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WA'S PARKS, WILDLIFE AND CONSERVATION MAGAZINE

# LANDSCOPE

Volume 31 Number 1 Spring 2015 \$7.95

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## *Kunzea eriocalyx*

This pretty pink flower is known only by its scientific name, *Kunzea eriocalyx*. It occurs nowhere else in the world except three sites within Fitzgerald River National Park on the south coast of Western Australia.

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ON THE COVER

**Front cover** *Petrophile fastigiata* is a shrub that grows in sandy soils along the south coast, including in Fitzgerald River National Park. Its cream-yellow flowers bloom from September to November when it's a popular attraction for photographers.

Photo – Tourism WA

**Back cover** A red wattlebird feeding on a Hooker's banksia (*Banksia hookeriana*).

Photo – Andrew McInnes



Described as one of the last true wilderness areas in the world, Western Australia's Kimberley Region is spectacular. Its rugged gorges, ancient plateaus, pristine beaches and sweeping vistas make it one of the most beautiful places in the world, while its remarkable abundance of plants and animals makes it one of only 15 biodiversity hotspots in Australia. Traditional owners maintain a strong connection to and cultural responsibility for their country throughout the region, something which has been cultivated over many thousands of years. I've been lucky enough to call this amazing place home since 2007.

Parks and Wildlife has the fortunate responsibility to manage large tracts of this intact wilderness for future generations. With this comes an opportunity to set a new benchmark for effective joint management with traditional owners. This is being achieved through the \$81.5 million *Kimberley Science and Conservation Strategy* in partnership with traditional owners, many who have been employed to work with us on the country they call home.

To date, work is well underway to create Australia's largest national park as well as three new marine parks. Progress is also being made on a number of projects to better understand and therefore protect the area's spectacular natural and cultural values. Bushfire management, feral animals and weed control are also being tackled. You can read more about a highly successful weed eradication program that's being carried out in 'Weeding out Kimberley weeds' on page 41.

The Kimberley attracts more than 250,000 visits each year from people of all ages and abilities and the department is working to expand eco-friendly nature-based tourism. Providing opportunities for people with access issues is a priority and you can read more about what the department is doing on page 16.

Of course there are amazing areas all round the State, especially at this time of year when wildflowers bloom (see 'A journey of colour' on page 28). For those living in Perth, an opportunity to escape to a tranquil oasis exists right on their doorstep (see 'Adventure out: Kayaking on the Canning' on page 34), while further south D'Entrecasteaux National Park offers a stark contrast to the Kimberley (see 'Parks for People' on page 8).

I trust you'll enjoy the read and hope to see you in the Kimberley soon.

**Daryl Moncrieff, Kimberley Regional Manager**

Department of Parks and Wildlife

Contributing

**Rob Davis** has been with the WA Herbarium since 1991, originally involved in a range of botanical surveys from the State's bio-prospecting project to the Regional Forest Assessment. Rob now works as one of the WA Herbarium's identification botanists, confirming rare and priority flora, including identifying plants for Parks and Wildlife and members

of the public. As well as his plant identification role he is partly engaged in taxonomy, and is describing new species for the WA Herbarium journal *Nuytsia*.



**Sarah Barrett**

is a Parks and Wildlife flora conservation officer based in Albany. After starting with the department in 1994 she has been involved with biological surveys in mountains on the south coast region, *Phytophthora* dieback management, fire ecology, the Albany Regional Vegetation Survey, as well as threatened flora conservation. Sarah completed a PhD at Murdoch University which investigated the use of the fungicide phosphite to protect native plant communities from *Phytophthora* dieback.



**Wayne Schmidt**

is a forester and landscape architect who spent the majority of his career working with the Parks and Visitor Services Division in the former departments of CALM and DEC. Before his retirement in 2008, he and his wife Karen managed one of the department's ex-pastoral leases in the Murchison. Since then, Wayne and Karen have volunteered with the department and have helped department staff carry out disability access assessments of recreation sites and visitor facilities around the State.



## Publishing credits

**Editors** Rhianna King, Mitzi Vance.

**Scientific/technical advice** Kevin Thiele, Tracy Shea, Lachie McCaw, David Pearson.

**Design and production** Mandy Pike, Tiffany Taylor, Lynne Whittle, Gooitzen van der Meer.

**Illustration** Gooitzen van der Meer.

**Cartography** Promaco Geodraft.

**Marketing** Cathy Birch.

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### For more information contact us:

**In person** 17 Dick Perry Avenue, Kensington, Western Australia 6151

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**This page** *Rhodanthe chlorocephala*.

Photo – Andrew McInnes



Department of  
Parks and Wildlife



**PARKS  
PEOPLE**

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shot**



## READERS' PIC

**Sturt's desert pea** (*Swainsona formosa*)  
Bronck Gaca

"My wife and I travelled across the Australian continent a few times and spotted Sturt's desert pea with a red centre at Millstream Chichester National Park, and with black centres at Karlamilyi National Park (formerly known as Rudall River National Park)."

Flowers, like people, can be of the same species but have different colour forms, sometimes depending on where they are found.

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

## Heading east for a new life

Following a successful translocation in 2014, a second group of Western Australian chuditch have travelled to South Australia to repopulate the Flinders Ranges where the species once occurred. Forty chuditch – sourced from Julimar Conservation Park, Fitzgerald River National Park, Dryandra Woodland and the Upper Warren – were fitted with radio transmitters and will be monitored intensively for 12 months. They follow 37 animals that made the journey in 2014 (see 'Postcards to home,' *LANDSCOPE*, Summer 2014–15).

Chuditch, or western quoll, are about the size of a small cat and were once found across 70 per cent of Australia. Unfortunately, in the past 100 years, their distribution has contracted to south-western WA.

The translocation is part of the Chuditch Recovery Program and involves staff and volunteers from Parks and Wildlife, the Foundation for Australia's Most Endangered Species, the Native Animal Rescue and the South Australian Department of Environment, Water and Natural Resources.



## A fight for flight

A record number of rehabilitated Carnaby's cockatoos have rejoined wild flocks in the metropolitan area.

Thirty-six birds were given a second chance at life between June 2014 and June 2015, having recovered from injuries sustained in a range of ways such as being hit by cars, other trauma and shootings. One of the cockatoos made a remarkable recovery after being shot in the head, with a shotgun pellet narrowly missing its brain.

The cockatoos were rehabilitated and released in a collaborative effort by Parks and Wildlife, Perth Zoo and volunteers from Kaarakin Black Cockatoo Conservation Centre and Native Animal Rescue.

The latest group were set free in Kensington, one of Perth's nine super roost sites, in June 2015. Before they were released, DNA was taken from each bird and they were fitted with a microchip and leg band to enable ongoing monitoring.

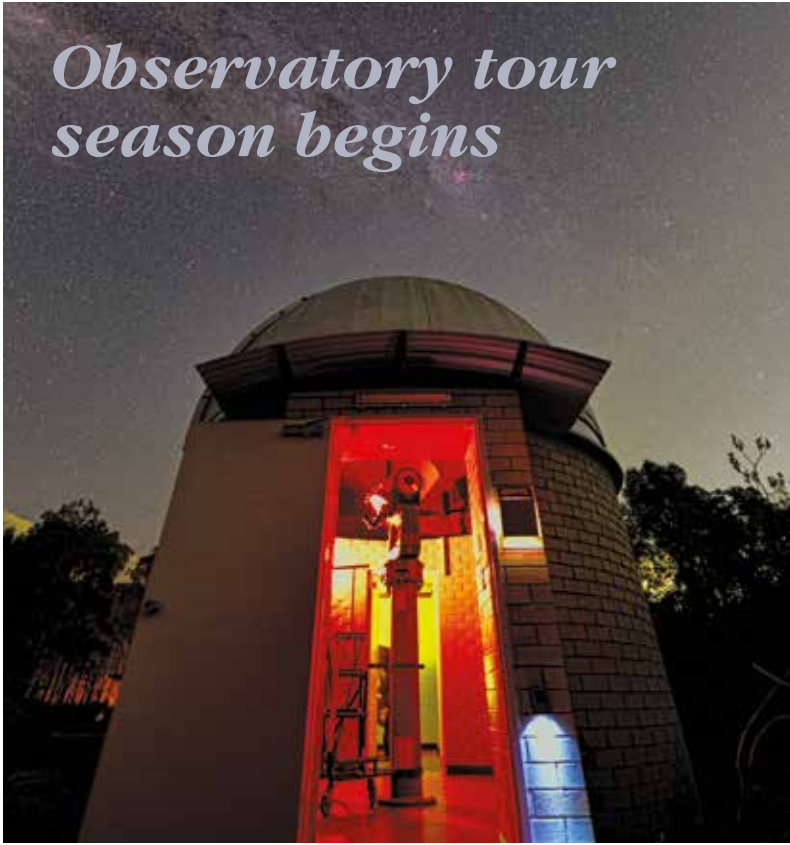
Nine red-tailed black cockatoos were also released during the year after making full recoveries. Rehabilitation of an injured cockatoo can take a number of years depending on the nature and severity of the bird's injuries.

**Above** One of the rehabilitated Carnaby's cockatoos returns to the wild.  
*Photo – Karen Smith/Parks and Wildlife*

**Below** Volunteers ready to release the Carnaby's cockatoos.  
*Photo – Parks and Wildlife*



# Observatory tour season begins



Above The Millennium Dome at the Perth Observatory.  
Photo – Andrew Lockwood

For more than two decades, Western Australian locals and visitors have been wowed by a closer view of the moon, planets and stars during evening tours at the historic Perth Observatory in Bickley. WA's oldest observatory runs its summer Star Viewing Night season from September to May each year.

This year's tour season will be the first to run under a new community partnership agreement between Parks and Wildlife and the Perth Observatory Volunteer Group, signed in June 2015. The agreement sees the 70-strong volunteer group partner with the department to continue and expand the public outreach program.

Experienced and passionate tour guides will be operating a unique collection of modern and historic telescopes to give evening visitors a glimpse into the fascinating world of astronomy, space science and astrophotography. Their viewing targets may be different depending on the month, the weather and the lighting conditions (dark, moonlit and full moon). Types of objects usually seen through the eyepiece include globular clusters, star clusters, nebulae and galaxies. Sometimes satellites and meteors flash across the sky unexpectedly too.

New offerings this year will include day tours using solar telescopes and special events to celebrate occasions such as Valentine's Day and Halloween.

In addition to hosting day and night tours, the Perth Observatory Volunteer Group offers group bookings, hosts lectures, maintains telescopes, manages the library and runs the observatory shop. For more information call (08) 9293 8255 or visit [www.perthobservatory.com.au](http://www.perthobservatory.com.au).

## Bush Telegraph

Rod Hillman – Guest columnist

CEO, Ecotourism Australia



Many years ago I had the privilege to work at the Valley of the Giants Tree Top Walk and then Yanchep National Park. These were (and are) special places that developed their own unique way of presenting their values and became key contributors

to their communities through employment, tourism opportunities and a place for the community to feel pride and bring their families and friends. The hundreds of thousands of visitors who continue to visit these sites leave with a better insight to why we protect certain areas, what makes them special and how they can become involved.

I went to WA because Western Australians were the leaders in presenting parks to people. They had commercially run enterprises in their parks and forests, a department-run week-long interpretive training school that was facilitated by the irreplaceable (and irrepressible) Gil Field, Steve Slavin at Hills Forest, Allen Grosse in the Kimberley and a whole team of brilliant landscape architects. No-one else in Australia had this talent or commitment, and it was an amazing time.

Time has moved on but Parks and Wildlife remains at the forefront of conservation tourism, continuing to implement new and innovative strategies such as the Review of Nature-Based Tourism and *Naturebank* and the *Parks for People* Caravan and Camping initiative.

I'm now with Ecotourism Australia – a non-government, not-for-profit organisation promoting ecotourism ([www.ecotourism.org.au](http://www.ecotourism.org.au)) – and this year I have the pleasure of returning to WA, as Parks and Wildlife is a sponsor of the annual Ecotourism Australia conference (Global Eco) ([www.globaleco.com.au](http://www.globaleco.com.au)) to be held on Rottnest Island 17–19 November.

A focus of the conference will be marine tourism and highlighting the efforts of high-standard tour operators to bring visitors to regions whilst promoting conservation benefits through interpretation and resourcing efforts. WA is again leading by example introducing new marine reserves near Karratha, Broome, Horizontal Falls and the North Kimberley that will provide yet more opportunities for tourism to partner with conservation.





## D'Entrecasteaux National Park

*A beautiful but unforgiving landscape, D'Entrecasteaux National Park is one of the most remote and pristine natural areas on Western Australia's south coast. With 130km of coastline, a rich cultural heritage, fascinating geology and a patchwork of vegetation types, it has long been a significant place for those who live in its embrace. Now it is gaining popularity among visitors who are seeking a rugged, hassle-free holiday.*

**Above** The beautiful Windy Harbour beach.  
Photo – Alicia Dyson

**Above right** Kite flying at Yeagarup Beach.  
Photo – Wendy Eiby

*Opposite page*

**Top** The spectacular coastal cliffs.  
Photo – Damon Anison

**Left** Black basalt columns at Black Point.  
Photo – Jiri Lochman

**Right** Bushwalking is a great way to explore the diverse vegetation types within the park.  
Photo – Alicia Dyson

**D**'Entrecasteaux National Park is steeped in rich history. Aboriginal people are believed to have lived in the area for at least 6000 years as it provided an abundance of food and fresh water. The park contains a number of culturally significant sites, including quarry, mythological and burial sites, as well as stone artefacts and fish traps. Lake Jasper, on the park's western side, is particularly important as there is evidence that the area was used as a major camp site. The place remains significant to the Piblemen Noongar people and a number of sites are listed on the National Register of Aboriginal Sites.

The area claimed a leaf in the European history books when, in 1792, Admiral Bruny D'Entrecasteaux led the largest scientific expedition of the 18th century

to explore Australia. His party consisted of two ships – *La Recherche* and *L'Esperance* – which carried 16 scientists from the French Society of Natural History. The party was uninterested in the area and it remained undeveloped, until the first farmers began settling there in the 1850s. The area had a number of uses, including pastoralism and mining before being gazetted as a national park in 1980. The gazettal came after local Forest Department staff developed the initial proposal for a coastal park.

### MODERN-DAY TREASURE

Since being declared a national park, D'Entrecasteaux has become entrenched in the itineraries of people travelling to the south coast. A new development at Black Point in the park's far-west offers an expanded camping area and facilities



“Local people have a long-held affection for this special place that surrounds their lives literally and figuratively.”



such as toilets, parking and a shelter. This has been made possible thanks to the State Government’s \$21 million *Parks for People* investment. The area is famed for its magnificent black basalt columns which originated from a volcanic lava flow some 135 million years ago. Upgrades to the lookout at Surfers Cove provide spectacular views across the Southern Ocean where

you might spot a whale passing on its migration north to warmer waters or south after calving, or seals and sea lions playing in the water off the point. This is a much-loved spot for fishers who are hoping to catch local salmon, and surfers chasing some waves.

Camping on the coast is possible at Banksia Camp, while more sheltered sites

are available inland at Carey Brook, Crystal Springs and Leaning Marri camp sites. A number of informal sites are also available within the park – perfect for people who are looking for a truly remote experience.

Local people have a long-held affection for this special place that surrounds their lives literally and figuratively. While many visitors to the park battle city traffic on their

# Parks for People D'Entrecasteaux National Park



way to and from their homes, members of the community of Windy Harbour drive through the spectacular national park. They have an affinity for the park and are involved in a partnership with Parks and Wildlife to manage it.

