bushland news

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Issue 127 **Spring** 2023 *Time of Djilba and Kambarang in the Noongar calendar.*

The first listing of threatened ecological communities; a remarkable history

Photo – Sarah Barrett.

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

PARKS AND WILDLIFE SERVICE

Bushland News *is a quarterly newsletter of the Urban Nature program to support community involvement in bushland conservation.*

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Issue 127 **Spring** 2023

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This publication is available in alternative formats on request. Current and archived issues of *Bushland News* are available at dbca.wa.gov.au/bushlandnews.

Next issue

Summer *Bushland News*

Summer *Bushland News* contributions should be sent to Urban Nature by **14 November 2023**. *Bushland News* seeks original contributions. If your submission has been or may be published elsewhere please let us know. Compiled and edited by Julia Cullity.

The first listing of **threatened ecological communities;** *a remarkable history*

By Valerie English

The Lake Clifton thrombolite TEC is a community of living rock-like structures formed through precipitation of calcium carbonate as a result of microbial activity. The structures are related to the ancient lifeforms that helped create oxygen on earth. Water quality is vital to its continued existence. Photo– Val English.

On 26 May 2023, the first 65 threatened ecological communities (TECs) were listed under Western Australia's *Biodiversity Conservation Act 2016*. Many significant milestones over nearly 30 years had to be completed before the first listing could occur. A multitude of people were involved in developing procedures, policy, legislation, and in providing expertise and advice that resulted in the momentous outcome of the first TEC listing.

The TEC listing evolved from humble beginnings when, in 1994, the Commonwealth government provided seed funding for the former Department of Conservation and Land Management's first project on developing methods to identify and conserve TECs. At that time, there were few examples of how TECs, or threatened ecosystems, could be listed anywhere in the world, and the procedures first had to be developed. This was done with advice from an advisory group comprised of expert ecologists. This first committee first met in 1995 and advised on the development of the ranking categories and criteria, nomination forms for listing TECs, and the first TEC database.

Continued next page ...

Cover caption: The Montane Heath and Thicket of the Eastern Stirling Range TEC is a naturally rare and restricted plant community, as Western Australia has few mountains. This plant community is threatened by issues associated with climate change, and dieback disease caused by Phytophthora cinnamomi. *It is also home to 13 threatened and 23 priority flora taxa and five threatened and one priority fauna species, many of which are endemic to the Stirling Range. Photo – Sarah Barrett.*

The current TEC Scientific Committee (TECSC) was established in 2000. Three members of the preceding advisory committees are still on the replacement TECSC that guided and championed the first TEC listing through to completion in 2023. These committees tested and applied the categories and criteria for ranking the level of threat to TECs to a huge variety of ecological communities (ecosystems) from across the state that included 44 rare vegetation types, nine invertebrate communities of underground caves and groundwater aquifers, seven assemblages of groundwater fed springs, four communities built by microbes ('microbialites'), and a faunal assemblage of intertidal flats.

An informal TEC listing procedure was developed in 2000, with the Minister for Environment endorsing the non-statutory listing of TECs in the absence of legislation to support listing TECs in WA. A total of 69 TECs were listed through that process (65 extant, and 4 presumed totally destroyed). The 65 extant TECs were provided with a more formal level of protection when they were listed as Environmentally Sensitive Areas under the *Environmental Protection Act 1986* in 2004.

After many years work in development by a global team of ecologists, the International Union for the Conservation of Nature released categories and criteria for ranking the level of threat to ecosystems in 2014 (IUCN Red List of Ecosystem criteria –IUCN RLE). These criteria are now accepted as a global standard.

In 2016 Western Australia's *Biodiversity Conservation Act* replaced the ageing 1950 Wildlife Conservation Act. This new Act enabled the listing and legislative protection for TECs in WA for the first time. Nominations that assessed the 65 informally listed extant TECs against the new IUCN RLE criteria were developed by an expert team in the Department of Biodiversity, Conservation and Attractions (DBCA) and carefully scrutinised by the TECSC. Some stumbling blocks along the way included COVID-19 restrictions that delayed the stakeholder consultation required to complete the TEC listing process.

This threatened ecological community of marri – Kingia australis *woodlands on heavy soils occurs on the outskirts of Perth on the eastern side of the southern Swan Coastal Plain. Once much more widespread, this TEC has been largely cleared for agricultural land and urban development. Photo – Val English.*

Continued next page ...

The WA Minister for Environment endorsed the first TEC listing, and it was published in the Government Gazette on 26 May 2023. The listing means that authorisation will now be required from the Minister for Environment to damage or destroy ('modify') a TEC, or significant penalties may apply.

So, the first TEC listing was 29 years in the making; and has involved many staff of DBCA and its predecessors, committee experts from universities, environmental consultancies, non-government organisations, and other government departments who volunteered vast amounts of their time and expertise, as well as a multitude of other stakeholders. The TECSC and earlier committees held 50 meetings that led up to the first TEC listing, and members past and present can be justifiably proud of this momentous outcome. Many departmental officers, including in DBCA's districts and regions were involved in identifying and documenting TECs, providing expert comment on the nominations, maintaining the TEC database, and undertaking the consultation process – all work crucial to the listing process.

A huge thank-you is due to a multitude of dedicated people who over 29 years have been involved in the many milestones towards achieving this historic first TEC listing!

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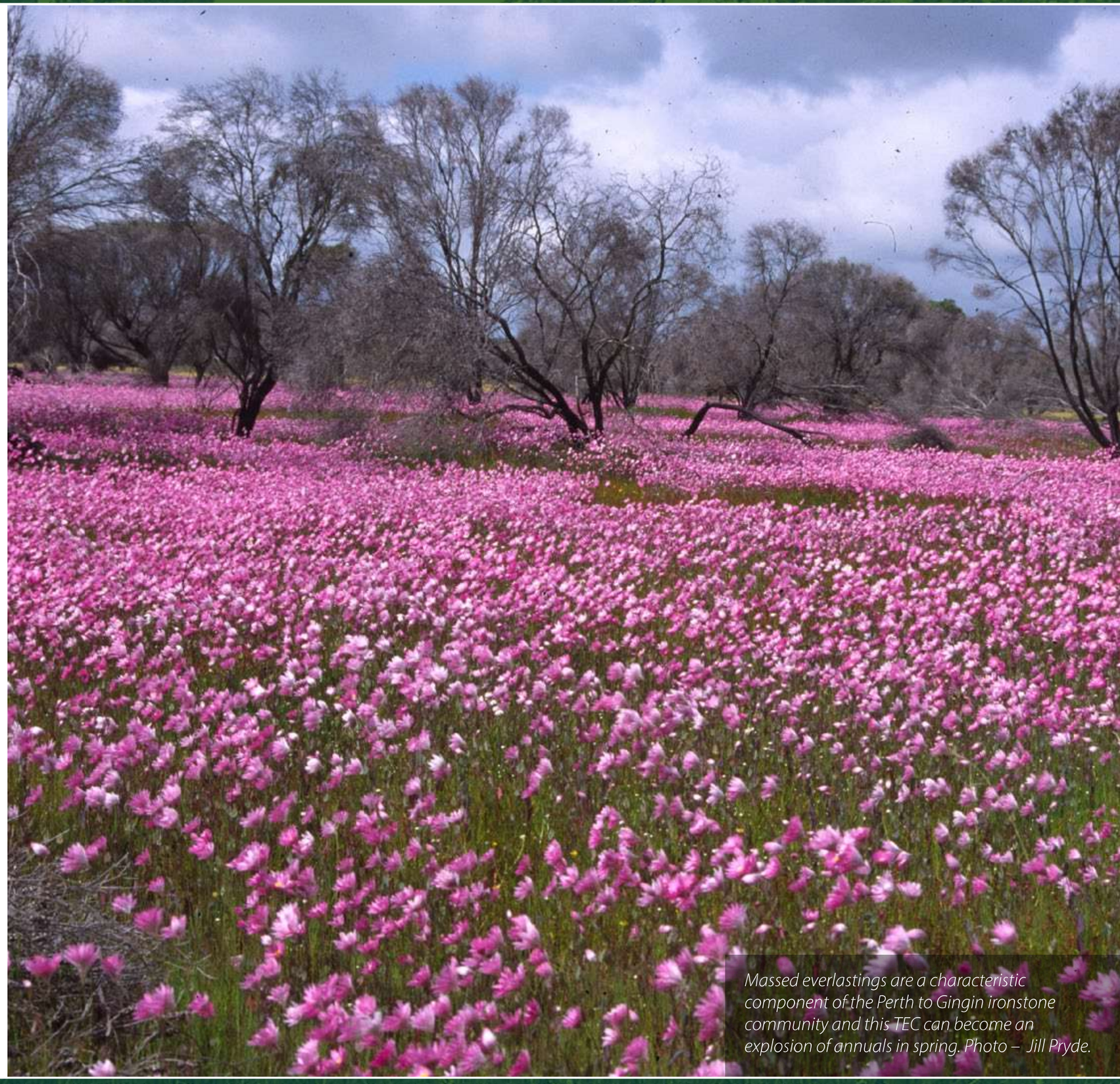

Massed everlastings are a characteristic component of the Perth to Gingin ironstone community and this TEC can become an explosion of annuals in spring. Photo – Jill Pryde.

