bushland news

urban nature

Issue 129 **Autumn** 2024 *Time of Bunuru and Djeran in the Noongar calendar.*

Western Australian Naturalists' Club celebrate 100 years

Photo – Mathew Garstone/Kevin Coate.

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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Next issue

Winter *Bushland News*

Winter *Bushland News* contributions should be sent to Urban Nature by **9 May 2024**. *Bushland News* seeks original contributions. If your submission has been or may be published elsewhere please let us know. Compiled and edited by Alex Hutchinson.

Western Australian Naturalists' Club celebrate 100 years

By Don Poynton

Every now and then, organisations change or update their logo. For the Western Australian Naturalists' Club this year, it was a very simple but significant task: the club had the privilege of adding the words "Celebrating 100 Years … 1924-2024".

The club was founded in 1924 by prominent scientists of the day, and after various ups and downs developed after World War II into a flourishing organisation holding regular meetings and excursions, conducting flora and fauna surveys, co-hosting very popular wildlife shows and producing its own journal, reference books and guide books. These activities have provided the opportunity for Western Australians of all ages, adults and children alike, to gain an understanding and appreciation of the State's unique plants and animals, and our terrestrial and marine environments, while providing a hub for amateur and professional naturalists to share knowledge and expand on their fields of interest.

When Ludwig Glauert, Curator of the WA Museum gave the first lecture, entitled 'The Past History of Australia as revealed by Animals of the Present Day', he started a tradition which continues today. Over the hundred years, members have heard local and visiting speakers give hundreds of talks covering topics in the traditional fields of botany, mycology, ornithology, entomology, herpetology, mammalogy, marine biology, geology, and more recently, climate change, prescribed burning and loss of habitat and biodiversity.

Since the first excursion, "to investigate the material washed up (on Leighton Beach) by the storm" in July 1924, members have participated in field excursions across the State to study or survey different habitats under the guidance of experts in the various fields of natural history. This 'hands on' experience has played a significant role in increasing members' knowledge as well as providing endless hours of wonderment and friendship. Several excursions to the Kimberley in the 1980s even led to an island just off the coast being named Naturalists Island in recognition of the club's contribution to the knowledge of the wildlife of the region.

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Since 1989, the club has presented the Serventy Memorial Lecture, named in honour of the members of the Serventy family who gave many decades of service to the club. This annual public lecture aims to raise the profile of Western Australia's extraordinary biodiversity and all the money raised continues the club's long tradition of supporting students studying natural history. This includes the WA Naturalists' club Serventy Memorial Prize in Natural History which has been awarded annually since 2002 to students from Perth's public universities "who show the most interest in and enthusiasm for natural history and to recognise their exceptional performance in their studies".

Left: Bob Goodale (centre) and club members on the Dryandra Forest excursion in 1990. Bob is pictured holding an echidna. Photo - Sylvia Tetlow.

Front cover: Club members atop Naturalist Island, Prince Frederick Harbour at the mouth of the Hunter River, listening to excursion leader Kevin Coate, 2006. Photo – Metthew Garstone/Kevin Coate.