## EXPLORING THE PARK

One of the most special features about D'Entrecasteaux National Park is its diversity of vegetation types; in the space of a few kilometres, visitors transition between tall karri forest, to sections of jarrah and healthlands, before reaching coastal scrub. If you visit in spring and early summer, you will be treated to a spectacular wildflower display of species such as tree hovea (*Hovea elliptica*), coral vine (*Kennedia coccinea*) and clematis (*Clematis pubescens*). Visitors to the park can explore this natural phenomenon on foot or on one of the many walk trails – including the Bibbulmun

Track – which winds through the park on its way to Denmark. For four-wheel-drive enthusiasts, a network of tracks offers a more adventurous experience. Much of the park is limited to four-wheel-drive access and some tracks may be closed in wetter months to reduce the spread of dieback or in the warmer months due to bushfire management. A number of tour operators offer activities in the park, including boat cruises and eco-tourism experiences. Details of these operators can be found through local visitor centres.

**Top right** Camping at Broke Inlet.  
Photo – Cliff Winfield

**Above right** Lake Jasper, in the western side part of the park.  
Photo – Bron Anderson/Parks and Wildlife

## Do it yourself

**Where is it?** The park stretches 130km from Black Point, 35km east of Augusta to 10km west of Walpole. It lies 8km from Northcliffe and 40km from Pemberton.

**What to do:** Camping, bushwalking, nature observation, boating, fishing, surfing, beachcombing.

**Facilities:** Camp shelters, toilets, lookouts, four-wheel-drive tracks, walk trails.

**Nearest Parks and Wildlife offices:** Donnelly District Office, Kennedy Street, Pemberton, phone (08) 9776 1207. Frankland District Office, South Coast Highway, Walpole, phone (08) 9840 0400.

[parks.dpaw.wa.gov.au](http://parks.dpaw.wa.gov.au)



BRIGHTENING THE LANDSCAPE

# Stirling Range wattle

BY ANNE COCHRANE,  
SARAH BARRETT, REBECCA DILLON  
AND CHRISTINE ALLEN



With the quintessential yellow balls of colour common to other wattle species, and taking its name from the only place in the world it's found, Stirling Range wattle is facing a brighter future thanks to conservation work.

The Stirling Range wattle (*Acacia awestoniana*) was first discovered in 1933 by the Scottish-born Australian botanist Henry Steedman, but only formally described in 1990. It is only known from two small populations located in wandoo woodland adjacent to drainage lines within Stirling Range National Park in the south-west of Western Australia. As a consequence of its limited geographic distribution and low number of plants, the species was declared as Rare Flora in 1996, and subsequently ranked as 'Vulnerable' under International Union for the Conservation of Nature (IUCN) criteria.

This tall spreading shrub is killed by fire and its survival is totally reliant on recruitment from seed. This makes it vulnerable to inappropriate fire regimes because if fires occur too often plants will be killed before they reach reproductive maturity, depleting the soil seed bank and risking localised extinction.

On the other hand, too long between fires may also threaten its long-term persistence. It is believed that the decline of a small roadside population to just seven plants may have been due to natural aging of the plants and the absence of fire to stimulate the germination of new ones. However, the largest known population growing along Papa Colla Creek in the park suffered a serious decline in numbers after a wildfire in 2006. While good regeneration and speedy growth had been anticipated after the fire, surveys revealed that the new recruits were being heavily grazed and that the population size was less than that recorded pre-fire. Signs of grazing had been evident early on, but it was hoped that this was only a temporary impact.

By 2008 it was clearly evident that grazing was persisting and was slowing growth, preventing flowering and causing seedling mortality. Scats indicating a range of potential animal culprits were present including western grey kangaroos (*Macropus fuliginosus*), quokkas (*Setonix brachyurus*), brushtail possums (*Trichosurus vulpecula*) and rabbits. From 2010 a range of measures were undertaken by



Previous page

**Main and inset** Stirling Range wattle.

Photos – Anne Cochrane and Sarah Barrett/  
Parks and Wildlife

**Above** Stirling Range wattle was first described in 1990.

Photo – Anne Cochrane/Parks and Wildlife



● Stirling Range National Park

Parks and Wildlife staff to reduce grazing impacts including tree guards, wire and plastic mesh fences, all with mixed results. By 2012 the threat category for the Stirling Range wattle had been raised to Critically Endangered due to the low numbers of mature plants and the documented decline in population size, and an interim recovery plan was written for the species.

## BOOSTING PLANT NUMBERS

Fortunately, staff from the Threatened Flora Seed Centre in Perth and Parks and

Wildlife's Albany District office had been collecting seed from a wide range of plants of the Stirling Range wattle since 1994 and more than 25,000 seeds were in storage at the seed bank. This offered insurance against the loss of plants in the wild and in 2009 it was decided that more active management was needed to support the recovery of the species in the wild.

A plan to boost the small roadside population was developed and taken on by UWA PhD student Christine Allen, in association with staff from the



**“... Stirling Range wattle had been raised to Critically Endangered due to the low numbers of mature plants and the documented decline in population size ...”**

then Department of Environment and Conservation. Seeds were retrieved from storage, germinated at the Threatened Flora Seed Centre and grown at Kings Park. In autumn 2010, Christine travelled to Stirling Range National Park where she prepared two microhabitats (one in ‘open ground’ and the other under wandoo canopy) and developed three watering treatments (no water, weekly watering and monthly watering). Christine and a group of volunteers and department staff planted 864 seedlings into 24 fenced plots. Department staff established an additional 164 seedlings in five unfenced plots to investigate the effects of grazing on seedling establishment. During the next three years Christine took seedling measurements (including health of plants,

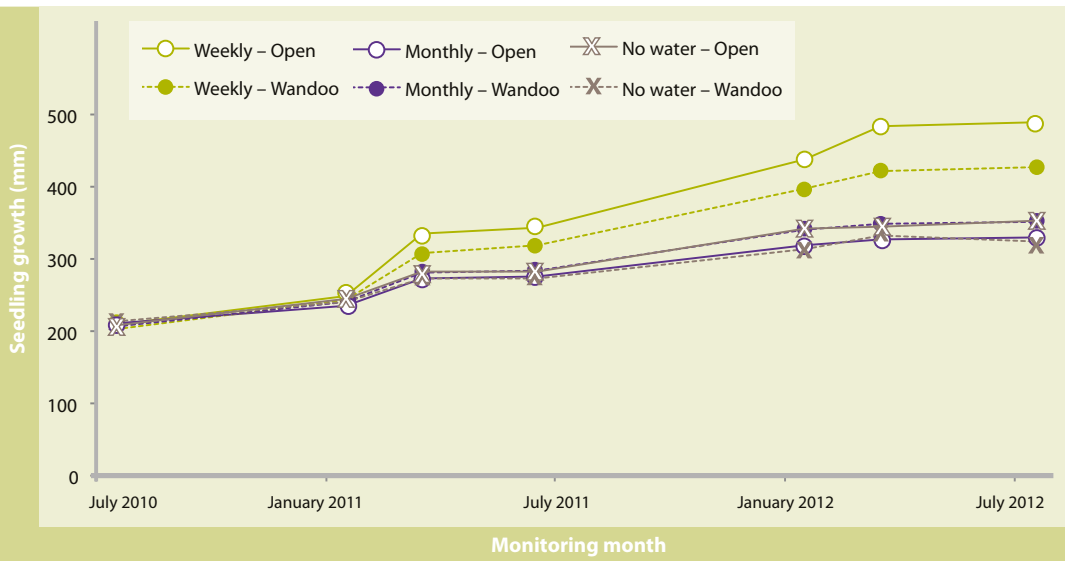
growth, herbivory and mortality) and conducted environmental monitoring at the site, in particular measuring soil moisture at different depths. Surprisingly, watering seedlings over summer did not improve overall survival compared with the unwatered seedlings. However, the combination of microhabitat and watering affected growth, with the largest seedlings growing in weekly watered plots away from competing wandoo roots (see graph on page 14).

Five years on, and the translocation is hailed as a resounding success. Mortality has been minimal, and three quarters of the seedlings planted in autumn 2010 were still alive and healthy in early 2015. Most plants had flowered and produced fruits. In early summer of 2014, bags were

**Above left** Erecting the fence around grazed juvenile plants.

**Top** A juvenile plant showing signs of being grazed.  
*Photos – Sarah Barrett/Parks and Wildlife*

**Above** Muslin bags were used to collect seeds from the translocation site.  
*Photo – Stephen van Leeuwen/Parks and Wildlife*



**Top and above** A comparison of seedling growth between those that received weekly watering in the open (top) and those that were not watered and planted under wandoo. Photos – Christine Allen



**Left** A brushtail possum caught on camera grazing on new tips of low Stirling Range wattle plants. Photo – Dylan Lehmann/Parks and Wildlife

placed over some of the developing fruits and more than 2500 seeds were collected from 21 of these translocated plants. Samples will be germinated in due course to determine their viability.

### MYSTERY MUNCHER

Remarkably, there were minimal signs of damage from invertebrates or vertebrates to the seedlings at the translocation site, even in the unfenced plots which had been established as a control. Seedlings were unpalatable to rabbits and were unscathed, despite rabbit diggings and scats within centimetres of unfenced seedlings on several occasions.

However, this was not the case at the wild population on Papa Colla Creek

that had been burned in 2006. Although plants in some sub-populations eventually escaped grazing pressure, in other sub-populations regular monitoring of tagged plants showed that grazing continued to severely damage plants and contributed to high rates of mortality, even where fenced. Remote cameras were installed in 2014 by Parks and Wildlife officer Dylan Lehmann and, surprisingly, infrared photos revealed that the culprits responsible for the grazing damage on young seedlings that recruited after fire were brushtail possums and not kangaroos or wallabies, as previously thought. On camera, possums were seen to specifically target the growing tips of smaller plants, including those within fenced enclosures,

and the limitations of fencing became obvious. However, once plants were of a certain height (0.5m), they appeared relatively safe from grazing ensuring at least some individuals managed to survive each year.

It is suspected that the differences in grazing pressure between the two populations is likely due to the Papa Colla Creek population having undergone a relatively recent fire, with large amounts of post-fire new green growth attracting herbivores to the scene. Dispersal of herbivores into this area would be facilitated by the population's location in a large tract of continuous bush in the national park. In contrast, the small



roadside population is situated within a much smaller linear remnant bordered by farmland and a main road. While rabbits thrive in this area, the possum population is likely to be much smaller, constrained by the area of habitat available and threats such as foxes and vehicle traffic.

## INTERPRETING SCIENCE

As the translocation was in an area within the national park that was regularly visited by people from the nearby caravan park, a path was created and signs erected, thanks to State Natural Resource Management funds, to explain why this

**Above** Gro-bags were used to protect seedlings from grazing.

**Above right** A demonstration plot is signed to provide visitors with insight into the project.

**Right** Signs provide information to help visitors understand and appreciate Stirling Range wattle and the efforts to protect it.

*Photos – Sarah Barrett/Parks and Wildlife*



recovery action had been conducted and to prevent possible damage to newly planted seedlings and fencing. It also created a new visitor experience.

## LOOKING FORWARD

The future of the Stirling Range wattle now looks more hopeful than it did some five years ago. However, if the translocation is to be considered a 'success' a new generation of plants must recruit and the population needs to be

self-sustaining. Unfortunately, at this stage, no new seedlings have been found but this is not unexpected as fire or other disturbances may be required before the seeds will germinate. Meanwhile, plants will flower and seeds will develop, disperse and be incorporated into the soil-stored seed bank eventually enabling seedlings to recruit in the future. The site will continue to be monitored on an ongoing basis and information will be provided to visitors to the park.

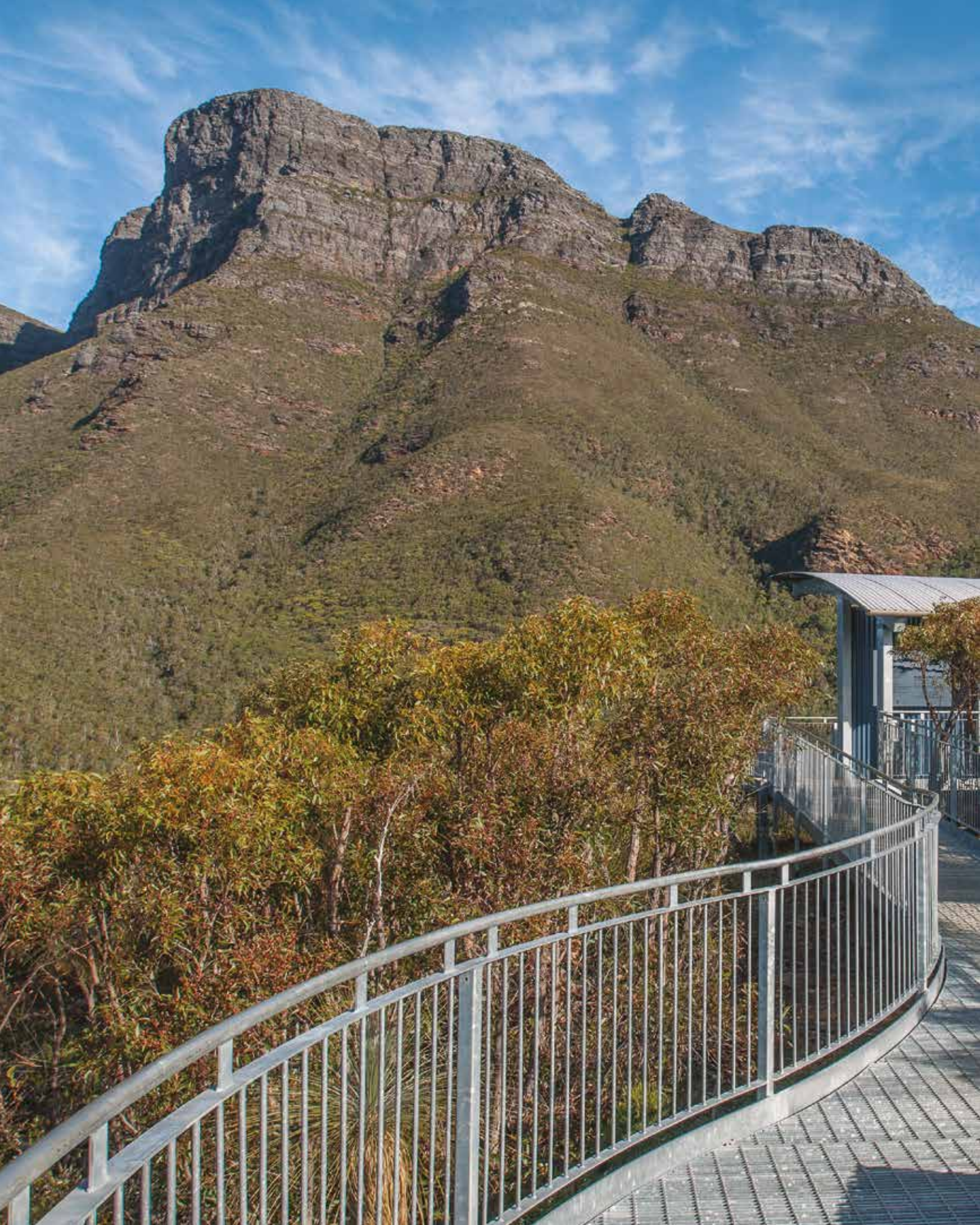


**Anne Cochrane** is a Parks and Wildlife senior research scientist (seed conservation) and can be contacted on (08) 9219 9062 or by email ([anne.cochrane@dpaw.wa.gov.au](mailto:anne.cochrane@dpaw.wa.gov.au)).

