of their local *Saving Sea Lions* project in 2022.

These pup counts from images generated during unmanned aerial vehicle (UAV) surveys help scientists from the South Australian National Parks and Wildlife Service to monitor pup production and therefore population health and trends, and this work is critical in understanding sea lions and their recovery.

## THE PLIGHT

Australian sea lions are one of five sea lion species in the world and are listed as endangered on the International Union for the Conservation of Nature's (IUCN) Red List, with population numbers recently estimated to be below 10,000.

The threats they face include drowning in fishing gear and marine rubbish, habitat degradation, prey depletion, human disturbance, deliberate killings, disease, pollution and oil spills, and climate change.

As part of the *Saving Sea Lions* project, DBCA's Dr Holly Raudino, Dr Kelly Waples and Miecha Bradshaw explained to students about how they monitor and count sea lions and study their behaviour as part of their jobs.

Around Perth, marine rangers undertake monthly sea lion monitoring as well as intensive counts during the peak season. Rangers visit the six haul out sites

in Perth waters and record the numbers of sea lions and fur seals they see, as well as their age, class, behaviour and weather conditions.

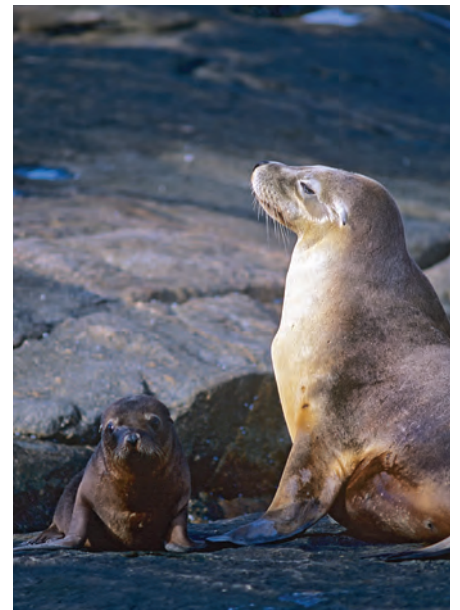
In Perth, the sea lions are mostly males that are resting after long foraging or breeding trips. Animals found around Perth are a mix of juveniles, sub adult males and mature males or 'bulls'. Approximately every 18 months they swim north to the islands off Jurien Bay to find female sea lions or 'cows' to breed with. When sea lion numbers in Perth are low, numbers are peaking in Jurien Bay.

Understanding trends in sea lion population size through monitoring helps managers understand if there are pressures preventing the species' recovery. They can then implement site-specific strategies that will help reduce the pressures on this endangered species.

## WHERE IT GOES

In 2021, the *Saving Sea Lions* project raised more than \$500 for sea lion conservation and education. The funds will be directed to producing video, photographic and communications resources to be used to share the experience of discovery and knowledge gained with community and the schools.

Oceans Blueprint will continue to provide educational support and engagement directly with the school and community as well as communication of the scientific discoveries and findings to community and government with partner institutions.



**Top left** Australian sea lion.  
*Photo – Associate Professor Chandra Salgado-Kent*

**Top right** Shoalwater Bay from Penguin Island.  
*Photo – Rick Dawson*

**Above** Australian sea lion and pup.  
*Photo – Jiri Lochman*

**Marnie Giroud** runs education programs through DBCA's education and behaviour change team. She can be contacted at (08) 9295 2244 or [marnie.giroud@dbca.wa.gov.au](mailto:marnie.giroud@dbca.wa.gov.au)

**Melissa Evans** is the district marine and riverpark coordinator with DBCA's Swan Coastal District. She can be contacted at [melissa.evans@dbca.wa.gov.au](mailto:melissa.evans@dbca.wa.gov.au) or (08) 9303 7787.

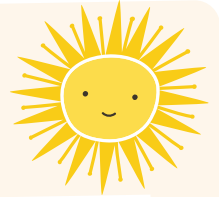
## Perfect pollinators

Plants can't move around to reproduce, so they need some help from some special animals designed for the job! Pollinators are animals that transfer pollen from one plant to another through beaks or proboscis. More than 20,000 species of bees, some flies, butterflies, moths, wasps, beetles, birds and bats are pollinators!