River restoration continues at Lowlands *By Julia Cullity*

The Peel Harvey Catchment Council supported DBCA with funding for the continued restoration of the riverbanks along the Serpentine River at Lowlands Nature Reserve. Urban Nature has been steadily moving downstream planting *Lepidosperma persecans* to stabilise the riverbank next to the deep, permanent pools. This sedge was propagated from seed collected at Lowlands and once established can reach 2m high and 3m wide. This provides shady habitat for species that live in and along the river and protects the banks from erosion. This year DBCA were, once again joined by Landcare SJ for a community planting day. We then held another planting day with Alcoa and the Winjan Binjareb Boodja Rangers. All up 2,000 plants were planted and fenced off from kangaroos and we would like to thank everyone for being a part of this important work.

There was a turn-out of more than 40 people from Alcoa (pictured), the Winjan Binjareb Boodja Rangers, Peel Harvey Catchment Council and DBCA to continue the restoration of the Serpentine River at Lowlands Nature Reserve. After a welcome to country by Franklyn Nannup we got stuck into the planting tasks. Photo – Julia Cullity.

DBCA has redeveloped our website and that means we have a change of address for both Bushland News and the Urban Nature webpage. You can find Bushland News housed in the Get Involved section of the website along with Find a Conservation Group. The Urban Nature webpage with our archive of resources is in the Management section. Scroll down and click on the rainbow where we are planting at Penguin Island. From here you can Find a Conservation Group, link back to Bushland News, download Bushland Weeds and tap into our research papers, reports, conference proceedings, presentations and posters. *Photo – Grazyna Paczkowska.*

Long-term funding supports bushland conservation *By Grazyna Paczkowska*

Living Landscapes by Perth NRM provided funding between July 2018 and June 2023 to various community groups to protect and improve the condition of the federally listed threatened ecological communities, including banksia woodlands, marri – kingia woodlands and claypans.

Having secure funding for five years allowed for long-term planning to manage environmental threats such as serious weeds and feral animals that require ongoing annual follow ups. It also allowed the groups to see some projects through from start to finish and even assess the results. For example we did some restoration plantings where we collected provenance seed, germinated tubestock and planted in a number of different plant communities. Some seedlings quickly established whereas other sites struggled and required infill planting for a number of years.

The program also allowed for a series of very productive partnerships to develop between landcare groups, community friends groups, local and State government. Urban Nature was privileged to work on several of the Living Landscape projects with SERCUL and the Friends of Brixton St Wetlands at Greater Brixton St Wetlands, at Paganoni Swamp with the Friends of Paganoni Swamp, and with Ellen Brockman Integrated Catchment Group at Lake Wannamal and Mogumber Nature Reserve.

In the final year of funding Urban Nature, assisted by our partners, re-mapped weed and vegetation condition at these management sites to assess change since the beginning of the program. Re-mapping has shown that vegetation condition has been maintained for all sites with a very slight increase in vegetation mapped in good or better condition. As for the weeds, the story is not that simple. Five years is not long enough to make a substantial dent, particularly for such weeds like perennial veldt grass or bulbous geophytes. Although the weed re-mapping results showed the cover has decreased at some sites, a reduction in area of distribution only happened for few species.

The re-mapping demonstrates that active and consistent bushland management has maintained and increased the biodiversity values of these sites. Follow up and ongoing management is required to maintain and build on the benefits from this bushland management and we would love to continue to work with these partners.

*Lake Wannamal Nature Reserve, south of Mogumber, contains large variety of habitats that support species of threatened flora, fauna and threatened ecological communities, including banksia woodlands and claypans. The banksia woodland at this reserve is dominated by acorn banksia (*Banksia prionotes*) with a rich understorey of shrub and herb layers. The Living Landscape funding contributed to the reserve's weed control, dieback mapping and revegetation projects. Photo – Julia Cullity.*

East meets west – weedy wattles in WA *By Eddie van Etten*

Most bushland remnants in south-west Australia have been impacted by weed invasion, typically involving a multitude of exotic species, with weed control eating up large proportions of reserve management budgets. Historically, such environmental weeds have originated from overseas, particularly from regions of similar climate (e.g., Cape Province of South Africa, Mediterranean Basin), typically having 'escaped' from their initial plantings in garden and agricultural settings. More recently, concerns have extended to native Australian species invading into local bushland, mostly originating from eastern Australia, but increasingly also involving local species expanding their range.

One group of plants which exemplifies this growing concern over expanding weedy native species are *Acacia* species of eastern Australian, several of which have readily established in south-west forests, woodlands, and wetlands. Western Australian Herbarium and Atlas of Living Australia records point to some 13 *Acacia* species from eastern Australia being naturalised in WA (see Table). A small number of these are probably not yet invasive, only being reported in highly disturbed bushland, but others are likely to be truly invasive species, that are actively spreading and causing damage to native ecosystems. Interestingly, all but two of these species are renown worldwide as problematic, 'unequivocally invasive' species. It is not clear why these same species are consistent culprits around the world - does it reflect inherent biological features which favour invasion, or are they just popular, widely planted species?

Table: Eastern Australian Acacia species which have been recorded in Western Australia.

Taxa [no. of subspecies]	Common Name ["…… wattle"]	Origin	Distribution outside Australia
*Acacia baileyana**	Cootamundra	Sth NSW	SAm, NAm, NZ, SAfr, India, SE Asia
*Acacia dealbata** [2 subspecies]	Silver	NSW to Tas	~All continents, Pacific
*Acacia decurrens**	Early green	NSW	SAm, NAm, NZ, EAf, SAfr, India, SE Asia
*Acacia elata**	Cedar	NSW, Vic?	Afr, India, NZ
Acacia floribunda	Gossamer, Sally	SE Qld to Vic	NZ, SE Asia, Indian Ocean
*Acacia iteaphylla**	Flinders Range	Sth Aust (Eyre Pen.)	Nil
*Acacia longifolia** [2 subspecies]	Sydney golden	NSW, Vic	~All continents, Pacific, Indian Oc.
*Acacia mearnsii**	Black	NSW-Tas	~All continents, Pacific, Indian Oc.
*Acacia melanoxylon**	Blackwood	Qld–Tas, Sth Aust	~All continents, Pacific
*Acacia paradoxa**	Hedge, Prickly	NSW, Sth Aust, Vic	NAm, SAm, SAfr, NZ
*Acacia podalyriifolia**	Mt Morgan	Qld, Nth NSW	Afr, SAm, Ind, SE Asia, NZ
Acacia prominens	Gosford	NSW	India
*Acacia pycnantha**	Golden	Victoria, NSW, Sth Aust.	SAfr, Sth Eur, Ind, SE Asia, NZ

* indicates one of 23 'unequivocally invasive' Acacia as assessed by Richardson et al. (2011).

Acacia longifolia, probably now the most widespread Australian *Acacia* globally, has been well studied in terms of traits which may promote invasiveness. Compared to attributes displayed within its native range, when growing elsewhere the species has been shown to grow faster, be larger in size, produce more seeds, and have fewer pests and diseases, as well as having more constrained genetic diversity, all of which tend to promote colonisation.