**Sarah Barrett** is a Parks and Wildlife threatened flora officer. She can be contacted on (08) 9842 4521 or by email ([sarah.barrett@dpaw.wa.gov.au](mailto:sarah.barrett@dpaw.wa.gov.au)).

**Rebecca Dillon** is a Parks and Wildlife research scientist. She can be contacted on (08) 9842 4538 or by email ([rebecca.dillon@dpaw.wa.gov.au](mailto:rebecca.dillon@dpaw.wa.gov.au)).

**Christine Allen** is Scitech's science partnerships catalyst. She can be contacted on (08) 9219 0739 or by email ([christine.allen@scitech.org.au](mailto:christine.allen@scitech.org.au)).



# Access for all

Western Australians and our visitors are spoilt for choice when it comes to enjoying beautiful, remote and fascinating places. But for the 20 per cent of Australians who have a disability, and their carers, a visit to the 'great outdoors' has not always been possible or practicable. Fortunately this is changing.

by Wayne Schmidt, Nathan Greenhill and Tracy Churchill



When it comes to experiencing the great outdoors, Western Australians and our visitors are among the luckiest in the world. Whether it's a casual family picnic or weekend camping trip with friends, an extended hike or mountain bike ride lasting a few hours to several weeks, fishing or surfing along a pristine beach, exploring remote outback tracks by four-wheel drive or participating in a myriad of other activities, we have it all. And along with interstate and overseas visitors, Western Australians are making good use of these areas. During 2014–15, more than 18 million visits were recorded to WA's national parks, marine parks, State forests and other reserves.

Parks and Wildlife has the important and challenging responsibility of protecting and conserving 28 million hectares of WA's natural environment and the diverse range of native animals and plants that occur there, while providing sustainable opportunities for people to access and enjoy these areas. It does this by providing a range of high quality, nature-based recreation and tourism opportunities and experiences, that encourage people to get out and enjoy nature, cater for them while they are there and are compatible with conservation and sustainable land management objectives. It strives to do this in a way that provides equitable access to everyone, including people with disabilities and the aged.

.....  
**Main** Bluff Knoll at Stirling Range National Park is one of many upgraded sites that now have facilities that cater to all people.

*Photo – Marie Lochman/Lochman  
Transparencies*

**Inset** People of all ages and abilities can enjoy sections of the Cape to Cape Track.  
*Photo – Friends of the Cape to Cape Track*



“Universal access is in part based on the fundamental principles of equal opportunity and equity and is underpinned by the basic Australian philosophy of ensuring a ‘fair go’ for everyone.”

## PEOPLE WITH DISABILITIES: NEEDS AND EXPECTATIONS

According to current figures, about 20 per cent or one in five Australians identify themselves as having some form of disability, which vary significantly in type and severity. For some people their disability is caused by sensory, cognitive and intellectual impairments, while others cause physical limitations. There are also many Australians who suffer from chronic illnesses such as arthritis or emphysema, and others who are temporarily incapacitated as a result of injuries and surgery. As human lifespans extend, the amount of disability experienced in our community will almost certainly increase.

So it is not surprising that the needs and expectations of people with disabilities is an issue of increasing national importance. Likewise existing Commonwealth and State legislation makes it unlawful to discriminate against people with a disability and these laws encompass the right to access and use public services. Fortunately, there is now wide recognition and acceptance within the community that people with disabilities deserve to have access to the same services and facilities as able-bodied people. This includes access to and enjoyment of WA's extraordinary natural areas. And this does not just

provide benefits to the individuals who have a disability, but their families, friends and carers who might otherwise miss out on experiences and opportunities too.

## UNIVERSAL ACCESS AND BARRIER-FREE DESIGN

Outdoor recreation planners and managers who work in natural areas have a dual responsibility. On one hand, they seek to provide a range of recreational opportunities and experiences for a diverse range of users. At the same time, they must ensure the protection and proper management of those very same natural areas that attract visitors in the first place. Successfully achieving these potentially conflicting objectives is a challenge.

Parks and Wildlife's *Disability Access and Inclusion Plan* sets out the framework to ensure that everyone in the community can access, use and enjoy mainstream facilities, services and programs. This is where the philosophy of 'access for all' or 'universal access' as it is sometimes termed fits in.

Universal access is in part based on the fundamental principles of equal opportunity and equity and is underpinned by the basic Australian philosophy of ensuring a 'fair go' for everyone. That is, all members of the community, irrespective

**Above** Visitors to Nambung National Park can explore the Pinnacles on universally accessible paths.

*Photo – Parks and Wildlife*

.....

of their age or ability, deserve to be treated equally and should be able to access and enjoy public services and facilities, which most of us take for granted.

Effective universal access is about designing 'barrier-free' places and spaces for the people who are going to use them. This can best be achieved by identifying potential access obstacles during planning and employing innovative or creative solutions to eliminate or minimise these in a way that is appropriate to the site, the environment and the community's expectations.

Although the concept of universal access is not new, it is only in recent decades that the process of providing equitable access has become mainstream in the planning, design and development of community facilities and services. While there is still some way to go, considerable



### *Did you know?*

Parks and Wildlife offers concession entry fees to people who hold a Seniors' Card, Age Pension, Disability Support, Disability Support (Blind), Carer Payment, Carer Allowance, Department of Veterans' Affairs (DVA), or a Companion Card. Accompanying companions/carers of a Companion Card holder are not required to pay entry fees. And Parks and Wildlife will consider waiving entry fees for organised outings for groups of people with disabilities and aged and infirm members, and education and study groups accompanied by their carers. Contact us if you would like to apply for a fee waiver. Visit [parks.dpaw.wa.gov.au](http://parks.dpaw.wa.gov.au) for more information or call (08) 9219 9000.



**Above left** Brenda Welsh enjoyed the Tree Top Walk with her seeing-eye dog.

**Above** Cape to Cape Track is suited to users of all ages and abilities.  
*Photos – Parks and Wildlife*

progress has been made to create more accessible environments throughout the State.

## EXISTING BARRIERS TO ACHIEVING ACCESS FOR ALL

There are a range of 'barriers' to achieving more accessible environments and creating facilities and services that are accessible to all. Arguably the biggest hurdle in the past has been a general lack of awareness about the specific access needs of people with disabilities and the aged, and an understanding of how these can be met through the application of universal access design principles. This issue is being addressed through legislation and standards, and through advertising and training programs aimed at increasing public awareness.

Another significant barrier is the nature of the physical environments in which we live, work and recreate. Planning and designing universally accessible facilities and services is difficult enough in our cities, suburbs and other built-up areas. However, in outdoor environments and natural settings such as those managed by Parks and Wildlife, the physical barriers frequently encountered are significantly greater. This is largely due to the inherent characteristics of

the natural environment and the fact that many of the most attractive and popular outdoor recreation settings are located in rugged landscapes with significant physical contrasts to urban environments. The design and development of universally accessible facilities and services in heavily wooded areas, steep river valleys, deeply incised gorges, rocky headlands, undulating dunes and beaches for example can be very challenging indeed.

In addition, building codes and Australian standards that guide the development of accessible buildings and facilities are most relevant for urban settings and are not particularly appropriate for rugged natural settings. Outdoor recreation planners and natural area managers are faced with the conundrum of how far they should go to create accessible facilities while maintaining the integrity of the experience that has attracted people in the first place. Developing accessible facilities often requires significant alterations to the landscape, and the provision of roads, car parking, trails, toilets and other accessible facilities could fundamentally impact the conservation values in remote locations.

One approach to overcoming this dilemma is to plan and manage for a

range of experiences and access levels on a continuum from highly developed and easily accessible, to remote areas with no assisted access and visitor facilities. Parks and Wildlife's recreation planners and land managers weigh up the need for accessibility against the protection of the area and employ the approach that facilitated access should be avoided where it will fundamentally alter the area's conservation values or the nature of the experience.

## CASE IN POINT

While all this is a challenge, there have been a number of wonderful success stories. The Valley of the Giants Tree Top Walk near Walpole is a great example of how innovative design can deliver user-friendly and accessible facilities that are environmentally sustainable.

# Looking for somewhere to go?

## *Here are some access for all attractions*



1

**Walpole-Nornalup National Park** – The facilities at the world-class Tree Top Walk facility are universally accessible and wheelchair hire is available.

**Nambung National Park** – View the Pinnacles Desert from the wheelchair-accessible path and soak up the information provided at the universally accessible Pinnacles Desert Discovery Centre.

**Yanchep National Park** – Access the gardens and barbecue facilities on a number of wheelchair and pram-friendly paths, journey around Loch McNess or through the koala viewing facility.

**Bluff Knoll, Stirling Range National Park** – Witness the scale of Bluff Knoll from the lookouts and picnic facilities located adjacent to the car park and lookout over the spectacular topography of the Stirling Ranges.

**Karijini National Park** – Soak in the cultural heritage and interpretation of the Karijini Visitor Centre or view the amazing folded geology and pools of Hamersley Gorge from the wheelchair-accessible lookout.

**Cape Range National Park** – Stay awhile in this beautiful park and camp beside the Ningaloo Marine Park at Kurradjong in assisted access camp sites with accessible toilets.

**Monkey Mia Conservation Park** – View the dolphins at feeding time from the wheelchair-accessible deck or roam the interpretation centre at Monkey Mia.

**Fitzgerald River National Park** – Visit many of the new recreation sites in the east of the park including the sculptures at Barrens Beach and the spectacular views from the Cave Point lookout while staying in the accessible Four Mile campground, or look out for whales from the shelters and viewing areas at Point Ann.

**Mount Frankland National Park** – Cast your eyes across the vast expanse of Mount Frankland National Park from the Wilderness View lookout or have a picnic in the wheelchair-accessible shelters.

**Camping** – Accessible camp sites, toilets and camp shelters have been constructed at Logue Brook, Conto Field, Osprey Bay, Nanga Mill and Credo campgrounds as part of the \$21 million *Parks for People* initiative, giving people with disabilities and their families a range of camping options.

There are also plans in place for campgrounds to include designated accessible camp sites and facilities such as toilets, camp shelters and trails at Shannon, Wellington, Cape Le Grand and Leeuwin-Naturaliste national parks and a day-use site at Lane Poole Reserve. And plans are ongoing for improved visitor access at Cape Naturaliste Lighthouse and in Kalbarri National Park. Parks and Wildlife is also providing assistance to tourism contractors at Wharnclyffe Mill and Wellington Forest Cottages to improve or provide for universal access within their lease areas.

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### *This page*

1 Experience the koala viewing facility at Yanchep National Park.

*Photo – Parks and Wildlife*

2 The Pinnacles, Nambung National Park.

*Photo – Tiffany Taylor*

3 Osprey Bay, Cape Range National Park.

*Photo – Peter Nicholas/Parks and Wildlife*

4 Fitzgerald River National Park.

*Photo – Jiri Lochman*

5 Bluff Knoll, Stirling Range National Park.

*Photo – Tourism WA*



2



3



4



5



“... she was particularly appreciative of the experience, having been able to enjoy it in the same way as any visitor who does not use a wheelchair.”



**Top** Samantha Jenkinson and her son Jared Geddes on the Tree Top Walk.  
*Photo – Michael Geddes*

**Above** Clive, Sally and Tracey Wright-Smith with campground host volunteers Barry and Jeanette Ewers with ranger Erin David and Tracey’s assistance dog Molly at Windjana Gorge National Park.  
*Photo – Courtesy of Clive Wright-Smith*

**Top right** Lookouts help everyone enjoy Deep Reach Pool.  
*Photo – Scott Godley/Parks and Wildlife*

Landscape architects and forest managers of the then Department of Conservation and Land Management worked with architects and structural engineers in designing and constructing a world-class visitor experience in a very challenging and sensitive setting. The resulting development received a number of state, national and international awards as well as the Disability Services Commission’s top honour in their 1999 Count Me In Awards.

For disability advocate Samantha Jenkinson the Tree Top Walk was a quality experience. As Samantha and her family reached the highest platform of the walk 40m above the ground, she said she was struck by the beauty of her surroundings, and a wonderful feeling of space among the treetops. Samantha’s comments echo those of almost everyone who visits the Tree Top Walk, yet she was particularly appreciative of the experience, having been able to enjoy it in the same way as any visitor who does not use a wheelchair.

Conversely, when the Bluff Knoll trail in Stirling Range National Park was upgraded,

it was deemed inappropriate to provide access for all to the summit. The trail to the top is very steep and challenging, even for people who have few physical limitations. Providing access for everyone, assuming it was even possible, would have required a huge amount of infrastructure at an enormous cost and would have forever altered the experience of the trail for all visitors. Instead, defined parking areas, accessible paths to viewing decks, toilets and other facilities were installed at the day-use area so those unable to make the very challenging trek to the top could still see and experience the landscape and seek the best view of Bluff Knoll possible.

Other examples of recreation site redevelopments where Parks and Wildlife has incorporated universal access into the planning and construction include the Fitzgerald River National Park Improvement Project, Pinnacles Desert Discovery Centre and Pinnacles Walk, a section of the Cape to Cape Track from Cape Naturaliste to Sugarloaf Rock, Hamersley Gorge in the remote Karijini National Park and an



accessible campground at the Perth Hills Centre. These sites provide impressive facilities and experiences for all visitors in a variety of landscapes.

## WORKING IN PARTNERSHIP

The impetus of Parks and Wildlife and its predecessors to improve accessibility to WA's parks and reserves can be partly attributed to the partnerships it has formed with organisations whose primary role is to serve the needs of people with disabilities and the aged. These include the Disability Services Commission's Community Access and Information Branch, ACROD and the Independent Living Centre. Their expertise, advice and support have proven invaluable in identifying and eliminating access barriers as well as improving staff awareness about the nature and extent of disability in the community through in-service training programs. On occasion, the department has also engaged the services

of various specialists such as occupational therapists who are skilled in technical planning and design matters and who regularly assist with the needs of the elderly and people with disabilities.

The department has actively supported the Disability Services Commission's 'You're Welcome' WA Access Initiative since its inception nearly a decade ago. This program aims to assist people with disabilities to access community life by encouraging businesses, State agencies, local government authorities and community organisations to make their services and facilities more accessible and providing detailed and accurate information about the accessibility of various facilities and services across the State, through its website ([www.accesswa.com.au](http://www.accesswa.com.au)). For its part, Parks and Wildlife staff and volunteers have completed detailed access assessments of several hundred of its

**Above left** The Natural Bridge lookout in Kalbarri National Park offers views across the cliffs.

**Above** The Perth Hills Discovery Centre provides a range of camping opportunities. *Photos – Parks and Wildlife*

nature-based recreation and tourism sites and facilities (from entry stations, parking areas, scenic lookouts, trails, campgrounds and picnic areas to visitor information and interpretive facilities) for inclusion on the website. Information such as the type and firmness of surfaces, the availability of accessible parking, the gradients of walkways and ramps, the width of doorways and the internal dimensions and manoeuvrability within toilet facilities have been recorded along with a comprehensive photographic record.

## LESSONS LEARNT

The implementation of the department's access for all principles and the planning and design of universally accessible recreation areas and facilities has not been without its challenges. Eliminating access barriers requires careful thought and informed planning coupled

*"... there's little point in spending tens or hundreds of thousands of dollars providing universally accessible facilities if visitors are unable to access these because of other access barriers not considered in the planning process."*



**Above** Families with prams enjoy benefits from access for all facilities.  
*Photo – Parks and Wildlife*

**Above right** Jamie Dunross.  
*Photo – West Australian Newspapers Limited*

### *Access facilitates life change*

For Paralympian Jamie Dunross, what started as a ‘trip down south’ became a life-changing move made possible by accessibility in WA’s national parks.