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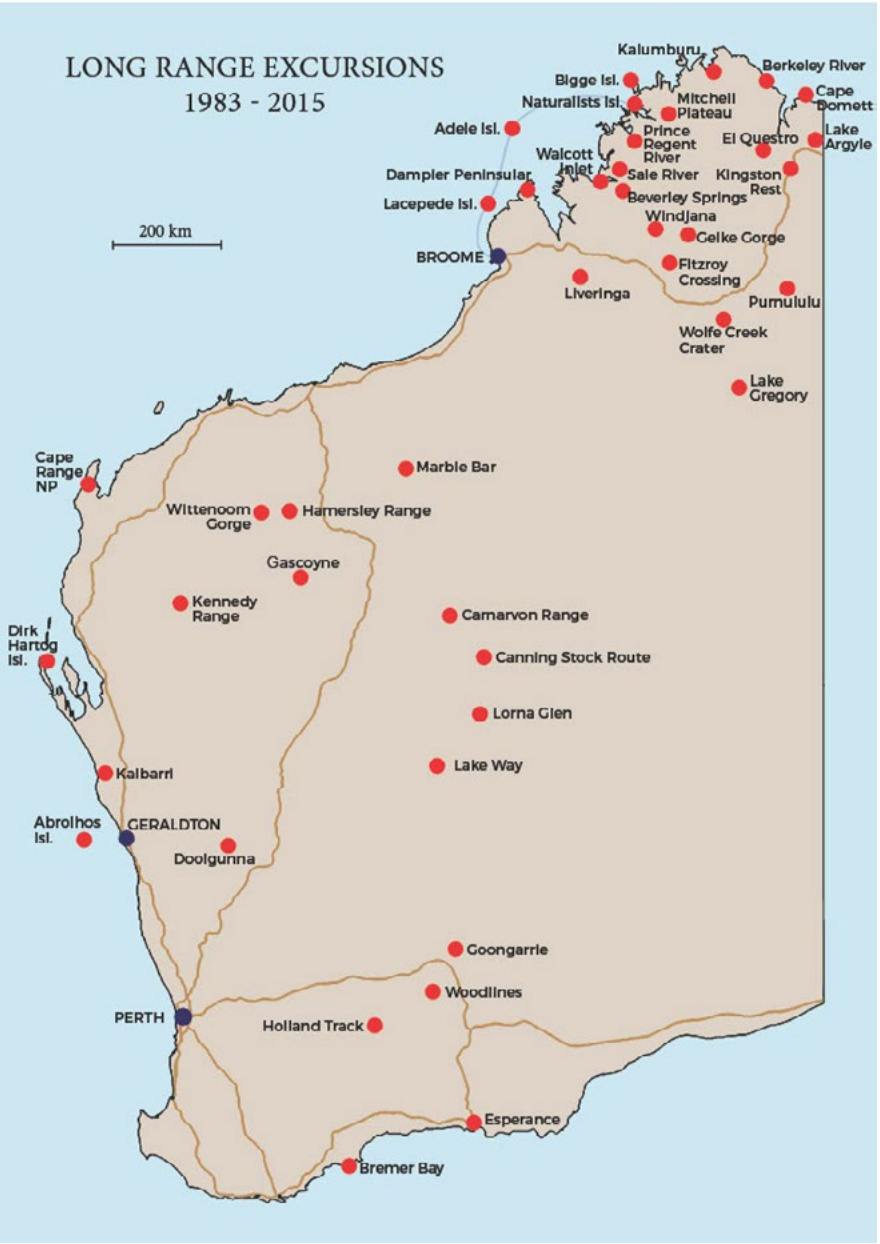


A map of the long range excursions undertaken by the club from 1983-2015. Image – Ian Coate.

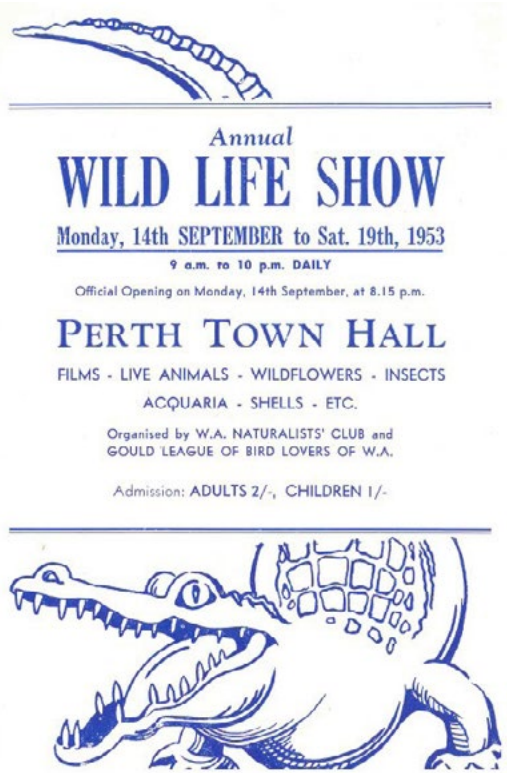
The flora and fauna surveys conducted throughout the State, including at the club's own field station on Cooleenup Island in the Murray River delta at Yunderup, have contributed to the scientific knowledge of our unique biodiversity and to the discovery of several new species of plants and animals. These discoveries, or in some cases rediscoveries like the noisy scrub-bird in 1961, along with many other observations were often, and still are, published for the first time in the club's own scientific, peer-reviewed journal, The West Australian Naturalist, produced continually since 1947. Notably, Ivan Carnaby's paper in the December 1948 volume, 'Variations in the White-tailed Black Cockatoo', led to the elevation of the sub-species into a full species, named after the author.

Although wildflower exhibitions held in the 1920-30s turned meagre profits and a Natural History Exhibition in 1939 attracted 382 adults and 521 children, it was the later wildlife shows that would prove to be the club's main source of income for many years.