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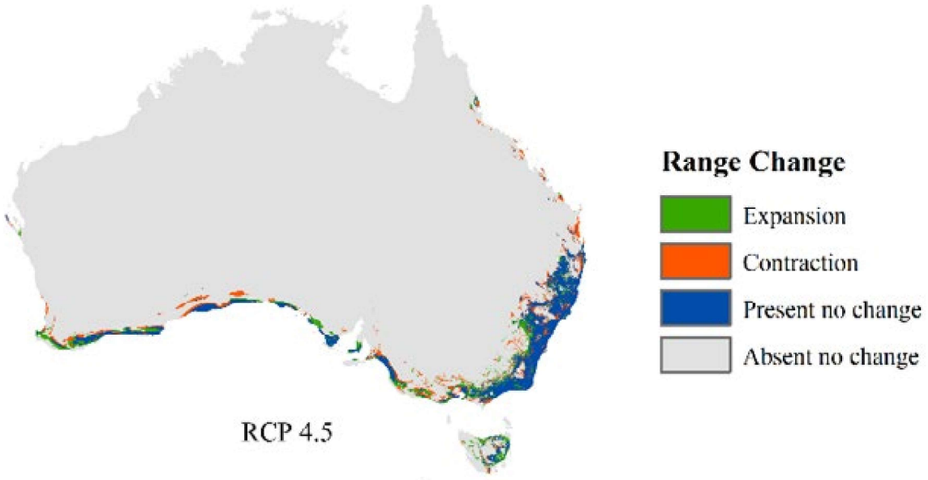
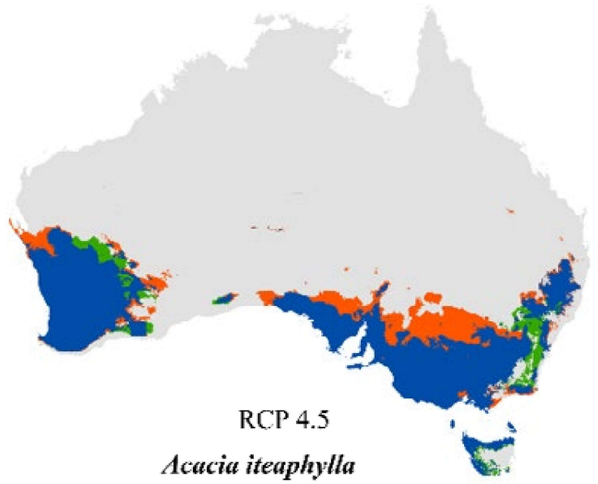
Despite these insightful ecological comparisons, little quantitative information is available on the patterns, degree and impacts of invasion of various eastern Australian acacias in Western Australia, nor for their potential to spread further in the future. Our studies at Edith Cowan University have spanned many species and localities across the south-west, but focus on two species: *Acacia iteaphylla* (Flinders Range wattle) and *Acacia longifolia* subsp. *longifolia* (Sydney golden wattle), selected because of their contrasting distributions and ecological requirements.

We have studied these species at two spatial scales – regionally via species distribution modelling, and locally via transects placed from bushland edge to interior.

Regionally, predictions of suitable climatic ranges differ substantially for the two species, both their current range predictions and that with anticipated climate change. *A. iteaphylla* is capable of spreading across large swathes of south-west Australia, reflecting climatic similarities with its home range in South Australia.



Mature Acacia iteaphylla growing under a jarrah tree at Wandi Nature Reserve. Photo – E. van Etten.



In contrast, *A. longifolia* subsp. l*ongifolia* is predicted to be more restricted to south coast areas, both now and into the future, likely reflecting preference for wetter climates. These regional-scale predictions are based on climate and therefore not so good at predicting distributions at landscape to local scales. For example, in the Perth area, the *A. longifolia* subsp. *longifolia* is common in seasonally wet damplands of the Swan Coastal Plain, again reflecting its preference for moister environments.

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Locally, highest densities of exotic *Acacia* were found at bushland edges, indicating most infestations start from margins of bushland, especially along roads and tracks. But we also found occasional plants in interior of bushland remnants, up to several kilometers from edges. Strong associations of seedlings and saplings with tree cover suggest birds are responsible for spreading seed (using elevated tree branches to defecate seeds). When such plants mature and set seed (typically in abundance), new satellite infestations can be started some distance into the bushland interior. Studies along transects also revealed the important role of fire in promoting spread and intensification of *A. longifolia* subsp. *longifolia* with a 10-fold increase in plant density noted in damplands on the Swan Coastal Plain burnt by summer wildfire (compared to adjacent unburnt transects).

These findings improve our understanding of the threats posed by these species, as well as some potential avenues for management, such as minimising fire (due to persistent seed bank stimulated to germinate by fire) and tackling new outbreaks quickly (with most species relatively easy to control when young and few in number).

Dense infestation of Acacia longifolia *subsp.* longifolia *(shrubs with bright green foliage in centre of photo) at a wetland-woodland ecotone, Thomsons Lake Nature Reserve. Photo – E. van Etten.*

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Rainbow bee-eater – the most beautiful little bird *By Chris Tate*

The most beautiful little bird ever seen
With every colour –including a shimmering green.
Darting from a branch high up in the sky
A bee-eater is in pursuit of a dragonfly.
He spins, swerves and twists –first to the left then to the right
He snatches that insect in mid-flight.

Gliding gently back to his branch in a tree
The most beautiful little bird you could ever see.
A blaze of green, orange, black and blue
Dazzling in colours of every hue.

And with a twist of the head and a quick flick
He bangs the poor insect against a stick.
And to make sure his dinner goes down
He tosses it in the air, to turn it around.

A long tunnel is dug in the ground
For a nest chamber that is not very easily found.
Up to seven white eggs the mother will lay
While the father is busy catching insects all day.
Dragonflies, wasps, beetles and bees
Darting from a branch after every insect he sees.

Rainbow colours erupt in the sky
A squadron of bee-eaters gathers up high.
Late in the afternoon seems to be the norm
When a mass formation begins to form.
They spread out high over the land
For reasons we still don't fully understand.

Over a number of weeks the chicks grow older
They learn to fly well and the weather gets colder.
Late in March and the time has come
For the flock to migrate north and follow the sun.

Until next October, towards the end of the year
The most beautiful little birds will re-appear.

Watercolours – Chris Tate.

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Collaborative effort to improve estuary health

By Charlie Jones

Leschenault estuary, one of the seven estuaries that are part of Healthy Estuaries WA. Photo – Ash Ramsay.

Regenerating bushland along waterways on farms is one of many actions underway to improve water quality in estuaries through the State Government's Healthy Estuaries WA program.

Estuaries, the vibrant areas where rivers meet the ocean, are prone to water quality problems like algal blooms and fish kills. These problems are caused by excessive nutrient inputs and exacerbated by our drying climate. Healthy Estuaries WA is a collaborative program with farmers, local catchment groups, industry groups, local communities and government organisations working together to both reduce future nutrient inputs, and address those that are already present in catchments and waterways.

Wilson Inlet Catchment Committee staff and volunteers preparing native plants for revegetation on farms. Photo – Wilson Inlet Catchment Committee.

In the catchments of seven estuaries in south-west WA, funding and support is available to farmers to fence and revegetate waterways on their farms. Revegetating waterways like creeks, drains and streams can help to filter nutrients and fencing to remove stock avoids inputs of organic matter. The funding is available through the Peel-Harvey Catchment Council, Leschenault Catchment Council, GeoCatch, Lower Blackwood LCDC, Wilson Inlet Catchment Committee, Torbay Catchment Group, and Oyster Harbour Catchment Group.

As well as supporting farmers, some catchment groups are hosting community planting or weeding events where anyone can pitch in to help. And South Coast NRM's project to restore Albany's Yakamia Creek has plenty of opportunities for local community members to get involved with activities like planting and weeding.

Farmers can also join a fertiliser management program through Healthy Estuaries WA that provides support for soil testing and making informed fertiliser decisions. By only applying what is needed for plant growth, we can minimise the loss of nutrients to our waterways.

In urban areas of estuary catchments, reducing garden fertiliser and water use can also contribute to reducing nutrient pollution to estuaries. Planting native gardens can help because many native plants need less fertiliser and water.

Department of Water and Environmental Regulation (DWER) scientists monitor water quality in Healthy Estuaries WA catchments and estuaries to better understand estuarine systems and direct investment effectively. You can learn about the latest findings from water quality monitoring in your local estuary at a series of upcoming estuary forum events.