Jamie, who has been in a wheelchair since being injured in a mining accident in 1988, visited Mandalay Beach in D’Entrecasteaux National Park and was delighted to find it was accessible with assistance.

“I’ve travelled all over the world and had never seen anything like this – in fact it was more accessible in the national park than it was in town,” he said.

“Parks and Wildlife has got it really right and it’s not just at one spot as a token gesture, but across the board, within reason.”

“And this doesn’t just benefit people with access issues but also mums with prams who can come to these areas, use the paths and get a pram into the toilets where they can change their babies.

“People with scooters and walking aids can also use these facilities.”

Based on his experiences in the area, Jamie moved to north Walpole where he fully immersed himself in the local community and is credited for leading the reinvigoration of the yacht club which operates out of Walpole-Nornalup Marine Park.

“The local yacht club was looking to change its name or be shut down completely, but I asked them to hold off until I moved down,” he said.

“The yacht club had 50 years of history and is set in one of the most idyllic locations in the world; there are not many places where you have big trees coming into the water.”

A massive community collaboration to fix up the clubhouse revitalised the sport in the area, and the ‘Walpole in the Trees’ regatta has now become the largest regatta outside the metropolitan area.

“This event engages people from across Australia of all ages – from kids paddling in the water to the 80-year-olds who love the opportunity to get their boats out,” Jamie said.



with creativity; in many cases recreation designers and land managers have been required to come up with innovative solutions that are not specified in manuals or standards.

They have found immense value in consulting widely and seeking advice from intended users early in the process to gauge the needs and expectations of the community.

They have also found that many additional costs incurred to provide increased access can be avoided through careful planning and design of appropriate infrastructure. They also recognise the importance of identifying and eliminating all access barriers within a recreation site, however minor they might seem, as there’s little point in spending tens or hundreds of thousands of dollars providing

universally accessible facilities if visitors are unable to access these because of other access barriers not considered in the planning process.

### **A CLEAR PATH TO THE FUTURE**

People frequently interpret the word ‘access’ as only referring to physical access, but this is just one aspect of improving access to facilities and services for everyone in the community. While there have been many significant physical access improvements across the conservation estate that have benefitted all users, we have yet to comprehensively address the needs of people with sensory, cognitive or other disabilities. This, combined with a continued commitment to identify, minimise and eliminate the physical and social barriers which have

in the past prevented some members of our community from experiencing and enjoying the ‘best of the west’ will result in a more accessible park system, one that we can all be proud of.

**Wayne Schmidt** worked for the former departments of CALM and DEC and, since retiring, has assisted department staff carrying out disability access assessments of recreation sites and visitor facilities.

**Nathan Greenhill** is Parks and Wildlife’s Recreation and Landscape Unit coordinator. He can be contacted on (08) 9334 0420 or by email ([nathan.greenhill@dpaw.wa.gov.au](mailto:nathan.greenhill@dpaw.wa.gov.au)).

**Tracy Churchill** is Parks and Wildlife’s Visitor and Regional Services coordinator. She can be contacted on (08) 9334 0374 or by email ([tracy.churchill@dpaw.wa.gov.au](mailto:tracy.churchill@dpaw.wa.gov.au)).



# Scientific serendipity

A tropical cyclone might not seem like ideal conditions for good fortune, but when an unusual specimen was found near Exmouth, a bit of serendipity and the enthusiasm of a group of people has led to a very exciting discovery.

by Rhianna King

**P**arks and Wildlife senior wildlife officer Doug Coughran is one of those people who lives and breathes his passion. For 36 years, he has dedicated his professional career, and much of his personal time, to whales. He leads the department's whale disentanglement team and has refined tools and techniques that are now used in other parts of the world. He has travelled to other states and countries, sharing his knowledge on whale behaviour and keeps up-to-date with as much new research as he can get his hands on. Some, including his wife, might call him obsessive – a notion that Doug does not deny.

So there wasn't really anything out of the ordinary when, one weekend in February this year, Doug was at home flicking through the pages of a book

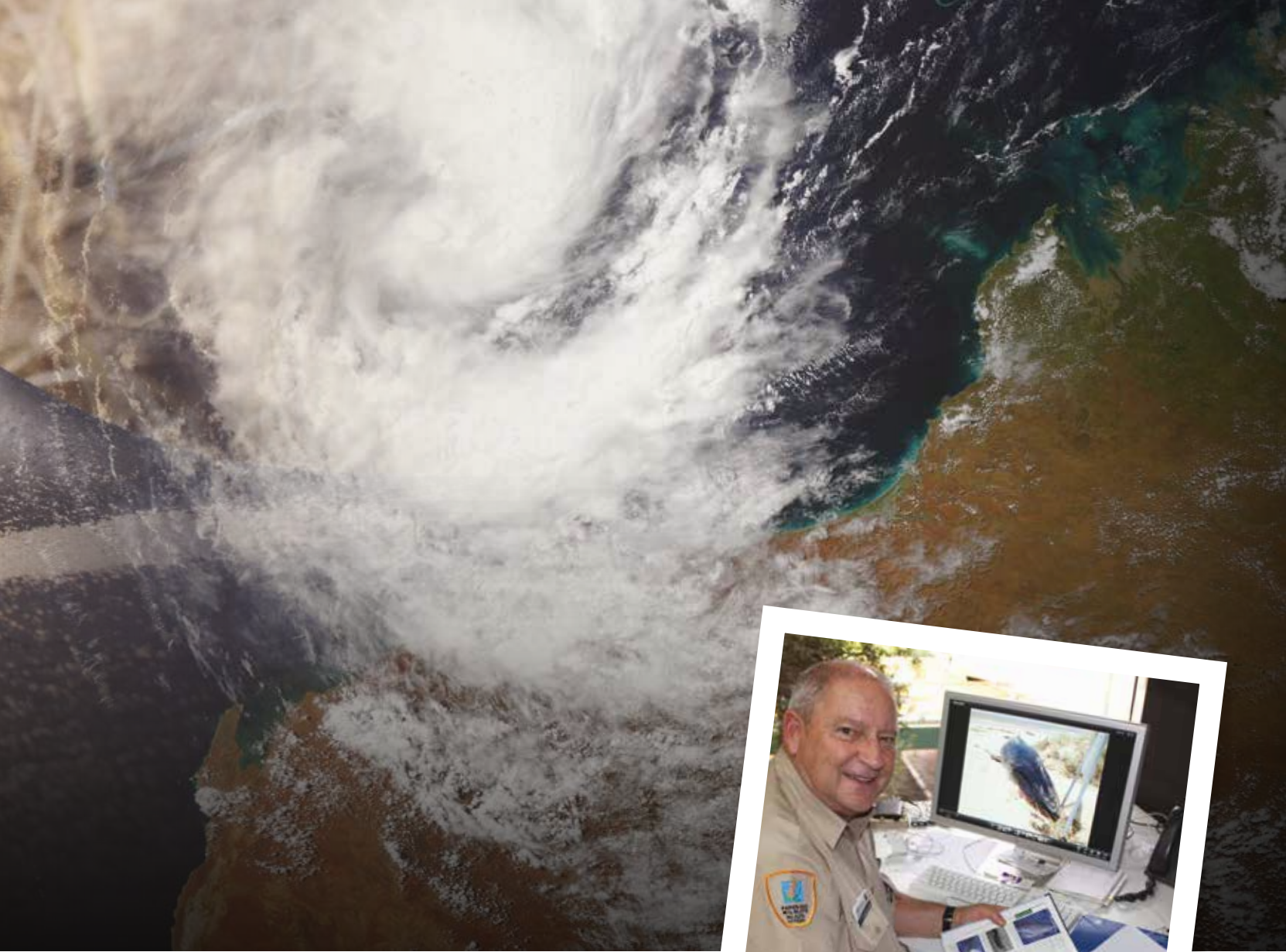
about whales that he'd picked up on his latest trip to the US and added to the collection of natural history library books that he started as a kid. That was until he reached a description of Omura's whale (*Balaenoptera omurai*) – a species that Doug had never heard of. The book included a description of its unique hooked fin but contained virtually no other information about the species, which only piqued Doug's interest further.

## A NEWCOMER TO SCIENCE

Omura's whale was only described in 2003 after whale expert Dr Tadasu Yamada was called to a remote island off Japan in 1998 to help identify a whale that had collided with a fishing boat. The whale had experts perplexed since it carried characteristics of a number of species.

An analysis of its skeleton revealed it was new to science. It was named Omura's whale after Japanese cetologist Hideo Omura, who helped make the discovery.

Then, in a twist of fate a few years later, Dr Yamada was at the Adelaide Museum being shown through the museum's collection and was amazed to discover that a skull collected on York Peninsula in South Australia in 2000, incorrectly thought to have belonged to a Bryde's whale, was that of an Omura's whale, making it the first specimen of Omura's whale to be confirmed in Australia. With each new specimen comes the opportunity to learn more about the species. But there were still many unknowns: Where does it live? What are its breeding habits? What is its life expectancy?



## AN UNLIKELY SETTING FOR SOME GOOD FORTUNE

Fast forward more than 10 years and Exmouth was hit by tropical cyclone Olwyn. In the lead up to the cyclone crossing the coast, meteorologists predicted it had the potential to cause widespread damage and destruction. Parks and Wildlife staff prepared for the worst and closed local parks while Exmouth residents stocked up on supplies and secured their homes and businesses. The approaching cyclone also attracted media attention with camera crews and journalists, including journalist Geof Parry from Channel 7, travelling to the area to report on the event.

Fortunately for the Exmouth residents, the cyclone, which crossed the



coast at 2am on the morning of 13 March, was nowhere near as destructive as was anticipated and turned out to be a bit of a non-event. Or so it was thought.

## A LEAD AND A HUNCH

There to cover the cyclone, Geof and his crew went in search of storm damage. Not finding any of significance, they

**Above** The distinctive hook-shaped fin of the whale that washed up in Exmouth piqued Doug's suspicions it might be an Omura's whale.

*Photo – Lyn Irvine*

**Background** Tropical cyclone Olwyn on 12 March 2015 as it neared the coast of Western Australia.

*Photo – NASA's MODIS Rapid Response Team*

**Inset** Doug comparing the photo sent to him with one shown in his book.

*Photo – Rhianna King/Parks and Wildlife*



**Above** The photo that Channel 7's Geof Parry sent into Parks and Wildlife for identification. Photo – Geof Parry/Channel 7

**Above right** A local team carried out a number of observations and took samples. Photo – Lyn Irvine

“... but when the image loaded on his computer and the whale’s hooked fin came into view, he suspected this might be one out of the ordinary. Could this be the same rare species he had read about just weeks before?”

instead followed a lead about a whale that had washed up on a beach. As part of his fact-checking process, Geof sent a photo of the whale to Parks and Wildlife’s media liaison officer Mitzi Vance in Perth who tracked Doug down on a day off to get the species identified. Doug routinely receives requests for identification from all round the world, but when the image loaded on his computer and the whale’s hooked fin came into view, he suspected this might be one out of the ordinary. Could this be the same rare species he had read about just weeks before? Back at home, Doug rechecked his book, which did nothing to allay his suspicions, and he spent a sleepless night waiting until he could contact his Parks and Wildlife colleagues at the Exmouth District office to enlist their help.

In the morning, Doug phoned Parks and Wildlife’s Exmouth District marine program coordinator Peter Barnes and shared his suspicions. Without hesitation, and understanding that time was of the essence to ensure the sample was as fresh as possible, Peter set out with marine

parks coordinator Heather Barnes, whale shark conservation coordinator Dani Rob, local vet Dr Megan Gall, and Institute for Marine and Antarctic Studies research scientist from the University of Tasmania Lyn Irvine.

An initial assessment of the 5.68m whale suggested that it had most probably died within the past 24 hours. This insight was significant because it indicated the whale had been swimming in the area and had presumably been alive at the time it stranded or had died very close to shore, meaning it had not just been washed ashore by the cyclone. The team took a sample of the whale’s skin and blubber, conducted an internal autopsy, took a number of photos and made physical observations. They assessed it to be a juvenile to young adult (depending on which species it turned out to be) and determined that it did not appear to have any obvious injury or illness.

Peter brought the special DNA cargo down to Perth where Parks and Wildlife research scientist Dr Kym Ottewell got to work to DNA profile the animal

and compare the results to records on GenBank – an international database. Being able to carry out DNA profiling ‘in-house’ using Parks and Wildlife’s state-of-the-art equipment and world-class expertise resulted in quick results and avoided having to send the samples to specialists overseas or outside the department, which could have taken months. Kym ran the tests twice and the results were conclusive. This was an Omura’s whale.

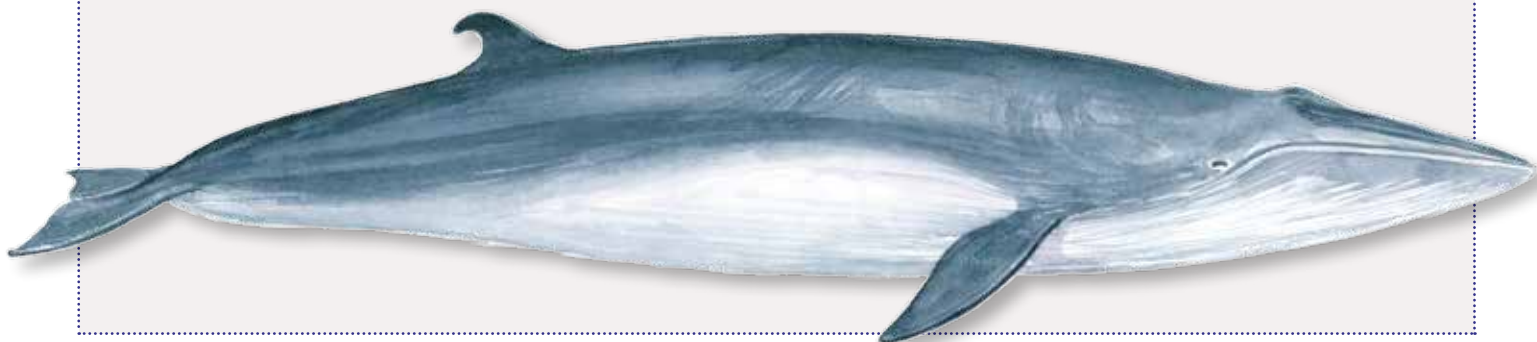
## EXCITING RESULTS

This find extends the known distribution of Omura’s whale and is only the second record in Australia. That it was a juvenile suggests there are probably others in our waters, and has made Doug suspicious that the whale in the Adelaide Museum may not be the only case of mistaken identity between Bryde’s and Omura’s whales.

But this whale tale is not over. The specimen has been buried so it can decompose and its skeleton can be recovered for future studies, which will

## ***Omura's whale (Balaenoptera omurai)***

Very little is known about the distribution, breeding habits and diet of the Omura's whale. From the three samples collected, Omura's whales are known to have a single median ridge along the top of the rostrum. It is similar in appearance to the fin whale and Bryde's whale but has a strongly hooked dorsal fin. There is sufficient evidence from molecular genetics to confirm that it is a valid species, different from Bryde's whale. It is an early offshoot of the rorqual whales (those whales with throat pleats of the family Balaenopteridae) and is currently thought to be more closely related to the blue whale. They are believed to grow to 11.5m and have several distinct morphometric features, especially in their skull characteristics. The Exmouth specimen will contribute greatly to much-needed information to better understand this newly discovered species of whale.



offer more information about this rare species. The finding has been written up as a scientific paper and submitted to the peer-reviewed *Aquatic Mammals* journal so the international community can learn from the discovery. No doubt it will also remain a highlight in the careers of those involved in finding, sampling and identifying it.