The West Australian Naturalist magazine

"It is not intended (to) … be a magazine of popular natural history. …. The matters published will represent the original work of our member field-naturalists, work that will be a contribution to the knowledge of our flora and fauna. Nevertheless, the journal should be of interest to that section of the general public which has a taste for natural history" V.N. Serventy, President, W.A. Naturalists' Club in The Western Australian Naturalist, Vol. 1, No. 1, June 18, 1947.

Club members on an excursion to Point Peron in 1950. Photo – Joy Harnett.



Right: Poster for the 1953 annual wildlife show held at Perth Town Hall. Hopefully no crocodiles were present but the showing of a short-necked tortoise, now known as the western swamp tortoise, was of great interest. Image – Western Australian Naturalists' Club.

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Initiated in 1946 by the club in association with its sister organization, the WA Gould League, as a way of raising urgently needed funds, the wildlife shows were the highlight of the year not only for club members and the public, but for thousands of school children who made the annual trip into the city to attend the show in the Perth Town Hall and later in the Fremantle Town Hall. At its peak in the 1960s, up to 20,000 children were attending the week-long event where they were encouraged to join the junior or intermediate branches of the club. The show attracted world-wide attention in 1953 when junior member Robert Boyd brought a short-necked tortoise to the show. It created great interest among zoologists as this animal had not been seen since Priess collected the first specimen in 1839. A club member and former junior, Andrew Burbidge, who renamed the species as the western swamp tortoise (*Pseudemydura umbrina*), received his Doctorate for research into their life history. The ingenious use of transmitters attached to their bodies enabled him to trace their movements.

Andrew then joined the Department of Fisheries and Fauna in 1968 and went on to work as a research scientist and manager for a series of Western Australian Government departments until 2002. In 2014 he was appointed an Officer in the Order of Australia (AO), recognising his distinguished service to the environment as a conservation biologist. In 2022 Andrew collaborated with another Naturalists' Club member Ian Abbott, to produce *Island Jewels - The Natural History of Western Australia's Islands.*

Today, the Western Australian Naturalists' Club continues the work of its founding members and as Perth has grown, so has the club. In addition to the 'Main Club' in central Perth, to which all members belong, branches have been established in the east (Darling Range Branch, established 1974), in the south (Kwinana-Rockingham-Mandurah Branch, established 1980) and in the north (Northern Suburbs Branch, established in 1985 as the Wanneroo Branch).

To mark its 100th anniversary, the club will hold several events throughout 2024, commencing with a public launch of the anniversary at Tomato Lake, Kewdale, on Sunday 7 April 2024. Details of other events the club will host throughout the year for its members and the wider community will appear on the club's website. Past members are encouraged to contact the club and to join in its celebrations. A new history of the club is planned for publication after the conclusion of its centenary year.

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Club members clearing Salvinia molesta *from Tomato Lake, Kewdale,1974. Photo – Penny Hussy.*

Why Tomato Lake?

Tomato Lake is the site of just one of the club's many achievements over the last 100 years. In 1974 the club instigated a massive cleanup of Tomato Lake for its 50th anniversary conservation project. The lake had become infested with a thick mat of the introduced aquatic fern Salvinia molesta which covered the entire lake. The weed was preventing waterbirds from using the lake and the long-necked turtles from coming to the surface to breathe. Club members, the local community and the Belmont Shire Council (now City of Belmont) joined together and by manually removing the weed, the lake returned to being a haven for wildlife. Tomato Lake is now a refuge for the turtles and numerous bird species as well as its surrounds being a very popular spot for recreation.

Urban Nature update

By Alex Hutchinson

Though the Urban Nature team has been trying to avoid the hottest days of summer for field work, there have still been many opportunities to get out and about; with some trips, as discussed by Grazyna in full detail below, of most excitement.

In December, making the most of the cooler weather, I ventured out to do some monitoring of a rehabilitation area in Jandakot Regional Park alongside Karen Clarke, who has been a part of the management and monitoring at that site for a long time now. It was my first time at the site and I was barely able to imagine how it could have previously been a cleared grassy paddock with areas of fenced and unfenced rehabilitating bush. The Banksia Woodland Restoration Project, funded by Jandakot Airport Holdings to offset the clearing of 167ha of native vegetation at Jandakot Airport, is being managed by DBCA.