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HEALTHY ESTUARIES WA

Mosquito control using drones *By Michael Worthington*

The City of Bayswater was the first local government in Western Australia to incorporate drone technology into its mosquito management program. Prior to adopting this technology, a significant amount of pre-planning was undertaken, safety management plans were developed and Civil Aviation Safety Authority approvals were obtained.

In 2022, the City commenced trials using commercial drones for aerial site surveys and mosquito larvicide treatments of high breeding sites within the Berringa Park and Baigup Wetlands coastal saltmarsh threatened ecological community along the Swan River.

A small drone was used initially to map the pools of stagnant water within the wetlands and this information was then programmed into a larger drone, which weighed approximately 67kg and carried up to a 30kg payload of mosquito larvicide.

Certified operators set-up a temporary control centre in a nearby reserve and flew this drone out to the treatment area. The drone would then automatically fly itself on a designated route throughout the area (approximately five metres above the ground) applying a granular biological larvicide to the targeted locations. Although the drone can also spray liquid, we have found that using granules is a more accurate form of larvicide delivery. This larvicide is a naturally occurring soil bacterium (*Bacillus thuringiensis israelensis*) that specifically targets mosquito larvae only, without harming other wildlife or surrounding vegetation.

The larger drone can treat up to 16ha in an hour and was pre-calibrated to ensure that the larvicides were being delivered to the required application rates.

To determine the effectiveness of the treatments, the City's Mosquito Control Officers actively sampled the wetlands for mosquito larvae and set carbon dioxide traps to determine mosquito activity pre and post treatment. Since commencing the trial, monitoring has revealed a significant reduction in the emergence of adult mosquitoes. This new method of applying larvicide creates a lower environmental footprint within the wetland areas. Drones have reduced the use of quad bikes and wading through sedges to treat mosquito breeding areas. As a result there is less trampling, soil compaction and creation of tracks. It is also a safer and more efficient application method for our staff.

To explore the use of drone technology for mosquito control or other work applications, please feel free to contact us.

Contact

Mosquito Control Officer
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This large commercial drone used for mosquito control weighed approximately 67kg, could carry a payload of 30kg and can treat up to 16ha per hour. Photo –City of Bayswater.

Treatment of Berringa Park wetlands. Mosquitoes breed in pools of water within the sedgebeds and saltmarsh. Drones can target these areas with a biological larvicide, efficiently, safely and with no disturbance to the remaining, fringing vegetation of the Swan River. Photo – City of Bayswater.

Please send us your regional report (400 words) and one or two photos by Tuesday 14 November 2023. Text may be edited in response to volume of submitted reports.

Feral fish removal – Lake Joondalup *By Bryan Saunders*

Woodvale Waters Friends of Beenyup Channel (WWFoBC) witnessed a significant feral koi carp spawning event in the southern end of Lake Joondalup in September 2022. Seven koi carp averaging 7kg were caught using handheld nets. Koi carp had been observed in the lake in previous years however not in the same numbers or size. The increase in both size and number of fish observed in 2022 has been attributed to the lake not drying out in summer since 2017. Lake Joondalup is a seasonal lake and has traditionally dried out in summer.

The southwest of Western Australia is recognised as having the highest proportion of endemic freshwater fishes of any of the Australian Ichthyological Provinces. Introduced species such as koi carp and goldfish pose a significant threat to freshwater fish and can, if left to proliferate, have a devastating effect on the biodiversity of freshwater eco systems through predation, competition, decreased water quality, and spread of disease.

With support from DBCA and WWFoBC the Yellagonga Regional Park Community Advisory Committee allocated funding for two days of electrofishing in the lake in autumn 2023.

Fishing was undertaken by Stephen Beatty of Murdoch University and the Harry Butler Institute in April and June 2023. Only the southern section of the lake was fished in April with part of the northern section of the lake fished in June.

Thirty two koi/carp and 12 goldfish weighing a combined total of **130kg** were caught during the two days with the majority caught in April when water levels were lower allowing better access to the edges of the lake. The largest koi carp was 85.1cm weighing 9.2kg with the average goldfish measuring 40.2cm in length. The female to male ratio for both types of feral fish was carp 0.88 female to 1 male and for goldfish 3 female to 1 male.

All feral fish were euthanised on capture and placed on ice and taken to Murdoch University to be analysed for diseases. Fortunately, no Asian fish tapeworm were found however 94% of koi carp and 100% of goldfish had red spot disease along with 81% of koi carp and 75% of goldfish affected by a yet to be identified eye parasite, with some of the fish rendered blind. These diseases can be transmitted to our native fish.

Murdoch University's report noted that there appeared to be a low recruitment of juvenile fish following the 2022 spawning season likely due to either a lack of successful spawning events and, or high rates of larval or juvenile mortality. The report has recommended a further three days each of fishing for both the southern and northern sections of the lake in autumn 2024.

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Electrofishing lowers electrodes into the water which causes the fish to swim towards the anode where feral fish are netted and immediately euthanised in an ice slurry. There is no permanent harm to non-target fish. Photo – Jan Saunders.

Some of the koi carp that were controlled using electrofishing at Lake Joondalup. Most of our feral fish are spread by human-mediated pathways including people releasing unwanted pets into waterways. Don't dump that fish. Photo – Amber Kennedy.

Yangebup Lake nature discovery day popular in Cockburn *By Michele Nugent*

Discovering the benefits of getting close to nature can begin anytime, but the earlier the better!

That was the view of more than 80 curious children and their parents who attended the City of Cockburn's first Nature Discovery Day during the July school holidays, raring to go for an 8.30am start.

Families with children aged four to 12 threw on their raincoats and gumboots to brave the wintery Makuru rain showers for the low-cost day-long event.

The event was designed to help locals discover the City's many nature reserves and bushland areas, and their diverse flora and fauna. It was so popular that the City's Sustainability and Climate Change Team will now hold similar events at its nature reserves during future school holidays.

City of Cockburn Acting Sustainability and Climate Change Coordinator Rafeena Boyle said the City had more than 80 reserves within its boundaries but not all had toilet facilities, which could make it hard to attract families with young nature enthusiasts.

"We had so much positive feedback from the kids, families and carers about the day itself which gives us a clear indication that locals are keen for a reason to explore their neighbourhood bushland. For this event we set up a space at Yangebup Lake with toilets, shelters and activities designed to make it easy for people to relax and get up close and personal with the amazing natural environment in Cockburn. This particular event was held to commemorate NAIDOC Week, recognising First Nations cultural and eco values which are commonplace in the City's sustainability programs."

The event was held in partnership with the City of Cockburn Library Service and DBCA. Unique cultural and eco-education activities included community walks touching on the site's Noongar significance and its past uses for agriculture and wool scouring. There was also a pop-up walk trail for passers-by, a nature story time trek for under fives featuring books written by First Nations authors Yurleen Winmar and Sally Morgan and the Kep Boodjar 'Water Country' activity led by Cyril Yarran.

More than 80 children and their parents attended the inaugural day-long Nature Discovery Day at Yangebup Lake this July. The low-cost day was designed to help locals discover the City's many nature reserves and bushland areas, and their diverse flora and fauna. It was so popular they will be held at Cockburn bushland reserves every school holidays.

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Connecting kids with nature *By Melanie Wilshin*

Five primary schools are participating in the WA Parks Foundation's 2023 Nature Connection Education Program. They are Queens Park, Brookman, Hilton, Kingsley and Clifton Hills.

Since its launch in 2021, this immersive eight-week program designed and delivered by Educated by Nature, has involved 14 primary schools in the Perth and Peel regions in outdoor learning experiences within their local communities.

Research suggests that contact with nature is not just a vital aspect of human development but is also necessary for the ongoing conservation of our natural environments. Children who develop a sense of ownership and concern for the natural environment are likely to want to protect it in the longer term.

The program has been made possible through funding support from the Australian Gas and Infrastructure Group.

Nature Connection is an immersive eight-week program that engages primary school students and their teachers in outdoor learning experiences within their local communities. Photo – Educated by Nature.