This case highlights the role that everyone can play in science; had Geof Parry not sent in the photo, this whale may have been buried without anyone ever knowing how special it was. Whale researchers and the community at large are encouraged to be on the lookout for this elusive species, which can be identified by its very hooked dorsal fin. Nowadays, when many people carry a camera phone with them wherever they go, everyone has the power to contribute meaningful information to science. Who



knows, a photo shot and shared, might provide clues about another rare species or even help identify another animal new to science.

**Rhianna King** is a *LANDSCOPE* editor and can be contacted on (08) 9219 9903 or by email ([rhianna.king@d paw.wa.gov.au](mailto:rhianna.king@d paw.wa.gov.au)).

**Top** Omura's whale.

*Illustration – Gooitzen van der Meer/Parks and Wildlife*

**Above left** Channel 7's Geof Parry reporting on the discovery.

*Photo – Channel 7*

**Above** Kym Ottewell carrying out DNA sampling on a portion of blubber taken from the whale.

*Photo – Rhianna King/Parks and Wildlife*





# *A journey of colour*

by Rob Davis

With nearly 10,000 species of flowering native plants, and new species being described all the time, Western Australia's south-west is an internationally renowned botanical hotspot. Just take a trip through this area from late-June to November for the magnificent and very colourful proof.

**W**hen most Western Australians think of wildflowers, they picture masses of everlastings spreading as far as the eye can see. However, the richness of WA's wildflowers extends well beyond this image. The south-west of the State is an internationally renowned botanical hotspot, rich in endemism, species numbers and floral diversity. It attracts international travellers, particularly from Europe and Asia, who specifically come to see our unique flora. And new species are still being discovered.

So when and where are the best places to go to experience these rich botanical treasures? In many places, some native plants will be flowering all year round, while in other places varying rainfall also dictates where the best flowers can be seen. Still, some general pointers can be given. The flowering season is influenced by temperature, so from June to August the warmer northern parts of the south-west are the best places to visit, while by October to November the southern coast is at its best. The

**“The south-west of the State is an internationally renowned botanical hotspot, rich in endemism, species numbers and floral diversity.”**



*Previous page*

**Main** Everlastings at proposed nature reserve Thundelarra Station.

*Photo – Cliff Winfield*

**Left** *Ptilotus macrocephalus*.

*Photo – Rob Davis/Parks and Wildlife*

**Below** Murchison wildflowers.

*Photo – Samille Mitchell*

Western Australian Herbarium's online resource *FloraBase* enables you to search botanical regions, flower colour and flowering times helping pinpoint what's flowering where and when.

### AWASH WITH COLOUR

From late-June the State's Midwest region starts to come alive with colour. Head up to the Shark Bay area and you can expect to get an 'outback' or 'station country experience' with open Acacia scrublands, Eremophilas, everlastings

and *Ptilotus* (mulla mulla). As you get closer to Kalbarri, a variety of sand-plain species appear including Ashby's banksia (*Banksia ashbyi*), sceptre banksia (*Banksia sceptrum*), coppercups (*Pileanthus peduncularis*), prickly plume grevillea (*Grevillea annulifera*) and white-plume grevillea (*Grevillea leucopteris*).

A little way south, the Geraldton area has a wide range of botanical species to explore; just north of the city are prominent rocky mesas, which in late winter to early spring take on a slightly mauve appearance from the masses of *Thryptomene* species. Howathara Nature Reserve is particularly stunning in June–July with *Thryptomene baeckeacea*, *Melaleuca megacephala* and *Grevillea pinaster* in full flower.

Coalseam National Park south-east of Geraldton provides the station country experience without having to go remote. Here you'll find Acacia woodlands with masses of everlasting like pompom head (*Cephalopterum drummondii*) in early spring.

South of Geraldton, around Dongara, is a stunning coastal limestone flora, with the large-flowered lilac hibiscus (*Alyogyne huegelii*). South-east of there, Tomkins Road and Mt Adams provide an outstanding drive through Yardanogo Nature Reserve, taking in typical low heathlands with species like Hooker's banksia (*Banksia hookeriana*), *Geleznowia verrucosa*, granite boronia (*Boronia cymosa*) and hairy leschenaultia (*Lechenaultia hirsuta*).

Lesueur National Park is one of WA's premier floral destinations. It provides a



# Wildflower hotspots

Mulla mulla. Photo – Andrew McInness



Black kangaroo paw. Photo – Marie Lochman



Everlastings. Photo – Andrew McInness



Common mountain bell. Photo – Babs and Bert Wells/Parks and Wildlife



Orange Morrison featherflower. Photo – Rob Davis/Parks and Wildlife



Pimelea ferruginea. Photo – Samille Mitchell



Shark Bay

June July August September October November

Coalseam Conservation Park

Lesueur National Park

Moore River National Park

Leeuwin-Naturaliste National Park

Stirling Range National Park

Fitzgerald River National Park

Royal hakea. Photo – Parks and Wildlife



## WIN a beautiful framed wildflower print

Enter for your chance to win a framed print of the stunning *Kunzea eriocalyx*. Exquisitely painted by Parks and Wildlife's own Gooitzen van der Meer (whose work also appears on page 27 and 54 of this issue) *Kunzea eriocalyx* occurs nowhere else in the world except three sites in Fitzgerald River National Park on the south coast of WA where it blooms between August and October.

To enter, simply send an email with your full name and address to [landscape@dpaw.wa.gov.au](mailto:landscape@dpaw.wa.gov.au) with the subject line 'Wildflower competition'.

WIN!



**Above** Bushwalking in Leeuwin-Naturaliste National Park is a great way to experience wildflowers.

Photo – Samille Mitchell

**Above right** *Pileanthus peduncularis* ssp. *pilifer*, a coppercup.

**Left** *Rhodanthe chlorocephala* ssp. *splendida*.  
Photos – Rob Davis/Parks and Wildlife

## PERTH'S DOORSTEP

Some of the more spectacular displays of wildflowers can actually be found on Perth's doorstep. Studies have shown that the Darling Scarp east of Perth has flora comparable to many of the well-known botanical destinations in WA. One place worth a visit is John Forrest National Park during September to October. The granite outcrops are always fascinating to explore and it is a good spot for 'belly botany' – getting down to see an astonishing array of tiny herbs like triggerplants, sundews and daisies on show. The *Eucalyptus wandoo* woodland gives a wonderful display of colour and trunk texture, and though poor in the number of woody shrubs they have a myriad of small flowering herbs.

variety of habitats to visit with patches of woodland, lateritic hills and kwongan heathlands. On the lateritic hills you can expect to see species such as spider coneflower (*Isopogon adenanthoides*) or the unusual *Daviesia epiphyllum* with its flattened blue-grey stem from which large bright red pea flowers emerge. On shallow sandy soils look for black kangaroo paw (*Macropidia fuliginosa*), summer coppercups (*Pileanthus filifolius*) and *Verticordia ovalifolia* with its stunning feathery pink flowers.

In coastal areas just north of Perth, places like Nilgen Lookout on the Indian Ocean Drive in Nilgen Nature Reserve make ideal roadside stops, with a great representation of coastal heathlands characterised by species like *Diplolaena obovata*, *Grevillea preissii*, *Acacia truncata* and cockies tongues (*Templetonia retusa*).

Our very own Perth urban banksia woodlands have an outstanding array of plants. There are the familiar firewood banksia (*Banksia menziesii*) and slender banksia (*Banksia attenuata*), but one of the more spectacular displays happens in early summer when Morrison featherflower (*Verticordia nitens*) comes into full bloom. The best places to see this species is just north of Perth at Moore River National Park or Boonanarring Nature Reserve; good patches can even be seen in Whiteman Park.

## FURTHER AFIELD

The south-west tip from Margaret River to Walpole gives the botanical enthusiast a broad range of habitats to explore. The Capes and Leeuwin-Naturaliste National Park have great examples of coastal flora, with species such as *Pimelea ferruginea*, coral vine (*Kennedia coccinea*) and thick-leaved



fan-flower (*Scaevola crassifolia*). The majestic karri forests, while not especially rich in vascular plant species, are places to find species such as karri dampiera (*Dampiera hederacea*), tall kangaroo paw (*Anigozanthos flavidus*) and karri boronia (*Boronia gracilipes*). For the real enthusiast, swamplands in this area have a great range of species many of which flower well into early summer, including the stand-out swamp bottlebrush (*Beaufortia sparsa*) with its fluorescent red flowers, along with many species of triggerplants, *Xyris* and sundews.

Further around the coast, Torndirrup National Park has a range of coastal limestone species as well as an interesting granite outcrop flora. Close by are the Porongurup and Stirling Range national parks, which contain numerous endemic

**Above right** The amazing royal hakeas at Fitzgerald River National Park.  
Photo – Tourism WA

**Right** Fringed lily (*Thysanotus manglesianus*).  
Photo – Rob Davis/Parks and Wildlife



species (see also 'Brightening the landscape: Stirling Range wattle' on page 11). The Stirling's Darwinias are probably the park's most iconic species. Away from the peaks, the sand-plains below have an incredible variety of species; in September look for a wide range of pea-shaped flowers from the genera *Chorizema*, *Gompholobium*, *Gastrolobium* and *Daviesia*.

The south coast jewel in the crown would have to be Fitzgerald River National Park. A declared World Network Biosphere Reserve, the park has more than 1500 species of flora, many of which are unique to the area. While September

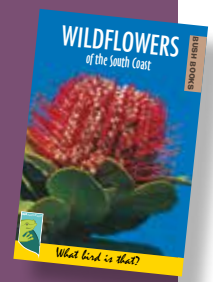
has a fantastic display of wildflowers, the season extends well into October–November. The iconic plant for the park has to be the royal hakea (*Hakea victoria*); while the flowers are well hidden, it's the colours of the cup-shaped leaves which intrigue plant enthusiasts. The colouration happens because of the nutrient-poor soils.

So, whether you're planning a day out in Perth's surrounds, a trip further afield, venturing along the coast or into the outback, pick the right time of year and you'll be treated to magnificent wildflower displays. You might even come across something that hasn't yet been described.



**Rob Davis** is an identification botanist at the Western Australian Herbarium. He can be contacted on (08) 9219 9124 or by email ([robert.davis@dpaw.wa.gov.au](mailto:robert.davis@dpaw.wa.gov.au)). The herbarium is part of an international network of botanical institutions and is responsible for documenting and understanding the diversity of WA's plants, algae and fungi. It has a number of functions including helping community, industry and researchers understand and identify plants, algae and fungi and contributing to taxonomic research.

One of Parks and Wildlife's best-loved Bush Book titles – Wildflowers of the South Coast – is back in print. This handy guide helps identify 46 wildflowers from Denmark to Esperance through easy-to-read descriptions and stunning photos. The area takes in the impressive Stirling Range, which houses more than 1500 species of which 80 are found nowhere else. It also includes Fitzgerald River National Park, which is an International Biosphere Reserve and has wonderfully rich flora, including a number of unusual species such as the royal hakea and Qualup bell. Like all Bush Books, Wildflowers of the South Coast is available for \$6.95 from Parks and Wildlife offices or from its online shop at [shop.dpaw.wa.gov.au](http://shop.dpaw.wa.gov.au). Bush Books are also available from good bookshops and visitor centres.



*Adventure out*

# *Kayaking on the Canning*

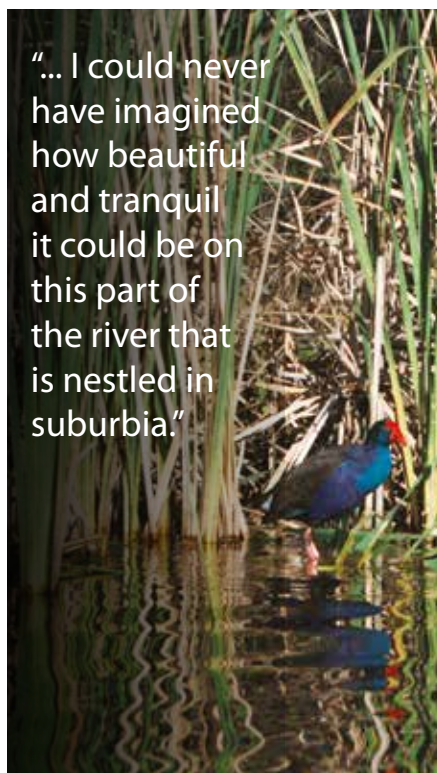
Tucked away in Perth's southern suburbs is the Canning River Regional Park and the river that runs through it – a tranquil oasis that provides an important habitat for a range of waterbirds. This beautiful area also offers people an escape from the hustle and bustle of city life to enjoy a moment of peace and quiet surrounded by nature, especially when explored on the water.

BY RHIANNA KING





“... I could never have imagined how beautiful and tranquil it could be on this part of the river that is nestled in suburbia.”



**Top left** The tranquil Canning River.

**Left** Kent St Weir bridge connects the north and south sides of the river.

**Top** A purple swamphen takes shelter in the fringing weeds.

*Photos – Rhianna King/Parks and Wildlife*

**Above** Cormorants are one of many bird species that frequent the area.

*Photo – Michael James/Parks and Wildlife*

**O**n a particularly chilly winter morning, my dad Brian Mooney and I journeyed to Kent Street Weir – just 9km from Perth’s CBD – to explore the Canning River on a kayak. I had expected that it would be a nice morning out, but I could never have imagined how beautiful and tranquil it could be on this part of the river that is nestled in suburbia.

Despite the 4°C temperature, Kent St Weir was busy with people walking their dogs and riding their bikes. But a few minutes after launching off on the still, calm water we were in a world of our own. Literally. Except for the occasional rumble of a plane flying overhead on its way to or from Perth airport, and the sporadic glimpse of a building through the trees, it was easy to forget our close proximity to houses, roads, businesses, parks and reserves. In fact, in the two hours of leisurely-paced paddling towards Mason’s Landing and back, we saw just a handful of people.

## LAUNCHING OFF

When it’s open, the Canning River Eco Education Centre provides a wealth of information about the natural and cultural history of the area and is a great place to visit before you head out to explore the river and surrounding Canning River Regional Park. The ‘Getting to know the locals’ display gives you an overview of some of the birds you’re likely to see in the area. But it doesn’t take long before you’ve seen more species than you can count on your hands.

We had barely paddled 20m from the weir when we spotted a male Australasian darter standing guard over its nest in the fork of a tree overhanging the river. The paperbarks, sedges and reeds, and fringing woodlands provide sanctuaries for a range of local and migratory birds, including spoonbills, swamphens, moorhens, coots, egrets, grebes, ibis, galahs, magpies and swans. The riverbanks and the outlying reserves are home to dugites, western tiger snakes and western bearded dragons, while, in the water, long-necked turtles, shellfish, gilgies and fish species such as Perth herring, tailor, common flathead,



**Top** Black bream is one of the fish that can be found in the area.  
*Photo – Matt Kleczkowski*

**Centre** Western bearded dragons can be found in the regional park.  
*Photo – Jiri Lochman*

**Above** Monitoring buoys control delivery of oxygen from plants used to oxygenate the Canning River.  
*Photo – Rhianna King/Parks and Wildlife*

yellow-eye mullet, black bream and cobbler live among the seagrass, snags and logs. These species provided an abundance of food for the Beeliiar people who travelled to the area during the summer months and referred to the river as ‘Dyarlgaard’.

Thanks to the Kent St Weir, the species found upstream are different to those found downstream. Built in 1928, the weir was designed to stop the movement of salt water upstream in summer so freshwater could be used for agriculture. Instead of the salt-hardy paperbarks found below Kent St Weir, upstream you’ll see the freshwater paperbarks, river banksia and reeds which all prefer the freshwater.