A major component of the project is to establish a new banksia woodland in cleared areas using topsoil from Jandakot Airport supplemented by direct seeding and planting. A part of the ongoing monitoring program at the site includes assessing the amount of foraging habitat available for cockatoos, and recording any feeding evidence. This monitoring involves counting the number of cones on a banksia tree, and then counting the number of follicles present on the cones. Thankfully we only count up to 20 cones on a single banksia as some of the trees in the rehabilitation area very prolific, having over 30 cones on some trees.

Another activity of interest was the WA Wetlands Conference held at the Wetlands Centre Cockburn which was a thought provoking two days and great for networking. It was nice to meet up with some of the contributors for this issue and past contributors too! You can find proceedings from past conferences on the Wetlands Centre website.

With Julia away, I have been learning the ropes of producing Bushland News and here we are—fully published and distributed! I am now passing responsibility for the winter edition over to Will Fowler who is being welcomed into the role, so if you have any queries, Will is the one to go to for the time being.

Continued next page ...

Myriocephalus nudus *hasn't been seen in over 170 years. It shows preference for open areas among wetland vegetation, where it creates a yellow carpet of everlasting. Photo – Grazyna Paczkowska.*

Back from extinction

By Grazyna Paczkowska and Greg Keighery

Not very often in our conservation careers, if ever, do we get involved in the rediscovery of flora species that were thought to be extinct. To find something that hasn't been seen in over 170 years is incredibly exciting, even if it was accidental (that is, we did not search for it) and it started as a misidentification.

Western Australian flora is very diverse with more than 12,500 native species known from the wild. Some species are common, but others are rare and threatened, and in the worst scenario some become extinct. For a species to be listed as presumed extinct, there is no reasonable doubt that the last individual has died. This requires that the species have been adequately searched for in known and/or expected habitat, at appropriate times over a reasonable time frame. There is some optimism in the phrase 'presumed extinct' as there is always a chance that a species listed as extinct may be found again.

Myriocephalus nudus is one of the plants listed as presumed extinct. It is a small annual daisy only known from collections made around the 1850s by James Drummond, an early Western Australian botanist. As it was in those days, with no road maps or even place names available, the collections lack precise locality details, and Drummond's collection is only noted as being from the Swan River, Western Australia. Paul Wilson, a daisy expert, noted in his revision of *Myriocephalus* (Nuytsia 14: 437-444, 2002), that the specimens 'appeared to have been gathered from muddy situations and were presumably growing in winter wetlands'.

Some time ago, Urban Nature was involved in setting up a monitoring program to assess recovery of a clay-based wetland in the Northern Jarrah Forest that was impacted by offroad vehicle and wild pig activity. Along one of the monitored transects, we found a small daisy that was just about to flower which was tentatively identified as *M. appendiculatus*. No voucher specimens were collected but two plants were stuck into a field herbarium. Subsequently, the transects were monitored for the next three years and this daisy reappeared only once along the same transect within that time frame.

I had a chance meeting with Greg Keighery, a botanist and recently retired DBCA Senior Principal Research Scientist, who is one of the many botanists who has been involved in the search for *M. nudus* for over 10 years. We had a discussion on the peculiar morphology of this plant species which consequently prompted me to revisit the Urban Nature field herbariums. There was in my mind a recollection of seeing something that could fit into Greg's description of the species in question.

There was a bit of excitement from Greg and WA Herbarium staff when I showed them the field herbarium from 2016 with these two plants. However, the specimens were immature plants and mature flowering and fruiting plants were required to confirm whether it was the presumed extinct *M. nudus*. Urgent surveys were carried out to the wetland site at appropriate times to relocate the plants and then to collected representative samples to enable confirmation of this plant identity.

We are happy to report that it is the presumed extinct *Myriocephalus nudus*. The rediscovery has generated a flurry of activity; Greg is currently working on updating and reviewing *Myriocephalus* taxonomy; a nomination will need to be prepared to list the species as threatened (and de-list it as extinct); and a detailed survey of this current population will need to be undertaken too. And of course, we are always on the lookout for new *M. nudus* populations.

Myriocephalus nudus *is a small daisy with yellow spherical (rounded) flower heads. Photos – Grazyna Paczkowska.*

Greg Keighery being finally able to collect the elusive daisy after almost a decade of intensive surveys.

Novel approaches to controlling a prickly problem *By Alex Hutchinson*

African boxthorn (ABT) (*Lycium ferocissimum*), previously discussed in Bushland News Winter 2012, remains on the Weeds of National Significance List and still presents managers with a prickly problem.