Sponsoring public sector schools which have limited resources has created an opportunity for primary school children to experience these programs which otherwise may not be within their reach. As WA Parks Foundation Chair, the Hon Kerry Sanderson says "Among elements of environmental stewardship are understanding and feeling part of nature, noticing changes in ecosystems, developing curious minds and feeling empowered to assist in protection and regeneration of natural assets". A sentiment echoed by the students "We've been learning about little plants that only grow once a year. I feel excited about Nature Connection. I will tell other kids how to look after the plants and making sure that we don't step on them."

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King's Birthday Honours 2023

Congratulations go to local landcare group member Jo Stone of the Canning River Regional Park Volunteers who was awarded an Honorary Medal of the Order of Australia in the King's Birthday Honours 2023 for service to conservation and the environment. All those who know Jo will know she is a fountain of local knowledge and is indefatigable in her efforts to manage and conserve bushland in and around the Canning River. A special shout out to the other Western Australians who were honoured for their service to the environment: Kingsley Dixon, Rebecca Prince-Ruiz and Ruth Byrne in the General Division of the Order of Australia and Margaret Byrne for her Meritorious award. Photo – Claire Kennedy.

Avon River rakali projects alliance WA *By Bronwyn Humphreys*

Rakali, or 'moyitj' in Wadjuk Noongar, is Western Australia's only freshwater semi-aquatic mammal and they were thought to be extinct from York's Avon River until rediscovered by the River Conservation Society (RCS) in 2015. The RCS is now halfway through a three-year Rakali Project, funded by a State NRM Community Stewardship Grant. This project has now found rakali in five additional pools in the Shire of York. The Friends of the Dale River group have also recently captured photos of rakali on the Dale River in the Shire of Beverley. And the Northam group have just had a positive sighting.

A Rakali Alliance group has recently been formed between Avon Valley Environmental Society, Friends of the Dale River and York River Conservation Society. Proudly independent and distinct, each group has a common pursuit of rediscovering rakali and being a voice for their protection and continued healthy existence in our Avon River. Our alliance has augmented confidence, competence and caring in the search for the elusive rakali. Achieving community awareness of the rakali is a major theme of our alliance.

The Alliance is becoming more competent and confident in project management and the practical use of wildlife monitoring equipment as we learn from each other and from the experts we engage.

From our informal chats between groups, we have begun the Avon Valley Schools River Rangers program.

River Rangers offers an opportunity for students to engage with their local community in citizen science.

The Rakali Alliance out canoeing on the Avon River. The trip was led by Terrestrial Ecosystems consultancy to educate our groups on the best locations to mount wildlife cameras to monitor rakali presence. Photo – Lucy Honan.

Under teacher Miss Nixon, at Beverely District School, Year 4 River Rangers have engaged with the Avon Valley Environmental Society and will have a display depicting rakali at the Beverley Show. The school and students will raise community awareness of the endangered rakali far in excess of anything our individual small groups could possibly achieve.

The Alliance have created valuable partnerships that include local schools, Wheatbelt Avon Bird Group, Bilya Koort Boodja Aboriginal Cultural Centre, Wheatbelt NRM, the Noongar Boodjar Rangers, Department of Water and Environmental Regulation, DBCA and Terrestrial Ecosystems.

Finally, each group belonging to the Alliance has been able to attract grants such as those from York, Northam and Beverely shire councils for riparian zone revegetation projects that will help to protect rakali habitat.

The Alliance has created new vitality as well as comradery. We encourage small passionate conservation groups to partner with groups in your area to achieve your environmental goals.

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Eungedup Wetlands purchased for conservation *By Shaun Ossinger*

The Wilson Inlet Catchment Committee (WICC) recently crowdfunded the purchase of the Eungedup Wetland. Lying between Denmark and Albany, Eungedup is home to endangered Australasian bitterns (*Botaurus poiciloptilus*) and other nationally and internationally significant waterbirds.

Eungedup Wetlands were used to cultivate seed potatoes since the early 1900's. At the cessation of cultivation and drainage for potato production in 2019, areas of permanent water developed and there was a rapid spread of *Typha* which now covers about one third of the wetland and continues to spread. Fortunately, this has provided an ideal habitat for the bitterns which were previously unrecorded in the area.

The global population of Australasian bitterns is estimated to be fewer than 2,500 mature individuals and decreasing. Australian data suggest that the Western Australian bittern population declined by 25-50% between the 1980s and 2010, and continues to decline. It is estimated that fewer than 150 mature individuals remain in WA. The historical draining of permanent and ephemeral swamps for agriculture and urban development in south-western Australia has been an important factor contributing to the decline.

Between 2021 and 2022 up to six male bitterns were detected at Eungedup using acoustic recorders and assuming these were part of a breeding pair, suggests that the wetlands could be home to nearly 10% of WA's Australasian bittern population.

Eungedup Wetlands is a 103ha wetland site on the south coast of WA, purchased for conservation by the community. It was an abandoned potato farm and now is a hotspot for the endangered Australasian bittern and other migratory waders. It will require some thoughtful management but the Eungedup Management Group are up for the task. Photo – Tim Gamblin.

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In early 2022, word of the bitterns at Eungedup reached WICC. WICC in turn partnered with a group of like-minded organisations to approach the owners of Eungedup to see if they would be interested in selling the property. A price of $505,000 was agreed to along with 18 months to raise the funds. Without a background in fund raising, WICC decided to focus their efforts on the local community. After six months they had raised $115,000 comprised of about 230 donations from local community members on the south coast. As donations began to slow, they realised that they needed to get the Eungedup story in front of other potential investors. An investment prospectus was put together and then sent to philanthropic organisations across Australia who came up with the balance of funds.

WICC and its project partners have now formed the Eungedup Management Group to guide and manage the wetlands with a vision as follows.

> *Eungedup Wetlands provides a safe haven and range of habitats to conserve a diversity of native fauna. It will be managed with evidence-based decisions providing a working example of wetland restoration and management for current and future wetland custodians.*

Immediate actions include the deployment of camera traps, the mapping of weeds and a feral animal management program which has reduced fox numbers by approximately 85%. Acoustic recorders will soon be deployed to triangulate the locations of nesting bitterns.

A key issue will be maintenance of a diverse habitat including open water and exposed mud for shorebirds and managing the spread of *Typha* to an appropriate level. At this stage it is uncertain how much *Typha* is needed and what control mechanisms could be effective. The measurement and control of water depths and flows will be critical for habitat maintenance and early surveys are in the planning phase.

An Australasian bittern caught on camera at Eungedup Wetlands. The bittern was first detected in the wetland from its distinctive call. Early estimates have Eugedup Wetlands supporting up to 10% of WA's population of this endangered species. Photo – DBCA.

Planning for the establishment of a wetland centre will soon commence providing a forum for wetland conservation extension into our schools. Eungedup will not only be managed to conserve local wildlife, but also be used as an example for others to follow in order to restore similar degraded wetlands across the South Coast of WA.

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New group grows at Mount Mackie *By Joe Courtney*

When Susan Downes bought the Rivoli property north of York she could not predict the journey it would take her on. Upon learning the Mt Mackie site was where Ensign Dale of the Swan River Colony first laid eyes upon the Avon Valley to the east in 1830, a vision emerged to restore the land for the upcoming 200-year anniversary.

Through the generous assistance of Wheatbelt NRM, the regeneration project began in 2022 with the fencing of a 100-acre area, then the planting of 25,000 seedlings, that have had a very high success rate one year on. The hilly and rocky terrain has provided challenges beyond the standard revegetation project.

Susan's vision has attracted a growing level of community support and the founding of the Friends of Mt Mackie. This team has embarked upon an exciting journey of discovery to understand the endemic plants and wildlife of the site and determine the best methods to regenerate the site and provide for wildlife habitat. Other than wandoo, and York gums on the lower slopes, little else appeared to have survived the long-term impact of sheep grazing. Cape tulip and grassy weeds on the other hand are thriving and weed control will remain an ongoing task over coming years.

Starting with recommended plant lists for the region, including for nearby private bushland and nature reserves, the team has conducted site visits to recognise indigenous plants, aided by plant surveys by the Wildflower Society. The natural emergence of plants demonstrates how nature can show us the best way forward, and be the guide for revegetation efforts. In 2023 a smaller planting of 5,700 seedlings was augmented by planting seeds collected from local areas, and included experimenting with seedballs.

Community involvement has been an important ambition of the project. In 2023 a total of 72 volunteers of all ages joined in over several weekends to lend a hand. They have been treated to visits from the resident population of euros, and an echidna, and future wildlife surveys are also in the plan to see what else returns.