## GIVING NATURE A HELPING HAND

On our way to Mason’s Landing, we passed yellow monitoring buoys, one of the three oxygenation plants on the

## Do it yourself

**Where is it?:** The Canning River starts on the Darling Scarp and joins the Swan River at Melville Waters, just downstream of the Canning Bridge. Canning River Regional Park consists of the Canning River foreshore and adjacent areas between Nicholson Road Bridge in Cannington and Shelley Bridge in Riverton.

**Kayak hire and tours:** Guided tours and kayak and canoe hire is available from Kent St Weir. Contact visitor centres for more information.

**Facilities:** Barbecues, walk and cycle paths, picnic tables, playgrounds, Canning River Eco Education Centre, cafe, toilets, parking and lookouts.

**Canning River Canoe Trail:** The Canning River Canoe Trail runs from Mt Henry Bridge to Hester Park and takes between two and three hours. It can be done as a return day-trip with lunch at one of the cafes it passes along the way or as a picnic on the riverbank. Or it can be broken up over several shorter paddles, which are perfect for less experienced paddlers.

Canning River and paddled alongside sections of pipe delivering the oxygenated water. These are part of an effort to oxygenate the stagnant river, which began in 1998 in response to severe blue-green algal blooms upstream of the Kent Street Weir. Decomposing organic matter such as agricultural waste, debris and wastewater overflow caused the low oxygen levels in the river, which were made worse by the lack of water movement and algal blooms. This resulted in fish deaths and compromised the health of the river ecosystem. Today, water is taken from the bottom of the river and mixed with oxygen under pressure. It is then piped back into the river where it works to maintain a healthy environment.

Until 1 July 2015, the Swan River Trust managed the Swan Canning Riverpark while Parks and Wildlife, together with the City of Cannington, looked after the surrounding Canning River Regional Park. This area will be afforded even better care



A milestone has just been achieved in Western Australia's botanical history. A few weeks ago we passed the 10,000 mark in the number of native, vascular plant species<sup>1</sup> known to occur in the State.

As Mark Harvey and I have said before in this series, discovery of new species is a regular occurrence in WA, both in plants and animals. In fact, WA has one of the highest rates of new species discovery in the world, a combination of two factors: we live and work in a global biodiversity hotspot that has not yet been fully explored biologically; and we have teams of dedicated taxonomists at the WA Herbarium and Museum (linked with many colleagues elsewhere) who get a great deal of job satisfaction from finding, understanding and naming new species.

Taxonomic discovery is important for a whole raft of reasons. Most importantly, only by knowing what species occur in WA, where they occur, and how common or rare they are, can we plan conservation strategies and policies that will give the best chance of survival for all the species with which we share this State.

Secondly, knowing what species we have is a first step in uncovering a whole range of fascinating stories. Every species is a treasure-trove of stories – how it lives and thrives, how it interacts with other species, how it has evolved and what it can tell us about the recent and distant evolution of the land we live in and the creatures we share it with. These stories connect us with our natural environment, a connection that's becoming more and more important in handling the many challenges we and the natural world face.

And the 10,000th species is ... a very small and very rare (but pretty cute) daisy, named this year in the Herbarium's taxonomic journal *Nuytsia* as *Angianthus globuliformis* by Parks and Wildlife botanists Mike Lyons and Greg Keighery. It was discovered in 2000 growing on gypsum-rich dunes around the margin of a small salt lake in the Wheatbelt, and is still known from only one specimen from one location. It belongs to a small genus of



## *Angianthus globuliformis*

**“WA has one of the highest rates of new species discovery anywhere in the world.”**

about 20 species found in semi-arid regions throughout southern Australia, mostly in the south-west. As far as we know, it's extremely rare, and perhaps threatened by changing salinity level, grazing by feral animals, or climate change.

Other than that, we currently know next to nothing about *Angianthus globuliformis*. We don't know how widely or narrowly it's distributed, exactly how rare it is, or what its conservation needs and threats are. We don't know what pollinates it, what eats it, or how it survives in its rather inhospitable environment. We certainly have no idea whether, perhaps, it contains some chemical substances that one day may be discovered and found to cure disease or help humankind in some other way.

But that's the great thing about taxonomy. Now that we know that *Angianthus globuliformis* exists, have given it a name and collated and published the little we do know, it becomes possible to

discover more. The very next step will be to initiate more surveys to try to determine its distribution and conservation status. Once it's secure, then all the other stories that it may one day tell can be discovered also. Discovery – it's a wonderful thing.

<sup>1</sup> While we have just passed 10,000 species, the number is higher if we count the other taxonomic ranks. Some species are classified into two or more subspecies or varieties. Counting all species, subspecies and varieties gives more than 12,400 named kinds of vascular plants. Vascular plants comprise flowering plants, ferns, conifers and cycads.

**Above *Angianthus globuliformis***  
Photo – Mike Lyons/Parks and Wildlife

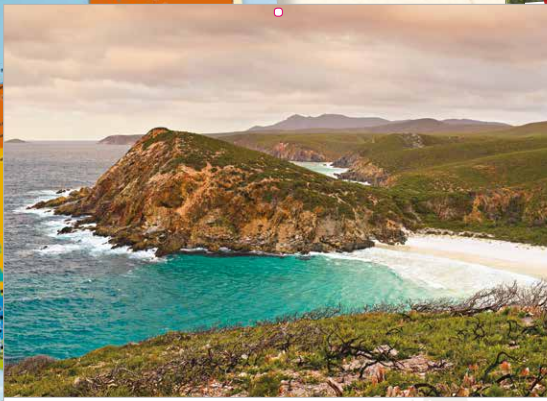
**Discovered** is a regular series prepared by scientists at the Western Australian Museum (Department of Culture and the Arts) and Western Australian Herbarium (Department of Parks and Wildlife).



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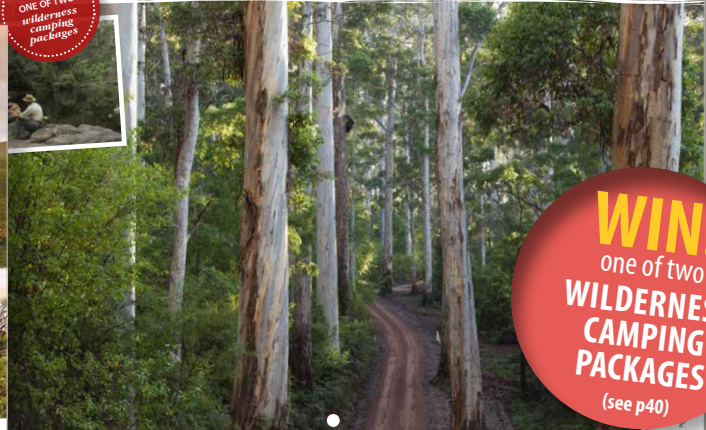
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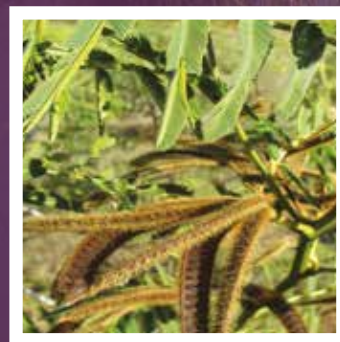




# ***WEEDING OUT KIMBERLEY WEEDS***

Each year since European settlement, seven to 11 species of exotic weeds have become naturalised in Australia, with many species affecting precious areas such as the State's far north. Work being carried out under the *Kimberley Science and Conservation Strategy* should see several species of Weeds of National Significance eradicated from the north Kimberley in the medium term.

by Greg Keighery



**W**eeds are a major threat to Australia's world-class biodiversity. They can alter fire patterns (for example, invasive grasses increase fuel loads and result in hotter, more frequent fires), modify soil characteristics or compete directly with native species. Currently, 2739 species are naturalised in Australia, or about 19 per cent of the flora. Even so, Australia is still comparatively free of weeds compared to countries such as Britain with 32 per cent and New Zealand with 51 per cent of their floras now naturalised exotics. Western Australia fares a little better than the nation, with 1239 weeds known or 12 per cent of the State's total flora. Most of these are found in the intensive land-use zone of southern WA. Because of limited agricultural use, low population densities, seasonal aridity and low soil fertility, Australia's tropical regions have lower percentages of weeds.

## WEEDS IN THE KIMBERLEY

Dealing with weeds is less like a war and more like trying to control a street party organised over the internet. There are the locals (native species), invited guests (agricultural and garden plants, some of which may misbehave) and the uninvited guests who need to be dealt with in varying ways. Dealing with such a large number of species present on many sites with differing access and tenure requires many hands and many approaches with input from the whole community.

In February 2015, Environs Kimberley organised a very successful workshop in Broome to bring together as many of the numerous players who work on weeds in the Kimberley as possible. This involved government (State, Commonwealth and local), non-government organisations, Indigenous ranger groups and land managers and, importantly, interested members of the public. A series of presentations on weed surveys and control led to the establishment of a Kimberley weeds action group.

The 2015 Kimberley weed list was updated for the workshop, resulting in a list of 306 species, comprising nine per



*Previous page*

**Main** Parks and Wildlife ranger Gary Edwards treats giant sensitive plant.

**Inset** Giant sensitive plant is known from three populations around Kununurra.

*Photos – David Chemello/Parks and Wildlife*

**Above** A grader grass infestation at Old Mitchell Homestead.

*Photo – John Hayward/Parks and Wildlife*

**Right** Trucking out neem (*Azadirachta indica*).

*Photo – David Chemello/Parks and Wildlife*



cent of the region's flora, compared to the Northern Territory, which has 237 species of weeds representing six per cent of its flora, the lowest percentage of any Australian state or territory. Most weeds in the Kimberley originated in tropical Africa, America or Asia and were introduced as garden, amenity or fodder plants. Most are annual or perennial herbs with small seeds that are usually dispersed in soil and by machinery, wind and water.

The departments of Agriculture and Food Western Australia (DAFWA) and Parks and Wildlife have undertaken systematic analysis (see both department's websites) of the list to prioritise the actual and potential weeds of the Kimberley. DAFWA is responsible for biosecurity and preventing serious weeds such as devil's claws (*Martynia*

*annua*), parthenium weed (*Parthenium hysterophorus*) and witchweed (*Striga asiatica*) not present in WA from entering the State, hence saving both the environment and agriculture from large future costs. Parks and Wildlife is responsible for managing weeds that impact on our conservation estate and has listed a series of weeds as 'alert species' that are potentially serious weeds for bushland but not yet recorded in conservation lands in the Kimberley.

Some weeds – such as escaped bananas present on Sunday Island, and various lawn and garden weeds – will never prove to be a threat to the Kimberley landscape. Others, including khaki weed (*Alternanthera pungens*), require removal from specific sites because of their impact on park visitors.



“Dealing with weeds is less like a war and more like trying to control a street party organised over the internet.”

### THE KIMBERLEY SCIENCE AND CONSERVATION STRATEGY

The Kimberley is essentially a large area of natural vegetation which, especially in the north Kimberley, has the appearance of unaltered wilderness. The north Kimberley is recognised as a stronghold for declining native mammals and an Australian biodiversity hotspot for endemic plants, snails, reptiles, frogs and mammals. To maintain this, the strategy’s Landscape Conservation Initiative aims to ‘retain current near pristine biodiversity and landscape values of the north-west Kimberley by preventing significant impacts from introduced animals, weeds, inappropriate fire regimes and other identified threats’.

The strategy recognises that the entire region has a low number of weeds compared to the highly altered landscapes of temperate Australia and that the focus should be on species that are highly invasive and can replace native species or alter ecosystem processes, rather than those already widespread and with low impact, for example, the asthma plant (*Euphorbia hirta*).

### FIGHTING THE GOOD FIGHT

The *Kimberley Science and Conservation Strategy* partners in the north Kimberley are having significant success in their attempts to completely eradicate several Weeds of National Significance with limited populations in the north-west Kimberley. These species include the giant sensitive plant (*Mimosa pigra*), the prickly acacia or nulla nulla (*Vachellia nilotica*, formerly *Acacia nilotica*), rubber vine (*Cryptostegia grandiflora*) and gamba grass (*Andropogon gayanus*). The partners are also working to prevent the introduction, establishment, spread and impact of already widespread invasive weedy plants in the north Kimberley, such as grader grass (*Themeda quadrivalvis*).

A declared Weed of National Significance, the giant sensitive plant (*Mimosa pigra*) from tropical America has infested 85,000ha of wetlands in the Northern Territory. In WA it is known from three small populations around Kununurra, especially on the eastern side of Lake Argyle, where a coordinated effort by Parks and Wildlife, DAFWA, the Water Corporation, Ord Land and Water

and the Miriuwung-Gajerrong Rangers is underway to contain and eradicate it. This will prevent the weed entering the north Kimberley.

Gamba grass is another Weed of National Significance and has had a serious impact in the Northern Territory. This robust tropical African grass grows to four metres tall and forms dense stands that increase fuel loads. It dries off late in the dry season and causes intense hot fires that kill many even relatively fire-tolerant woody plants. It spreads along roads via vehicles, machinery, graders, wind and in soil. Currently it is present in WA as a single population on El Questro Station in the east Kimberley where a combined effort by DAFWA, Parks and Wildlife and the Wunggur Rangers is attempting to eradicate this species before it can spread.

.....  
**Above left** A Yawuru ranger manually cuts and removes neem (*Azadirachta indica*).  
*Photo – Tracy Sonneman/Parks and Wildlife*

**Above** The Mitchell Plateau is one of the most spectacular areas in the landscape.  
*Photo – Rio Tinto*



“Fortunately grader grass has a relatively short-lived seed bank of three to five years, but is best controlled when flowering during the wet season.”

Another Weed of National Significance, prickly acacia or nulla nulla (*Vachellia* prev. *Acacia nilotica*), also forms a large infestation in the north Kimberley. This fast-growing African tree forms dense thorny thickets that choke out native vegetation. It is found sporadically over 10,000ha west of Wyndham. Ord Land and Water, under the auspices of the Rangeland Biosecurity Group, has been controlling this species since 2010 and has reduced the population by 96 per cent! Given this fantastic reduction, eventual eradication may be possible. However, it

has very long-lived seeds, so long-term monitoring and control will be essential. This species is a potential threat to all alluvial surfaces of the Kimberley.

Like gamba grass, grader grass (*Themeda quadrivalvis*) forms dense stands that increase fire intensities that kill trees and reduce fire-sensitive species such as mistletoes, and transforms parts of the north Kimberley into annual grassland. The fight against grader grass is being coordinated on stations and roadsides Kimberley-wide by the Australian Wildlife Conservancy and involves the

Shire of Derby-West Kimberley, Parks and Wildlife and the Wungurr and Unguu rangers. While this largely annual Indian grass is already present on more than 400km of roadsides, settlements, stations and some conservation areas, the aim is to stop further expansion and reduce infestation levels with some local eradication. Fortunately grader grass has a relatively short-lived seed bank of three to five years, but is best controlled when flowering during the wet season when access and working conditions are most difficult.

**Above** Kandiwal traditional owners Lionel Pindan, Selwyn Malay and Kade Malay, with Parks and Wildlife ranger Greg Goonack, and hand-pulled grader grass at Mitchell Plateau.