Originally from South Africa, the spiny, multi-branched, woody perennial shrub can quickly form dense impenetrable thickets with plants commonly 2-3m in height and some growing up to 6m. Flowering can occur year-round and the round, red fruits contain 20-70 seeds. Plants can spread through the dispersal of seeds by birds, mammals, and water, and by the suckering of plant roots. The seeds are highly viable, and broken off stem or root pieces can stay alive for some months before resprouting. ABT can impact upon biodiversity by altering vegetation structure and composition, displacing native vegetation (and consequently fauna habitat), impeding beach access for marine fauna, and causing the entanglement of seabirds and birds resulting in their death.

Complex sites - lessons to learn

In Western Australia, ABT has been recorded from Carnarvon to the border of South Australia, with infestations occurring along coastal islands around Geraldton to the Recherche Archipelago and in the Wheatbelt. Many infestations occur or have occurred on coastal islands and these sensitive ecosystems with high biodiversity values require varying considerations prior to implementing management.

On the Pelsaert Group of islands, west of Geraldton, management for ABT has been implemented since the discovery of plants on the Abrolhos Islands in 1989, though a hiatus in control for about five years was enough for the ABT to take over again. The main method of control across the Pelsaert Group since the mid-2000s has been cutting plants to the stump, including suckers, and treating cut stumps by painting on herbicide. Plants of appropriate size were completely removed including the root and subsoil structures where possible.

On follow-up trips it has been evident that secondary root systems can re-shoot and that the new shoots and suckers can occur at considerable distances from the main plant. Suckering of cut and painted stumps has been observed, albeit in small numbers, requiring continued monitoring and follow-up control.

Further down the coast at the Beagle Islands group, west of Leeman, managers face a similar story to those on the Abrolhos. The Beagle Islands are home to an array of native wildlife and support a resident breeding colony of Australian sea lions (ASL) (*Neophoca cinera*). The islands also provide breeding habitat for burrow-nesting seabirds such as the wedge-tailed shearwater (*Ardenna pacifica*) and for surface-nesters like the Caspian tern (*Hydroprogne caspia*) and rock parrot (*Neophema petrophila*).

In 2012 there was a heavy infestation of ABT with an estimated 250 mature plants recorded on the island. Dead seabirds were found entangled in ABT plants, and it became the dominant vegetation type in some areas providing subpar habitat for the ASLs and birds compared to the superficially similar native shrub *Nitraria billardierei*, which was being pushed out of areas where ABT prevailed.

Dead birds found entangled in ABT plants. Photo – DBCA.

To address the impacts of ABT on biodiversity, a targeted weed eradication plan was implemented by DBCA (then Department of Parks and Wildlife) Turquoise Coast district staff with the assistance of volunteers over the years of 2013-2018. It was important to determine appropriate timing for control to reduce disturbance to any ASL pups; needing to wait until pups were more independent, and females were more frequently out in the water feeding. Initial trials and field days in 2013 were met with various difficulties due to several factors but were overall successful.

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The chosen method of control for the Beagle Islands was the cut and paint method, with hand removal of smaller plants. Foliar spraying was not an option due to wind drift and the hardiness of the ABT plants, with some shrub complexes reportedly 'bigger than a car' in 2013. Glyphosate water mix was used due to the sensitive nature of the island ecosystem and concerns with taking diesel, commonly used to mix with herbicides, onto the island. Due to logistical difficulties associated with removing the thorny and weighty pruned ABT biomass off the islands and the risk of spreading seeds to un-infested areas, cut material was placed into windrows on a section of limestone on one island and left to breakdown in situ. Once dry and broken down the pile was burnt at an appropriate time.

The island was left to regenerate naturally—though there was some concern that ASL pups may require ABT for protection and may be impacted, so it was considered whether to erect artificial habitat if required the following year when a new round of pups would be requiring shelter. However, this was not required as native plants like the *N. billardierei* grew back quickly and re-established over the island in areas where the ABT had dominated, providing the necessary habitat required for fauna. In the limestone area that was burnt, seabirds were observed to be utilising the area, and in 2023 the threatened fairy tern (*Sternula nereis nereis*) was observed to be nesting on the site.

Over time it has been discovered that with ongoing management, less resprouts reoccur each year and subsequent regrowth is smaller and more manageable. The Beagle Islands are predominantly ABT free, with follow up monitoring continually occurring to detect any new infestation, and control is implemented as required.