Susan has felt the strong presence of the spirit of the land and has connected with local Ballardong elders who are supporting efforts to make the site a place of reconciliation, healing and potentially cultural functions.

Contact

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1 March 2023 inspection of the 2022 plantings showing an impressive survival rate. This section was the easiest being on the lower slopes where ripping was possible. Photo – Joe Courtney.

Planting this July at the top of Mt Mackie with the view of the Avon Valley to the east. Photo – Joe Courtney.

We've cottoned on to the problem and are flying in *By André deSouza*

The application of Artificial Intelligence (AI) technology for ecological monitoring is a natural progression given the rise in interest in the use of AI. AI is a broad term used to describe the technology that can be used to perform tasks designed to mimic human intelligence. In AI, machine learning, currently one of the most commonly used AI technologies, employs learning algorithms to build models for handling difficult tasks. AI has been around for a while and is used in many familiar areas such as the decision-making part of the auto pilot feature of aircraft.

However, there has been an explosion in popularity with this emerging technology now used for autonomous cars, sending email replies, drawing pictures and even writing poetry.

Ecological monitoring can be particularly challenging due to terrain and varying environment conditions. In Western Australia, this can range from beaches to hills and include vast expanses of unpopulated land. This diversity of form makes the application of remote sensing technologies, such as drones and satellite imagery, viable options particularly as application of these technologies become more affordable.

André flying the drone at Lake Walyungup, Warnbro (WA). Photo – Dannon Wu.

Fruiting cottonbush, the pods open and release light and fluffy seed (right foreground) which are easily picked up and blown large distances on the wind. This makes it a weed capable of swift invasion and a good candidate for weed mapping using drones where large distances may need to be travelled to detect a few plants. Photo – André deSouza.

Declared plant pests, including the narrow leaf cotton bush (*Gomphocarpus fruticosus*), can be challenging to control. Understanding the extent of the spread of cotton bush and controlling it, especially in difficult-to-reach terrain, is made more difficult by the fact that the seed pods, similar to cotton seed pods (hence the name), are easily picked up and blown large distances on the wind. This feature makes missing even one plant problematic for controlling the spread of this species.

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Enter application of drones and AI technology. There are large benefits in using a low-cost drone that can easily fly over an area to capture imagery and then applying AI models to detect where cotton bush is growing.

For my PhD through Murdoch University I have been doing precisely this, collecting imagery using a low-cost drone.

Although I have a CASA-certified drone license (RePL), operators may not require a RePL under certain conditions, such as drone weight of less than 2kgs or less than 25kgs and flying over your own land. I am developing an AI model to detect cotton bush using images taken with this drone and I am pleased to report some early success. Moving forward, if the model is applied using images collected from a wide area, it will potentially lower the likelihood of plants being left undetected and will make control of this invasive plant closer to being within reach. Eventually, if there is a drone company keen to collaborate, there could be real-time detections and autonomous flights flown by a spray drone, which could spot the weed and spot-spray it.

At the time of commencing the research, a cost-effective satellite imagery solution for detecting cotton bush was not available that had sufficient resolution to identify this invasive species. However, as satellite data becomes increasingly popular and available, the cost of imagery is likely to be more appealing and will provide a viable source of imagery for the model.

I am really keen to start working with small community groups to show them how easy it is not only to fly these drones, but also to use the early iteration of this AI model to detect cotton bush.

Even if you are only a small landowner who has recently bought a plot of land and are looking to understand the extent of spread of cotton bush on your land, I am happy to work with you. Being able to apply this technology to produce real world outcomes is the original intent of this project and I am also keen to expand the application of the same methodology to detect additional weed and plant pests.

The drone being used for this weed mapping research is low-cost and small. This one weighs less than a kilo, at the time was around $2,500 and doesn't need a licence to operate, meaning that this new technology could be within reach of community groups. Photo – Dannon Wu.

André's drone photographing him approaching a patch of cottonbush in Wungong Regional Park. Photo – André deSouza.

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Wilbinga Shacks Crew *By The Wilbinga Shacks Crew*

The Wilbinga Shacks Crew is dedicated to the sustainability of coastal lands and the promotion of responsible four-wheel driving and coastal fishing.

The Wilbinga Shacks Crew comprises owners, managers and volunteers of four shacks approximately midway along the coast from Two Rocks to Guilderton within Wilbinga Conservation Park. The four shacks have been in their current location for a period of seven decades and have served for many years as recreational fishing shacks built by the original pastoral land managers of the time. Generations later and these shacks are still maintained by the families of the original pastoral managers. The custodians of the shacks are Gary, Ken, Bob and Dave but they are assisted by many, many volunteers who help these guys maintain all four shacks.

Back in 2008, The Government of Western Australia created Wilbinga Conservation Park which takes in the majority of coastal land from Two Rocks to Guilderton. DBCA are the land managers and have recognised the historical value and significance of these four shacks and the dedicated people that continue to maintain them against very challenging odds, both weather and vandalism. The Wilbinga Shacks Crew have entered into an 'adoption agreement' and work in a voluntary capacity with DBCA in an attempt to maintain future responsible access to coastal areas of the conservation park for outdoor recreation. We are a member of the Australian Recreational Motorised Association and we encourage all users of the conservation park to treat the park with the utmost respect.

This means keeping to the four-wheel drive tracks, never driving on vegetation, and taking back out what is taken into the park.

Annually the Wilbinga Shacks Crew and its volunteers lead a yearly cleanup of the park. We came out this year on a Saturday morning in May. We hope this report will inspire others to work with us as volunteers to assist in the cleanliness, maintenance, and future access to this magnificent coastal conservation park in the Shire of Gingin that we all know as Wilbinga.

We had dire expectations for volunteer numbers after heavy rains overnight and early morning in Perth but surprisingly a very solid number of volunteers and their vehicles and resources such as trailers showed up for check-in. Paperwork for both past volunteers and new volunteers to DBCA was handled by us and Richard Cooper and his team from All Tracks 4WD Club at check-in points at the north and south of the 99km^2 site. The check-in process via a smart device using a QR code was reasonably well accepted by the volunteers. So DBCA is progressing well with new technologies making life that bit easier for the younger generations among us.

Checking in at the start of the day. Sand flags are a really important safety feature for the lead vehicle in every convoy. Photo – Geoff Couper.

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There seems to be a push towards joining an officially incorporated four-wheel drive club by the sheer numbers of volunteers turning up from all the different clubs. We recognised All Tracks 4WD Club, Toyota Land Cruiser Club of WA, The 4WD Club of WA, Team W4, The Isuzu 4WD Club of WA, and Track Care WA and if we haven't mentioned your club, you know who you are. Thank you and we are highly recommending these 4WD clubs as they are very well organised and progressive in maintaining access for the future for everyone.

We need to mention the commercial entities who came out to assist. The three DBCA commercial licenced four-wheel drive training providers, Ultimate 4WD Training, Adventure Offroad Training and Eureka 4WD and Truck Training. And to Shaun and Sarah from West Coast 4x4 Recovery getting three wrecks out and ironically, we are led to believe, the only ones that got bogged on the day. Shaun put the bogging down to some recovery practice. Thank you guys, for giving up your day and offering your resources free of charge.

And to all the individuals, not members of anything, thank you so much for being part of something good and wholesome.

The Shacks Crew cannot thank you all enough. You guys have certainly helped keep the place clean and open.

DBCA, armed with the BBQ trailer, fed lunch to all the volunteers as they came out of the bush and did brilliantly well, so friendly too. I think the parks officers were all very, very impressed with the sheer number of volunteers. The hours worked by volunteers assists DBCA with the upkeep of tracks and signage providing a better experience for visitors and protects the nature conservation values for the park.

Collectively approximately 100 volunteers' feet on the ground, just a morning's effort is all that is really needed, and it totals to a big effort of 500 hours out there. The Shacks Crew is happy to announce that the rubbish taken out this year has been the smallest amount in past years. So that makes all the annual cleanup efforts, which stretch back about 15 years, well worthwhile.

The weather held off for the time of the cleanup and started bucketing down again on everyone's return home. No dust trail to follow out, always makes for a better, more leisurely day.