**Above right** Wungurr ranger Dean Smith spraying gamba grass at El Questro Station.

**Right** Ranger John Hayward spraying grader grass at Mitchell River National Park.

Photos – Richard Tunnicliffe/Parks and Wildlife





**Above** The hairy seed pods of the giant sensitive plant are easily dispersed.  
 Photo – David Chemello/Parks and Wildlife



**Right** Grader grass at Mitchell River National Park.  
 Photo – John Hayward/Parks and Wildlife

## THE REST OF THE KIMBERLEY

In the south and east Kimberley, the implementation goal for the *Kimberley Science and Conservation Strategy* is

*‘to enhance biodiversity values at a landscape scale... by significantly reducing the detrimental impacts of inappropriate fire regimes, introduced animals, weeds and other threats, focusing on selected high value assets, including pathways for these identified threats to impact on the north-west Kimberley’.*

This will be achieved by controlling damaging environmental weeds in areas where there is potential for significant natural habitat and species recovery over the long term. The impacts of weeds in the south and east Kimberley has already been substantial and there are many serious widespread weeds. Weeds such as buffel grass, noogorra burr, parkinsonia and leucaena are already impacting high value riverine habitats along the Fitzroy River and couch and buffel are degrading

wetlands of national and international significance (the Broome wetlands and around Lake Gregory).

However, Parks and Wildlife staff and ranger groups in their conservation reserves and areas of activity are working to reduce weed impacts throughout the area, including neem (*Azadirachta indica*) in Yawuru conservation estate around Broome, buffel grass on the Dampier Peninsula by the Bardi-Jawi and numerous weeds in the national parks along the Fitzroy River. Local governments, Rangelands NRM and community groups are educating the public about weeds in their towns and are the major hope in reducing or eradicating new weeds that are still emerging. These include neem, a tree native to east Asia with bird-dispersed fruits that is extremely invasive in native ecosystems, spreading from plantings in towns throughout the region. We will only prevent this and many other species from invading the entire Kimberley by concerted and coordinated efforts of many groups in the region.

So after careful initial planning the party is in full swing. We know the locals, the invited guests and their tendencies that need managing and hopefully have a greater awareness of those guests we won't invite or how to control those who come uninvited.

**Greg Keighery** is a Parks and Wildlife senior principal research scientist. He can be contacted on (08) 9219 9043 or by email ([greg.keighery@dpaw.wa.gov.au](mailto:greg.keighery@dpaw.wa.gov.au)).

*Want to join the party? Parks and Wildlife and DAFWA invites members of the public to assist by keeping an eye out for weed species in the Kimberley, particularly weeds of national significance. Please go to the WeedWatcher section of DAFWA's website ([www.agric.wa.gov.au](http://www.agric.wa.gov.au)) to learn how to recognise these species and for reporting details.*





## PARKFINDER WA Application

ParkFinder WA – a new app produced by Parks and Wildlife – is a free one-stop-shop for people wanting information about 150 parks and reserves in Western Australia. Launched earlier this year, the user-friendly app is loaded with information that caters to those who know WA well and are looking for somewhere new to explore, and for visitors wanting information about what to visit and when.

You can find parks close to you on an interactive map, or search by name. Then you can access information about what sites you'll find, what activities and facilities are available, whether entry fees apply and how to get there. You can even filter your searches to find the activities and facilities you like and save them to your favourites lists or share with your friends on social media. You can also check whether dogs are allowed and if camping is available, and browse photos of each site.

The app is linked to the Parks and Wildlife Explore Parks WA website so the information always stays up-to-date, and information about fires and park alerts is published when it's available. So, whether you're looking for a nice spot for a weekend picnic, or you're setting off on an epic adventure, this app is sure to be a valuable addition to your travel kit.

*ParkFinder WA is available for free download from iTunes with plans to launch an Android version soon. For more information, visit [parks.dpaw.wa.gov.au](http://parks.dpaw.wa.gov.au).*



## THE WILD SOUTH Photography book

Readers of *LANDSCOPE* would be familiar with the stunning photos of Damon Annisson, which regularly decorate the pages of the magazine. *The Wild South* – Damon's latest book – is a collection of his photos that capture the beauty of the State's south-west, taking in the south coast, and introduce the reader to some of the fascinating animals that live in these parts such as the pelican, humpback whale and kangaroo. Damon wows with his sweeping landscape shots, taken at different times of the day, and showcases some of the area's most interesting and diverse environments. His photos have a special way of making the viewer feel part of the scene, conjuring memories of fun holidays and family trips, or providing inspiration for future plans.

*The Wild South is available for \$16 from a number of visitor centres and retail outlets. For more information about Damon and his work, visit [www.damonannison.com.au](http://www.damonannison.com.au).*



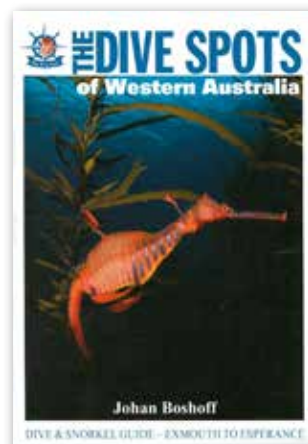
## THE DIVE SPOTS OF WESTERN AUSTRALIA Guide book

With more than 10,000km of coastline, Western Australia is blessed with an abundance of opportunities for spectacular snorkelling and diving – from the warmer tropical waters of the north which house magnificent coral reefs and animals such as whale sharks and manta rays, to the cooler parts in the south which are home to magnificent creatures such as the sea dragon. These diverse environments provide a range of diving and snorkelling experiences – some perfect for beginners and kids, while others provide a challenge to seasoned divers.

*The dive spots of Western Australia: Dive and snorkel guide – Exmouth to Esperance* is the latest in South African-born Johan Boshoff's collection of dive books.

It contains 175 dive and snorkel sites and provides helpful information such as GPS coordinates, average and maximum depths, descriptions of the dives and what you'll see. It also has a helpful starfish rating and includes general information about WA and water safety. Its pages are adorned by beautiful photographs and useful maps.

*The dive spots of Western Australia by Johan Boshoff is available for \$49.95 from [www.thedivespot.com.au](http://www.thedivespot.com.au) and from good dive shops.*



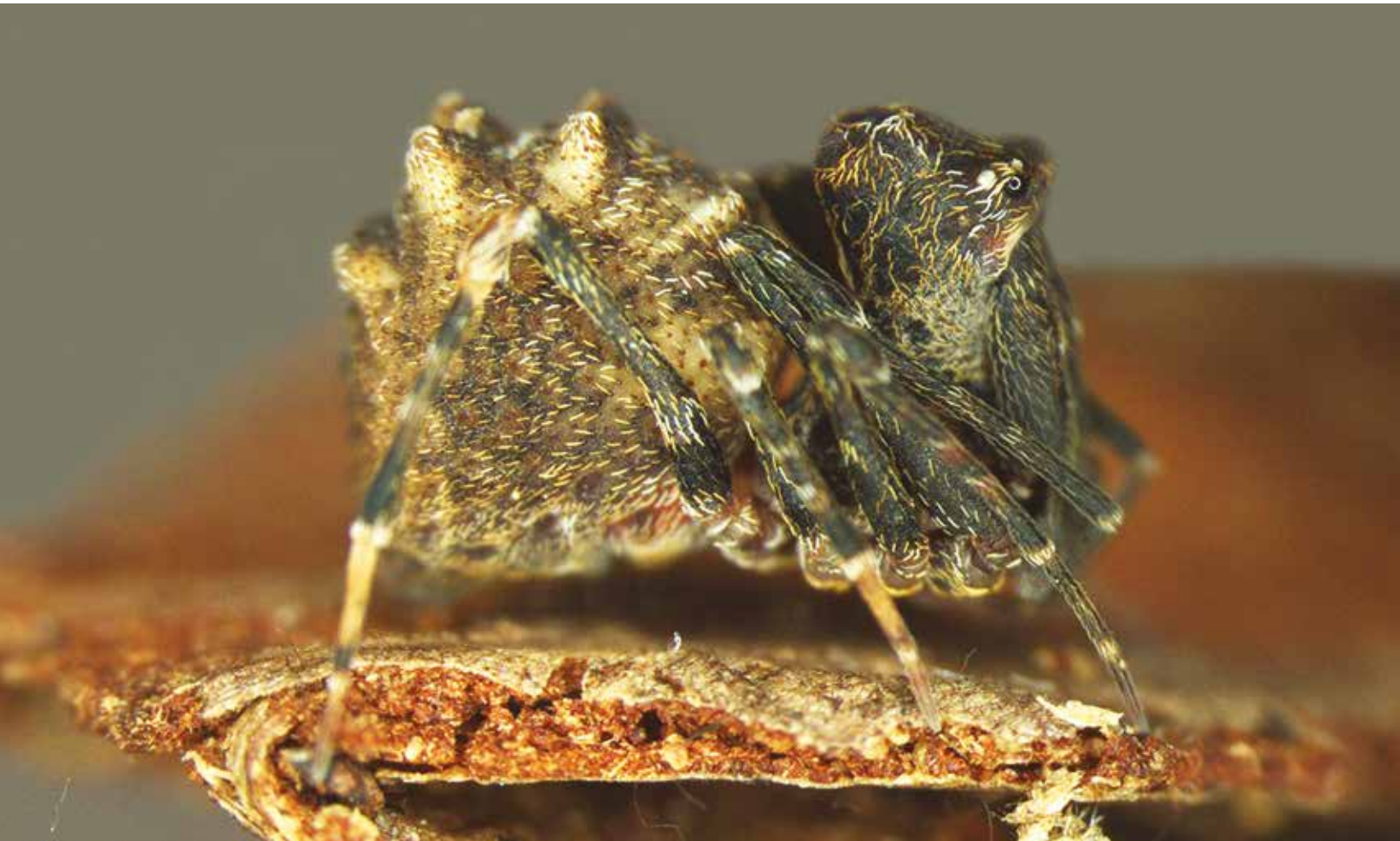


# UNCOVERING A SECRET WORLD ON THE SOUTH COAST

*Hiding beneath leaf litter and under rocks on the south coast lies a hidden world of spineless animals. Thanks to the tireless work of the South Coast Threatened Invertebrate Group we are getting a better picture of these amazing animals and how best to protect them.*

by Sarah Comer, Melinda Moir, Mark Harvey and Deon Utber





**T**he south-west of Western Australia is recognised as one of 34 global biodiversity hotspots, and while the flora and vertebrate fauna are relatively well described, the challenge of documenting invertebrate diversity is one that has kept the South Coast Threatened Invertebrate Group (SCTIG) members busy for nearly 15 years.

## UNDERSTANDING THE SPINELESS MAJORITY

To fully comprehend the challenges of invertebrate conservation it is important to understand some of the concepts that describe how little we know and what is being done. Invertebrates are ‘hyperdiverse’ – a term used to describe those organisms containing extremely high numbers of species – and of those that have been found, many are new to science and yet to be named. There is a bottleneck in describing these species, with only a very small percentage formally named in

published scientific literature each year due to the many species requiring names and the few taxonomists available to do the job. The term ‘Linnaean Shortfall’ describes this bottleneck situation, but doesn’t help to identify which species might require conservation. This is partly achieved by conducting surveys and examining records to determine how restricted species actually are, where they occur and, just as importantly, where they do not occur. This lack of knowledge on a species biogeography is referred to as the ‘Wallacean Shortfall’. So, while the importance of taxonomy is unquestionable, conservation managers also need to have some idea of which species are likely to need special attention for management.

Addressing this issue has been the focus of the SCTIG, which first gathered in 2001. A strong collaboration between staff from the Western Australian Museum, The University of Western

*Previous page*

**Main** Mark Harvey collecting invertebrates at Middle Island off the south coast.

*Photo – Sarah Comer/Parks and Wildlife*

**Bottom** The WA pill millipede (*Cynotelopus notabilis*).

**Above** A female *Zephyrarchaea mainae* found at Torndirrup National Park.

*Photos – Michael Rix/WA Museum*

Australia and Parks and Wildlife sought to address the initial challenge of identifying a particular subset of potentially threatened invertebrate fauna in the South Coast Region to improve conservation outcomes for these species. The expertise of specialists from the WA Museum, and the universities of Western Australia and Melbourne have provided the backbone for these efforts, with help from a number of Parks and Wildlife staff who have assisted not only with collecting



**Above left** *Samichus* sp. millipedes found at Two Peoples Bay Nature Reserve.  
Photo – Melinda Moir/UWA

**Above** An idiopid trapdoor spider burrow entrance found during SRE surveys of Fitzgerald River National Park.  
Photo – Alan Danks/Parks and Wildlife



**Far left** South Coast Threatened Invertebrate Recovery Team meeting.  
Photo – Melinda Moir/UWA

**Left** The idiopid trapdoor spider from the burrow above.  
Photo – Alan Danks/Parks and Wildlife

“The challenge of documenting invertebrate diversity is one that has kept the SCTIG members busy for nearly 15 years.”

invertebrates but also with taking up the challenge of incorporating invertebrate conservation into broader biodiversity management programs.

## IDENTIFICATION OF REFUGES

Given the observed increase in bushfires and the drying climate through climate change in south-western WA, SCTIG initially decided to target the groups of invertebrates that were dependent on relictual Gondwanan habitats, or those long unburnt pockets of vegetation likely to remain moist and damp throughout the year. ‘Relictual’ habitats provide the moist conditions that many specialised invertebrate species prefer, and were deemed a good place to start looking for invertebrates that might have specialised habitat requirements with a limited ability to disperse. A modelling exercise carried out in 2002 provided a rough idea of where these habitats might occur across the south coast.

These particular habitats had already been identified as refuges for a number of species, including the Stirling Range *Moggridgea* spiders that had been studied by Barbara York Main, one of the founding members of the SCTIG. Barbara’s early 1990s work on the detrimental effects of fire on the shallow burrows of these miniscule trapdoor spiders provided some insights into fire and refugial habitat for park managers. More broadly, the specialised habitats of *Moggridgea* – south-east facing moist gullies – were recognised as essential refuges for a number of species with naturally small ranges, known as short-range endemics (SREs). Examples of invertebrates that are predominantly SREs include Gastropoda (snails), Onychophora (velvet worms), Araneae (especially mygalomorph spiders) and Diplopoda (millipedes).

The ecological and life history characteristics of these groups are similar; many are hampered by their poor ability

to disperse and are restricted to isolated pockets of specialised habitats. SREs are only found within areas of less than 10,000km<sup>2</sup> and many of these are restricted to much smaller areas. This makes them more vulnerable to the processes that impact directly on the refugial habitat, and so they require special management to avoid the risk of extinction.

One of the early inspirations illustrating the concept of SREs for Parks and Wildlife’s South Coast Region staff was a pin-board in the office of WA Museum mollusc curator Shirley Slack-Smith. Shirley had placed different coloured pins on a large map of the south-west, with each colour representing what she thought were distinct species of the land snail genus *Bothriembryon*. The myriad of localised patches of vivid colours clearly illustrated the restricted range of many species. This group was difficult to study, but in recent years the work has been taken up by Corey Whisson from the

“As a result of the recent surveys, some 26 species have been recognised as threatened, including 17 millipedes, five spiders and four insects.”



WA Museum, and he is collaborating with Dr Bram Breuer from the Netherlands to examine diversity of the group using molecular sequence data.

## INVENTORY – PRIORITIES FOR SURVEY

Many collections of animals of interest had inadvertently already been made when the SCTIG formed, for example, through the broadscale leaf litter invertebrate collections conducted to assess the habitat of the insectivorous and endangered noisy scrub-bird (*Atrichornis clamosus*). One of the first actions of the SCTIG was to have Parks and Wildlife staff and volunteers extract potential SRE invertebrates from jars storing the noisy scrub-bird food samples for museum staff to identify. Many trapdoor spiders and millipedes were extracted from leaf litter samples collected between Mt Manypeaks and the Walpole Wilderness.