DBCA staff and volunteers taking a well-earned break. Dealing with extreme temperatures, high wind speeds, the logistics of getting personnel, equipment and heavy tools from the mainland to the island, and nursing or resting Australia sea lions were just a handful of items to consider and work around when doing weed control on the Beagle Islands. Photo – DBCA.

Research and action in the works

Other states in Australia are also impacted by this vicious weed, which prompted research by the CSIRO into the use of a classical biocontrol agent, a rust fungus (*Puccinia rapipes*), to help manage ABT. In 2023, the CSIRO began releasing the fungus in New South Wales at fixed monitoring plots, to evaluate its establishment, spread and impacts on ABT, supported by investment from the NSW Environmental Trust. At present, the fungus is not available for release in areas outside of NSW.

The rust fungus offers promise as a complementary control method because it is safe to native vegetation and wildlife, cost effective and sustainable, with negligible risk of off-target damage, thus making it particularly suitable in culturally and ecologically sensitive areas. The rust fungus was originally isolated from diseased plants in South Africa and extensive host-specificity studies undertaken by the CSIRO have shown that it poses no risk to native Lycium species and other tested Australian species. The rust fungus does not kill the plant but is expected to reduce plant growth and fruit output.

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An Australian sea lion on Beagle Islands Nature Reserve. Despite scheduling initial trips for when the pups would be more independent some were still present actively nursing from their mothers or sheltering in bushes. These areas were not disturbed and were re-visited on later days for control. Photo – DBCA

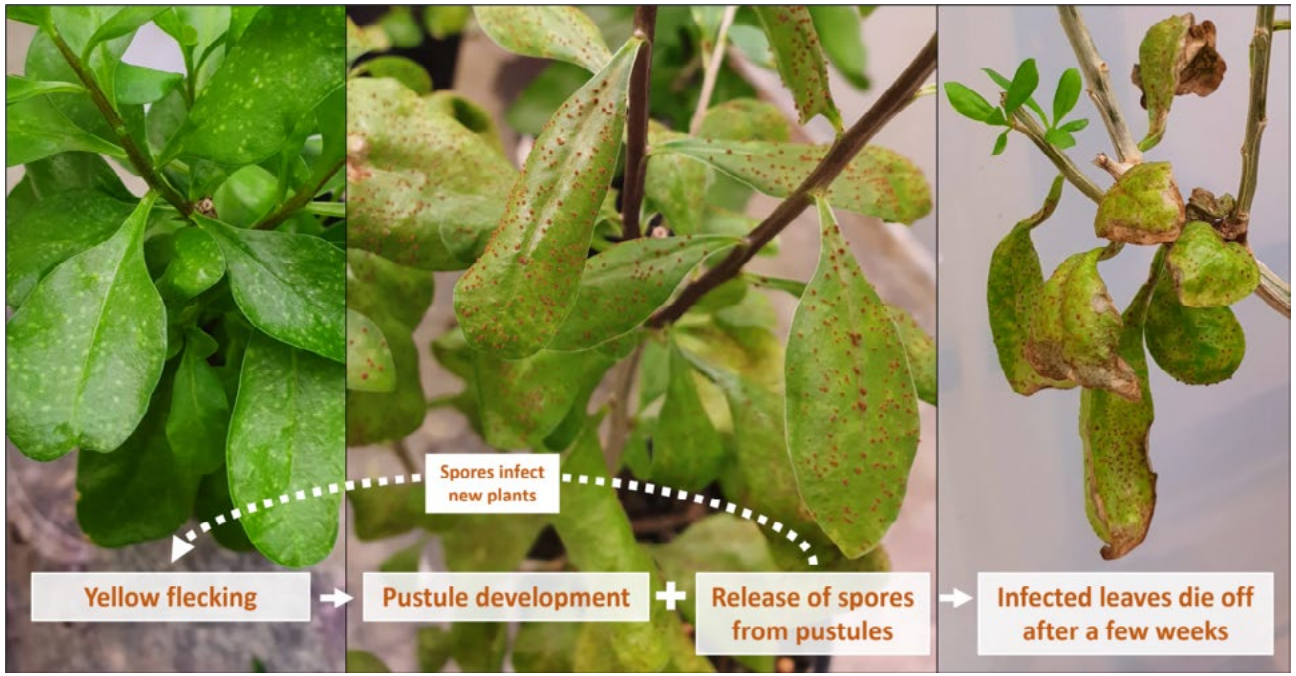
The success of the biocontrol agent is dependent on various factors such as climatic conditions and uptake across plants in an area. The current trials will be monitored to inform the further application of the rust fungus to manage ABT. Anyone interested in following along with the progress being made in NSW can go to the African boxthorn biological control research page. Further advice can be sought by emailing boxthornbiocontrol@csiro.au, noting that at this stage the fungus is not available for release in Western Australia.