All we ask is, whatever you choose to do in Wilbinga, do it to maintain future access for future generations, please! Do the right thing out there and if you don't know what the right thing is, ask someone, create that conversation, amongst yourselves and other peers of the 4WD community.

A pile of rubbish collected on our cleanup day in May 2023. We are happy to announce that it was the smallest amount in years. About 15 years of annual cleanups is starting to pay off. Photo – Darren Beekwilder.

The wrecks pulled out by West Coast 4x4 Recovery. Thanks for donating your time and resources. Photo – Shaun Butcher.

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Volunteers needed for seagrass health monitoring in the Swan and Canning rivers *By Charlie Phelps*

Seagrasses are some of the most productive organisms in the world with productivity rates that can be twice that of forests. They play a role in maintaining oxygen levels at the sediment/water interface, support diverse and productive faunal assemblages and are an important food source for animals such as the black swan. Between October and April each year scientists at DBCA measure, monitor and report on the physiological and chemical characteristics of seagrass condition in the Swan and Canning rivers and assess the responses and impacts of associated environmental pressures to provide an overall health metric for its seagrass meadows.

DBCA are looking for volunteers for three roles to assist this project and contribute to maintaining the health of the Swan and Canning rivers whilst gaining professional experience, training and skills in positions to March 2023. Participants need to be able to follow safety protocols, provide their own personal protective equipment (e.g. hat, sunscreen, sunglasses, rash-vest, booties), organise their own transport and participate in training relevant to their role.

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Peter Howie from DBCA installing light loggers into the Swan River at the Rocky Bay site. The light loggers monitor light quantity throughout the season to ensure the seagrass is receiving enough light to photosynthesise efficiently. An important aspect of ensuring we obtain fantastic light data is maintaining these devices in-situ. The 'adopt a logger' program gives volunteers the opportunity to care for and maintain these loggers throughout our seagrass season aiding DBCA in monitoring overall seagrass health. Other volunteer positions assist in monitoring seagrass quadrats in the rivers and in the lab. Photo – Jarra Chapman.

Adopt a logger

You will be responsible for maintaining a logger once a week. Maintenance includes cleaning, photographing, downloading data and returning the logger to its original position. Loggers are mounted at approximately 0.5–1m depth and you may need to squat down to submerge your upper body, but not your head, to unscrew it from its mount.
The ability to swim is required for your safety as volunteers may need to wade moderate distances, 100–1000m offshore to access your site.

Seagrass monitoring assistant

Volunteers work with DBCA staff two days a week to monitor quadrats for seagrass/macroalgae and benthic fauna; collect seagrass/sediment cores; and maintain data loggers.

You must be a confident swimmer and snorkeller, be competent with electronic tablets and spreadsheets and have an eye for detail.

Laboratory assistant

Volunteers assist with processing seagrass samples 1–2 days a week. This includes identifying, sorting, labelling, weighing, and data entry and processing of specimens at the Kensington laboratories. You must have an eye for detail and be prepared to spend long periods seated at the laboratory bench processing samples.

Get in touch if you'd like to get involved.

Bat monitoring for citizen scientists *By Kelly Sheldrick*

In Western Australia we have 42 bat species from eight different families. We have tiny bats that weigh less than a 10c coin and can fit on the end of your thumb and we have some of the largest bats in the world with a wingspan of over 1m!

We have a 'fishing bat', three species of fruit bats, lots of mozzie-eating bats, and even a bat that eats bats – our bats are diverse! Yet there are lots of unknowns about our WA bats. This makes it difficult for us to assess how populations are faring particularly in response to habitat loss, fragmentation, and climate change.

At the Conservation Council of WA (CCWA) our Citizen Science Program is all about actively working with the community by engaging citizen scientists to take part in projects that generate new understanding, contribute to meaningful research, and allow the exchange of knowledge.

For this reason, we're establishing a broad-scale citizen science bat monitoring program. This program will:

1. Determine current distribution ranges and populations for our bats and look at changes and trends in these populations over time.
2. Monitor the impact of habitat loss, fragmentation, and climate change on our bat populations over time.
3. Provide better protection and management for bats and their habitat, including enhancing IUCN red list assessments of bat species.

In addition, the program will raise awareness and build capacity for bat conservation.

Citizen scientists can join the program as Bat Champions who commit to walk a transect twice over summer for a minimum of five years. The Bat Champions are equipped with a hand-held bat detector which turns a tablet into an active bat detector to record echolocation calls and display bat calls as sonograms. There are also opportunities to train to join the team analysing bat acoustics or even to be the contact person that organises sharing the bat detector kits. Photo – Isobel Armstrong.

How can I get involved?

Join the WA Bat Monitoring Program and get involved with one (or more) of our bat monitoring opportunities. There will be something for everyone, no matter what your experience, your availability, or your age.

Some ways to get involved:

1. Roost counts - counting bats as they emerge from a roost.
2. Bat walks – walking a set transect route with a bat detector, whilst recording the bats you see and hear.
3. Bat call acoustic analysis - learning and assisting with the analysis of bat calls collected from bat walks and roost assessments.

There will also be the opportunity to help with echolocation call collection, bat detector building workshops, and being an awesome 'kit keeper' for a detector!

To get involved email us or join our CitSCi newsletter to keep in the loop with the latest bat monitoring and other citizen science opportunities.

*This tiny long-eared bat weighs between 5–9g, less than a Tim Tam. This is the Arnhem long-eared bat (*Nyctophilus arnhemensis*) which is found on the north coast and in the Kimberley. We have long-eared bats throughout the whole of WA, at least six species, including around Perth. Photo – Kelly Sheldrick.*

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Funding opportunities

2023–2024 Volunteer Grants $1,000–5,000 to support the efforts of volunteers, inclusion of vulnerable people through volunteering and increase volunteer participation. Contact your federal MP to be eligible for applications in the **second half of 2023**.

Saving Native Species (Priority Species) provides up to $500,000 to incorporated entities, Aboriginal Corporations, research organisations, local governments and trusts including in partnership with State government to improve the trajectories for the 110 identified priority threatened species from the Threatened Species Action Plan (2022–2023). Applications **close 7 September**.

The Hamer Sprout Fund Sustainability Grants gives to smaller organisations and projects to get them off the ground. Supports innovation in environmental education, engagement in environmental action, advocacy for environmental sustainability, and collaboration between young people engaged in environmental leadership. Applications **close 30 September**.

Healthy Estuaries WA is partnering with seven catchment groups to fund fencing and revegetation of waterways on farms to improve water quality in seven estuaries in the south-west of WA. Contact your local group as **funding varies**.

Swan Canning Riverpark Urban Forest program supports public land managers to improve their urban forests in a $3 million investment in revegetation and improved management in the Swan Canning catchment. Approach your public land manager to partner in projects. **Open year-round.**

NACC Growing Great Ground incentives up to $1,000/ha for establishment of ground cover and biodiverse native vegetation in the Northern Agricultural Region to address wind erosion on agricultural land. Expressions of interest are **open year-round.**

Wettenhall Environmental Trust small environmental grants scheme funds research and education projects on fauna and flora conservation. Applications **open 1 October.**

Purves Environmental Fund up to $50,000 for projects addressing the focus areas of habitat destruction, capacity building of key NGOs and climate change adaption. Applications are **open year-round.**

Alinta Energy Community Grants Program up to $20,000 for projects addressing social disadvantage or environmental sustainability. Applications **close 17 September.**

Aurizon Community Giving Fund up to $20,000 for projects in the areas of health and wellbeing, community safety, environment and education. Applications **likely to open September.**

IGA Community Chest raises funds to support local communities, charities and other worthwhile causes. Approach your local store **year-round.**

The Indigenous Land and Sea Corporation's Our Country Our Future program funds land acquisition or management projects that deliver benefits to Indigenous Australians. This includes on-ground activities to maintain or improve the condition of Country (land, water, biodiversity, and cultural heritage). Applications **open on an ongoing basis.**

Indigenous Protected Areas program grants available to establish 10 new IPAs and expand existing dedicated IPAs under an open-competitive grant opportunity. Applications **close 6 October.**

Aboriginal Ranger Program Development Fund with small grants <$150,000 for organisations looking to start a ranger program to assist with planning and preparation and large grants >$150,000 for organisations that need assistance employing rangers or need support building their capacity. Applications **close 9 October.**

Our Marine Parks Grants 3-year funding for organisations working in Australian Marine Parks to develop management solutions; research and monitoring of park values; and support traditional owners to maintain culture and park management. Applications **close 27 September.**

Lotterywest Grassroots Community-Led Grants are available for proposals big or small that work towards sustainable ecosystems including restoration, care for natural heritage, protection of endangered species, and reduction of the community's impact on the environment. Applications are **open year-round.**

Local government and place-based community grants These local governments provide small grants to their communities which may fund environmental groups' management and restoration projects. Eligibility varies. Armadale Community Grants **close 2 October**, Armadale Habitat Links **open year-round for rural residents**, Belmont **closes 20 October**, Busselton **closes 2 October**, Cockburn Sustainability are **open November**, Derby/West Kimberley **closes 31 December**, Gosnells **close 30 September**, Harvey Water **open year-round**, Mandurah **opens September**, Rockingham **closes 17 November,** Serpentine Jarrahdale **open in October**, South Perth **open year-round**, Swan **open year-round**, Wanneroo **open year-round**, Alcoa Waroona **closes 15 August**.