Mountain-top surveys conducted by Sarah Barrett in the 1990s provided invaluable invertebrate samples that identified species that appeared to be restricted to summit habitats. One of

these was the eastern massif assassin spider (*Zephyrarchaea robinsi*), which is known only from the eastern peaks of the Stirling Range. The habitat of this species is highly vulnerable to fire, and it is one of five assassin spiders in the region now listed as threatened.

Other examples of ‘opportunistic’ collections were invertebrates collected from vertebrate sampling across the region. One collection, made from a pit trap in a deep gully on Mt Arid during a LANDSCOPE Expeditions trip to Cape Arid National Park in 2006, was of an unusual pill millipede. Sarah suspected it was different and WA Museum Senior Curator Mark Harvey and his colleagues identified that it was the first record of the *Epicyliosoma* genus (now called *Cyliosoma*) in WA. Further surveys by researcher Melinda Moir found this species, later to be named *Epicyliosoma sarahae* by Melinda and Mark, in several other refugial habitats, but to date it has still only been collected from Cape Arid and Cape Le Grand national parks.

Further documentation of SRE invertebrates across the region was made possible by support from the South

**Above left** Frances Leng hunting for invertebrates in the Stirling Range National Park.

**Above right** Acacia weevils (*Melanterius servalus*) on *Acacia veronica* in Stirling Range National Park.  
Photos – Melinda Moir/UWA

**Above** Mark Harvey and Mike Rix from the WA Museum photographing trapdoor spiders at West Cape Howe National Park.  
Photo – Sarah Comer/Parks and Wildlife

Coast NRM which recognised the need to improve our understanding of poorly surveyed groups and provided funds to support some more targeted surveys. The mapped refugia from the 2002 model was an excellent starting point and in 2006 Melinda, with a number of assistants from the museum, surveyed many of the spots for SRE invertebrates. This work was supported by other targeted work by WA Museum staff and collaborators, and opportunistic collecting by staff from the then Department of Conservation and Land Management. Finally, in 2008, the



**Above left** Melinda Moir and threatened flora officer Sarah Barrett at *Banksia montana* translocation site.  
Photo – Frances Leng

**Above** The clouds that cloak Stirling Range National Park create microclimates that SRE invertebrates like.  
Photo – Sarah Comer/Parks and Wildlife

**Left** *Bothriembryon* sp. 'Thumb Peak', one of the new species of this genus collected during surveys of Fitzgerald River National Park.  
Photo – Alan Danks/Parks and Wildlife

first comprehensive survey of terrestrial SRE invertebrates on the south coast was completed, and a report compiled by research scientist Volker Framenau, Melinda and Mark.

## IMPROVING KNOWLEDGE

Until the SCTIG began its work in 2001, only three invertebrates were recognised as being threatened in the region and including on the WA list of threatened species. As a result of the recent surveys, some 26 species have been recognised as threatened, including 17 millipedes, five spiders and four insects. As our knowledge of this incredible group of animals increases, more will undoubtedly be identified as requiring special management consideration.

A diverse range of invertebrates have been collected and identified in recent years including species of pseudoscorpions, trapdoor spiders, millipedes, peacock spiders and velvet worms. Some groups have benefited from having students complete work on formally describing them. Karen Edward completed her Honours project looking at the millipede genus *Atelomastix* and while this group

is widespread, many of the species are clearly restricted and fit the criteria of SREs. As a result of Karen's work, some 16 species of *Atelomastix* are now recognised as requiring specific conservation management and these are all now formally listed as threatened under WA legislation. Many of these species are only found on a single outcrop of granite hills, and some of their names were inspired by the hard-working members of the team who have helped to locate specimens. For example *Atelomastix julianneae* is named for WA Museum staff member Julianne Waldoock, who spends hours sorting samples collected by museum staff and Parks and Wildlife staff and volunteers. Other millipede names honouring members of SCTIG include *Atelomastix danksi*, *Atelomastix mainae*, *Atelomastix melindae* and *Atelomastix sarahae*.

Another prominent millipede group that has received recent attention is *Antichiropus*. WA Museum staff recognise more than 160 species in WA and South Australia, of which only about 40 have been named. Cathy Car from the WA Museum recently reviewed the species of the Great Western Woodlands and

adjacent habitats, and named 30 new species, each with relatively small distributions. Some of the samples used in this study were supplied by SCTIG members or from the then Department of Conservation and Land Management Salinity Strategy Biological Survey of the late 1990s.

Several other groups have also been examined and, while sorting out the taxonomy of some of these has been completed, many remain formally undescribed.

## SPECIAL MANAGEMENT

Given that these invertebrates are so challenging to find, and that we still can't put a name to many of them, it is important we consider them when managing the areas where we know they are found. While we lack some specific knowledge, we have a basic understanding of the habitat they depend on, so can manage them appropriately, even if we aren't completely sure of which species are found where. Most refugial habitats are small, often isolated and are easily disturbed and fire is likely to have a significant impact – both its intensity and



**Left** One of the rare SRE pseudoscorpions *Cercophonius sulcatus* which is only known from locations near Pemberton.

*Photo – Mark Harvey/WA Museum*

when it occurs. Fires that occur when invertebrates are dispersing are likely to have a greater impact on SREs that are moving around, while less-intense patchy fires are likely to leave some unaffected sanctuaries within the refuge, from which SRE invertebrates can recolonise. So management that incorporates consideration of both refugia and sensitive components of the ecosystem is likely to afford them protection.

Land managers also have to look for novel ways to protect a challenging group of invertebrates that are only found on specific host plants. After delving further into the intricate world of invertebrates, Melinda found some interesting bugs associated with some of the rare plants found in small isolated patches in Stirling Range National Park and surrounds (see 'Slowing the extinction of insects,' *LANDSCOPE*, Winter 2013). One of these, the *Banksia brownii* plant-louse (*Trioza barrettae*), is found only on the leaves of the threatened feather-leaf banksia (*Banksia brownii*). Although the plant-louse does not appear to be beneficial to the plant in the way that a pollinating bee may be for example, it is also not detrimental. The risk of this invertebrate becoming extinct, with its host threatened by dieback caused by *Phytophthora cinnamomi* and too frequent fire regimes, is high. One of the more novel management interventions has been

to translocate the plant-louse with its host to attempt to maintain this complex relationship of insect and host and mitigate the extinction of either species.

The efforts of the SCTIG have been instrumental in improving our capacity to manage and conserve some remarkable invertebrates on the south coast. While the contributions towards understanding the region's invertebrates clearly demonstrate the benefits of strong collaborations, this work has been enhanced and supported by students and researchers who are focussed on unravelling some of the mysteries of this amazing group of animals. The SCTIG has now written one of the first recovery plans prepared specifically for invertebrates, and will continue to foster

research collaborations and knowledge-sharing to improve understanding and management of invertebrates.

A public awareness campaign is a necessary step, to highlight that shifting and relocating (or slaking) small granite rocks, which provide micro-habitats for many invertebrates can have catastrophic impacts. In many cases these refuges are so small that no level of damage can be easily seen. By sharing knowledge of this exciting group of animals as widely as we can we can capture the affection of the wider community so members of the public appreciate the value of these amazing animals and understand the need for appropriate management. Already, the dramatic colours and behaviour of the peacock spiders have rapidly become a regular feature on YouTube (see 'Ready to dance: peacock spiders', *LANDSCOPE*, Spring 2012) and it has even inspired a swimwear designer to create the 'peacock-spider print bikini' based on a restricted spider from Stirling Range National Park. Many of the other SREs are equally inspiring, and our job is to share these miniscule wonders with the wider world.

**Sarah Comer** is the regional ecologist for Parks and Wildlife's South Coast Region, and her work with Mark and other members of the invertebrate team over the past 15 years has inspired a love of the spineless wonders of the invertebrate world.

**Melinda Moir** is a research entomologist at the Department of Agriculture and Food WA and an adjunct lecturer at The University of Western Australia.

**Mark Harvey** loves nothing better than exploring the diverse world of terrestrial invertebrates. Mark is Head of the Department of Terrestrial Zoology and Senior Curator of Arachnids and Myriapods at the Western Australian Museum.

**Deon Uther** is the regional leader of nature conservation for Parks and Wildlife's South Coast Region, and the current chair of the South Coast Threatened Invertebrate Recovery Team.

Numerous people have supported the work of the South Coast Threatened Invertebrate Group, in particular Mike Rix, Corey Whisson, Volker Framenau, Julianne Waldoock, the late Bert Main, Barbara York Main, Sandra Gilfillan, Janet Newell, Polly Mitchell, Sarah Barrett, Alan Danks, Karlene Bain, Alan Longbottom, Shirley Slack-Smith, Emma Massenbauer and Karen Edwards. South Coast NRM has supported the efforts of this group through funding Melinda's survey of south coast refugia.

by Lauren Emmerson



## Focus on... cane toads

Toads were brought to Queensland almost 100 years ago to eat beetles that were destroying sugar cane crops. Unfortunately cane toads are poisonous, so animals that eat a toad can get very sick and even die. Cane toads are a major threat to our native wildlife and there is plenty being done to try and address the issue.

**Reggie** the springer spaniel joined Parks and Wildlife in January 2014. After completing his training early last year, he is now a full-time Parks and Wildlife cane toad detector dog, based in Kununurra.

**Reggie starts his day with a morning walk and then takes part in some exercises with his trainer Andrew Rethus, who hides toads around the Parks and Wildlife depot and other locations around town for Reggie to find.**

"I get to search for toads every day."

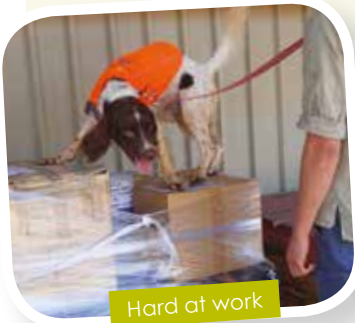


I found one!



Reggie and trainer Andrew.

**He spends his afternoons visiting farms and freight companies to search for hitchhiker toads to detect them before they find their way down to Perth, or travels with Andrew to communities to teach kids about cane toad identification and how to safely pick them up.**



Hard at work

## Kids in the field – animal trapping



### A week in Perup

Bush Ranger cadets from Rossmoyne Senior High and Dallyellup College recently spent a week in Perup as part of a fauna trapping program. The cadets set and cleared traps, took measurements and released the animals including brushtailed possums, woylies and chuditch.



**"The trapping activity provided us with a closer glimpse into the environment, showing us endangered species we normally wouldn't see, while developing research and gathering statistics so these precious fauna can be more effectively preserved. It was an incredible experience that provided us an opportunity to bond with our peers and the environment, a camp that I would definitely jump on board to go on again."** – Sumati, Rossmoyne Senior High School



**Above** Students learning about threatened species.  
**Right** A successful trapping.

## Western Shield marsupial trapping

Every year, students get involved in real-life scientific research carrying out live marsupial trappings at Wellington Discovery Forest. Students from Applecross Senior High School were recently introduced to the wildlife recovery program *Western Shield* and learnt about threats to native fauna. They baited and set the traps in the late afternoon.

Early the following morning, after a brief discussion about fauna handling techniques and taking measurements, the students checked the traps and assisted with emptying, measuring and recording.



**"The camp was a thoroughly enjoyable experience and consolidated what we had been learning in class. It was a unique and hands-on way to see the application of our lessons. Definite highlights were setting and checking some traps, and of course the sensational night trail!"** – Sarah and Hannah, Applecross Senior High School



*Grevillea preissii* subsp. *glabrilimba*

*Grevillea preissii* subsp. *glabrilimba* is a low sprawling shrub that grows from 15cm to 70cm high and up to 1.2m wide. It's often found on rocky limestone outcrops between Cervantes and Green Head. The unusual and irregularly shaped red flowers occur in clusters at the end of the branches, and bloom from July to September.

Illustration by Gooitzen van der Meer

Reference photo by Rob Davis



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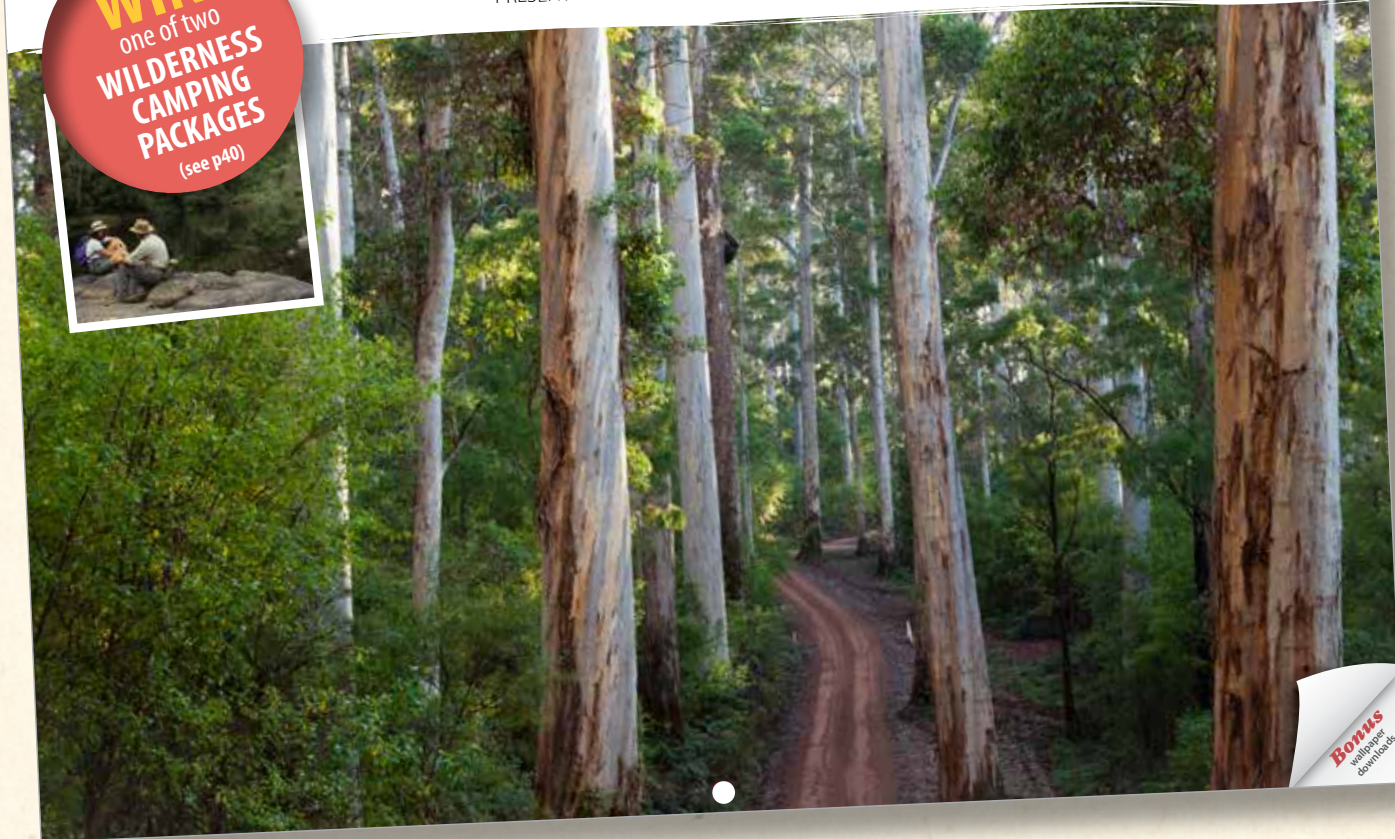
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