What about Perth's beaches and islands?

ABT has been recorded occurring in the greater Perth region and is known to occur on Carnac Island and Penguin Island. There are also historical records from Garden Island, around Coogee, Rottnest Island and Bold Park. This weed will take over a site quickly if left unchecked. The successful targeted control works done on the Islands north of Perth have revealed that initial high intensity control followed by sustained monitoring and control is effective and can have a positive impact on biodiversity values in an area.

Coastal and bushland managers in the Perth region are encouraged to be on the lookout for ABT and to get onto weed control early before it gets out of control. The National Best Practice Manual provides guidance on weed management and further details can be found on the Weeds Australia website.

Thank you to the DBCA Parks and Wildlife staff in Turquoise Coast District and Midwest Region for providing input on their management experiences with ABT to aid in the writing of this article.



Depiction of disease progression for the fungus on Puccinia rapipes. The fungus can result in extensive defoliation and can also disrupt the photosynthetic capacity of the plant, reducing overall plant growth and reproductive output. Image - CSIRO.

Trapdoor spider burrows provide refuge in fiery conditions

By Dr Leanda Mason

Coming out of a hot summer, the importance of mitigating the impact of fire on natural ecosystems and biodiversity is at the forefront of many land managers minds. In Kings Park, the destruction following an arson attack in October 2023 has led to ecological and conservation investigations post-fire. Focusing on my trapdoor spider totem, my investigations are drawing attention to their remarkable survival strategies in the face of an inferno.

These arachnids are uniquely adapted and specialised to local environments, resulting in limited geographic ranges. Unlike many species that are mobile enough to flee from the threat of fire, these sedentary spiders must stand their ground – or rather, go to ground. Trapdoor spiders, known for camouflaged, hinged lid burrows, have survived hostile above-ground conditions throughout their long evolutionary history by creating a favourable silk-lined micro habitat underground.

Investigating a burnt trapdoor spider burrow in Kings Park. Photo – Dr Leanda Mason

When a fire approaches, I believe that they seal themselves at the bottom of their deep silk-lined burrows. As even very intensely hot fires only penetrate the first 5cm of soil, trapdoor spiders can withstand high temperatures and even fire passing overhead if they stay at the bottom of their burrows (which in some species can reach over a metre deep!). Combined with a very low metabolic rate that allows them to go without food for weeks at a time, it is likely most trapdoor spiders will survive a fire and wait until vegetation and prey populations start to recover. However, the trapdoor spider surveys at Kings Park that I am undertaking indicate that it may not only be trapdoor spiders benefiting from their burrows during a fire.

A plethora of other small animal species are lacking in mobility to survive fires or post-fire conditions. These species may seek out natural refugia such as rock crevices, underground nests, or even the protected bases of old-growth trees. However, the survival of these species is not just about enduring the immediate blaze. The torrid moonscape of ash after a hot fire provides little protection from the dry, hot conditions and food sources are scarce.

A desiccated trapdoor spider that did not survive the fire. Photo – Dr Leanda Mason

Through the surveys I am discovering that many different species, from slaters, snails, small lizards and in one instance, even a number of ants carrying their eggs, seemingly took up temporary residence in the top part of the burrow entrance. Trapdoor spiders would be sitting right at the bottom of the burrow, and as the burrow gets partially filled in with ash and other debris from fires, the burrows may be protecting many other species in otherwise hostile post-fire conditions. Some trapdoor spiders do not have camouflaged doors, but rather open, silk-lined burrows. So, these burrows may even be helpful to even more species during a fire.

However, there is still so much we do not know about these spiders and other invertebrate species that it is difficult to know the full and long term impacts fire may have; especially in urban bushland patches such as Kings Park where even the more mobile species may have nowhere in which to escape.

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It is also important to understand that all fourteen trapdoor spiders that have been recorded at Kings Park are all very different with a range of habitat requirements so fire may not impact all of them in the same way, especially depending on the season. It is also important to recognise the cultural significance of the site to Whadjuk Nyungar peoples; being known in Nyungar as 'Karagatup' or 'place of spiders' as one of the many local names of what is now referred to Kings Park and surrounds. Thus, maintaining this site is not only of high conservation concern, but also cultural heritage.