Resources

Recent Research

Fowler WM, Standish RJ, Enright NJ, Fontaine JB (2023) Extinction debt varies in two threatened Mediterranean-type woodland communities undergoing rapid urbanization *Australian Journal of Botany* online early.

Povh LF, Willers N, Shephard JM, Fleming PA (2023) A conservation-significant threatened mammal uses fire exclusions and shifts ranges in the presence of prescribed burning *International Journal of Wildland Fire* online early.

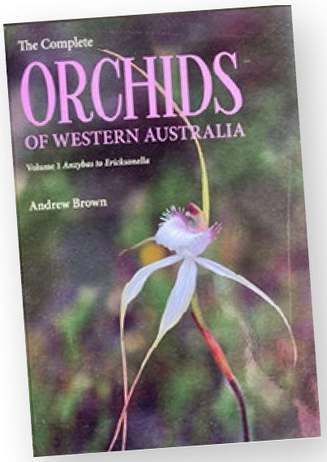
Ramsey DS, Patel KK, Campbell S, Hall RN, Taggart PL, Strive T (2023). Sustained Impact of RHDV2 on Wild Rabbit Populations across Australia Eight Years after Its Initial Detection. *Viruses* 15(5), 1159.

Shaw R, and Ottewell K (2023) Understanding sources of feral cats in Dryandra Woodland through DNA analysis *Final report to Peel Harvey Catchment Council*.

Resources

Publications

The Western Australian Restoration Economy: A roadmap towards a sustainable industry with better environmental outcomes Young RE, Subroy V, Trevenen E, Kiatkoski Kim M, Jonson J, Pandit R, Whitten S, Poole M, and Kragt ME WABSI, 2022 A report to understand the size and scope of the Western Australian Restoration economy including a market-based analysis, gap analysis and draft roadmap to lift WA's ability to deliver large-scale ecological restoration.



The Complete Orchids of Western Australia Brown, Andrew. *The Australian Orchid Foundation*, 2022. $70 . This comprehensive two volume set contains descriptions and more than 1,500 colour photographs for all 42 genera and 470 orchid species currently known to occur in Western Australia including formally named, unnamed, and hybrids. It includes who named them and where they were first collected, habitat, distribution, flowering period, size, and distinguishing features with distribution maps.

Appreciating and Documenting Unique Native Orchids: Why fungi and insects matter Dhakal, Subas. *Friends of Brixton Street Wetlands*, 2023. $15. Showcasing the unique native orchids of Brixton Street Wetlands using conservation photography. Available from the friends call 0407 544 679 or email.

Western Australian Feral Cat Strategy 2023–2028 aims to conserve populations of threatened native fauna species through effective, adaptive, and humane actions to control feral cats. The strategy is backed by a $7.6 million investment through the 2023–24 State budget.

Felixer™ Feral Cat Grooming Trap Study Final report Bettink K and Townsend C *Peel Harvey Catchment Council*. Presents finding from the photo only (non-toxic) mode trails of Felixer™ feral cat grooming traps in Dryandra National Park and surrounding agricultural land.

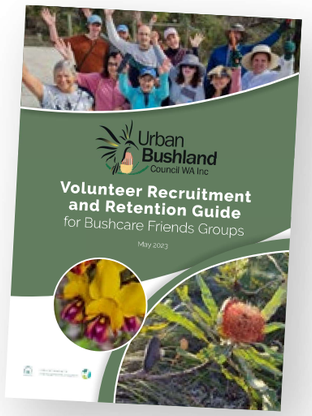
Feral pest management Two planning guides have been published by the Centre for Invasive Species Solutions for feral cat and fox management. They provide a framework for land managers, community groups, pest control professionals and biosecurity organisations to make decisions and select management options that suit their circumstances.

Plants of Rottnest Island *WA Naturally*, 2021. $6.95. Discover more about the remarkable plants that inhabit Rottnest Island with a copy of Plants of Rottnest Island in your back pocket. You will learn how to identify different species, and uncover fascinating facts. This BushBook presents 37 the islands most noticeable plants many of which would be encountered during a day's visit. All but three are native species. Other widespread of plants are likely to be be weeds. Pocket-sized publication.

Secretive Slime Moulds Stephenson, Steven. *CSIRO Publishing*, 2021. $180. Comprehensively describes Australia's 330 known species of myxomycetes, or slime moulds. Neither plants, nor animals, nor fungi, the myxomycetes are a surprisingly diverse and fascinating group of organisms. This comprehensive monograph provides keys, descriptions and information on the known distribution in addition to containing introductory material relating to their biology and ecology. Many species are illustrated, showing the diversity of their fruiting bodies, and greatly facilitating their identification.

Mistletoes of Western Australia Start T and Thiele K *CSIRO Publishing*, 2023. $59.99. An illustrated guide to the seven genera and 42 species of mistletoes found in WA. Identification including simple keys, photos and distribution maps, conservation, ecology, biogeography and evolution including how they cope with fire.

Websites and videos



Volunteer Recruitment and Retention Guide for Bushcare Friends Groups a new report with extra links from the Urban Bushland Council to help you find out about current volunteering trends and approaches to setting up new groups

Australia's Threatened Species Index had its fourth release in December 2022. The index covers 278 species and tracks change in abundance since 1985. The latest release shows that documented threatened and near threatened species are continuing to decline with the strongest downward trend experienced by plants. However, some species and groups of species are stabilising or beginning to increase. Investigate trends and download data for species groups, states and territories and baseline years using the data visualiser tool.

Centre for Invasive Species Solutions Youtube channel with forums or short-form videos on tools and strategies to prevent, detect and manage invasive species.

Hearts Healing the Land 2023 conference is now online to stream videos of each presentation if you missed it or want a refresher.

Junior Landcare website has a new look. It includes a Learning Centre developed by educational professionals with 30-minute learning activities on four key areas: food, Indigenous perspectives, waste management and biodiversity. And a new section **How to start a Junior Landcare group** full of ideas, resources and activities to connect young people interested in helping to restore, protect and enhance the local natural environment.

For local stories featured on **Gardening Australia** check out The Friends of Lake Claremont or Dr Kit Prendergast our native bee specialist.

foxtails

Photo – John Siemon.

By Julia Cullity and Karen Clarke

Foxtails (*Andersonia caerulea*) with their striking pink and blue spikes of flowers begin flowering in winter, continuing through spring. An endemic plant of WA, you will find them in sandy heath and woodlands in the southwest corner of WA from around Mandurah through to the south coast, east of Albany. The Stirling Range is a great place to find them.

They are small plants, so look down as they can be 0.5–1m tall. They can be common where they are found in the understory and have an abundance of flowers. Foxtails are eye-catching and unusual due to the contrasting colours of blue and pink in the flowers, often shared in the *Andersonia* genus but rarely seen elsewhere. The small pink stars are formed by the sepals. The sepals surround the blue petals that form a tube open at the tip where they expose a fluffy underside. The species is very variable in leaf shape, and height and has four described subspecies.

Andersonia's are a member of the heath family Ericaceae and are usually difficult to propagate and cultivate. It is believed they are pollinated by native bees, but observations and photos are needed to confirm this. Plants in the heath family also have specific mycorrhizal associations of fungi in their roots.