Australian Pollinator Week 12–20 November acknowledges our important and unique insect pollinators during spring and the Noongar season of djilba.



Join **The Wild Pollinator Count** during Australian Pollinator Week 12–20 November. Count the pollinators near you and contribute to scientific research!



## Pollinators and plants

Match the bird, bee and butterfly with the flowering plant they pollinate. Hint – look at the shape of their beak or proboscis.



**Chequered swallowtail**  
**Bindi Bindi**  
(*Papilio demoleus*)



**Western spinebill**  
**Booldjit**  
(*Acanthorhynchus superciliosus*)



**Blue-banded bee**  
**Ngoowak or Djilyara**  
(*Amegilla* sp.)



**Kangaroo paw**  
**Kurulbrang**  
(*Anigozanthos manglesii*)



**Little crith**  
**Berrung**  
(*Grevillea crithmifolia*)



**Coastal rosemary**  
(*Westringia dampieri*)



**Clockwise from top left:** Chequered swallowtail. Photo – David Knowles; Western spinebill. Photo – Dom Lim; Blue-banded bee. Photo – Kit Prendergast; Coastal rosemary. Little crith. Kangaroo paw. Photos – Rob Davis.

Answers  
Blue-banded bee & Coastal rosemary, Western spinebill & Kangaroo paw, Chequered swallowtail & Little crith

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



## Sacred kingfisher (*Todiramphus sanctus*)

Despite their name, the sacred kingfisher (*Todiramphus sanctus*) rarely eats fish. They mostly prey on insects and larvae, but also eat other vertebrate and invertebrate animals including reptiles. The medium-sized woodland kingfisher is found throughout most of Australia in open eucalypt forests, melaleuca swamps, mangroves, mudflats, and river or lake margins, farmland, parks and gardens. They are mostly blue-green to turquoise with white underparts and collar feathers as well as a black 'mask'.

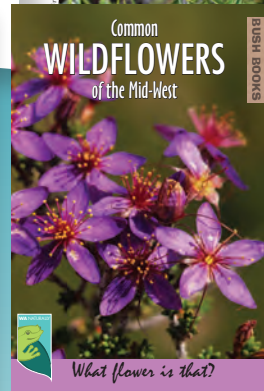
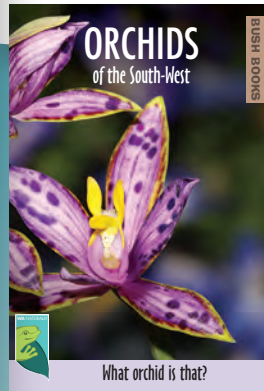
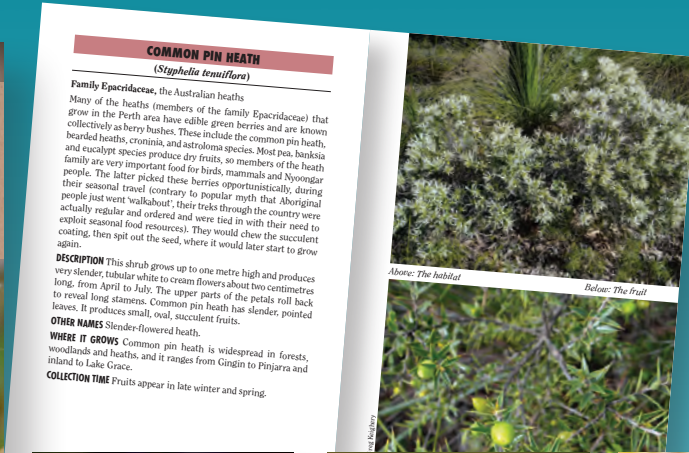
Illustration by Gooitzen van der Meer

Reference photo by John Anderson

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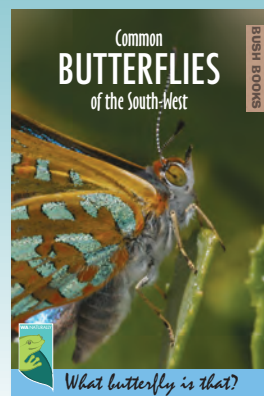


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