*A shield back trapdoor spider (*Idiosoma sigillatum*) burrow relined with silk in Kings Park post-fire. Photo – Dr Leanda Mason*

A trapdoor spider burrow, possibly belonging to the species Aname tepperi. *Photo – Wirambi Landcare.*

Conservation efforts are critical to help these populations recover and be maintained; especially as their naturally restricted ranges alongside extensive habitat clearing in the last few hundred years mean that a single catastrophic event could wipe out entire species. The Botanic Gardens and Parks Authority, who manage Kings Park, are continuing to collaborate with all local stakeholders, and those with relevant expertise are also encouraged to reach out to help protect our complex and unique local biodiversity in the face of novel human threats and adversity.

The trapdoor spider, with its humble and steadfast burrow, may reciprocate in teaching us that sometimes the best way to survive is not to avoid, but to determine alternative life strategies that helps not only themselves but others.

Trapdoor Tally *By Jason Bird*

Late spring through to mid-summer is a is a good time to look for trapdoor spider burrows, as the female has added extra web and spruced them up to entice the males. The Wirambi Landcare Trapdoor Tally is a citizen science project, where volunteers count the number of burrows seen during a slow, 20-minute walk, looking around the base of trees, shrubs and near woody debris.

The tally will focus on two species that are relatively common on the Swan Coastal Plain, both with open burrows (no lid), that can be easily seen; the wishbone spider (*Aname mainae*) and, the lidless banksia trapdoor spider (*Proshermacha tepperi*). They occur in remnant vegetation, so if you think they might be in your local bushland patch, and are interested in taking part in the tally, please contact Wirambi Landcare wirambilandcare@gmail.com. You can also contact Dr Geoff Barrett, DBCA Regional Ecologist geoff.barrett@dbca.wa.gov.au for information.

Thanks to the City of Melville and City of Cockburn for supporting the Trapdoor Tally, as well as the many 'Friends of' groups who are already participating in the survey.

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Biodiverse cycleways and walk trails: a new guide

By Rachel Peterson and Jane Chambers

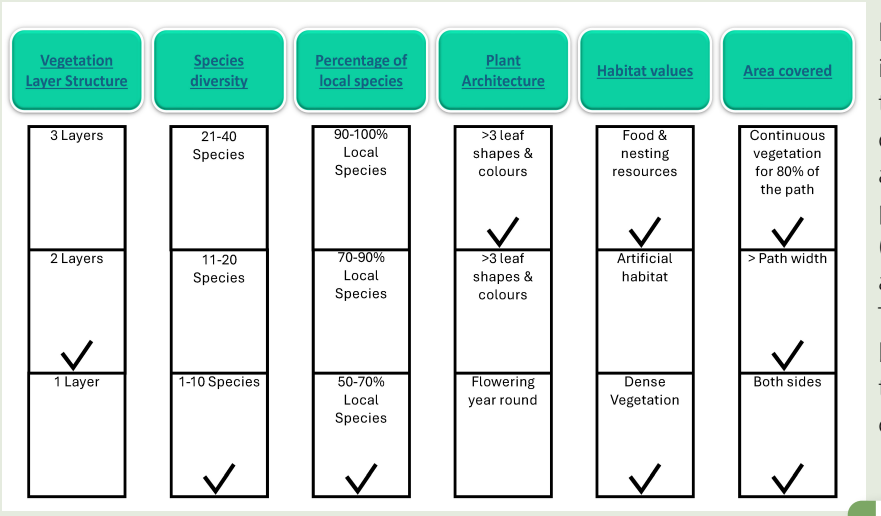
Urban areas can be hostile places for native wildlife; urban sprawl isolates habitat patches, severing the movement and dispersal of native fauna. Increasing biodiversity in urban areas can help facilitate wildlife movement, especially where constructing linkages between habitats which increases connectivity.

One of the primary goals of NatureLink Perth is creating 'naturelinks' throughout urban areas, cycleways and walk trails. While these pathways are vital for people for both recreation and transit, by adding vegetation to one or both sides of the path, they can provide not only increased amenity and shade for people but also connectivity between remnant patches of habitat and many other benefits for local fauna.

Woody Meadows are a novel way for increasing biodiversity along cycleways and walk trails. Photo – Maeve Dowty

However, there is lot more than you think to creating biodiverse paths, potentially creating a barrier to their uptake. NatureLink Perth intern Rachel Peterson has created an engaging, visual, comprehensive set of guidelines to assist the creation of greener cycleways and walk trails in urban areas. The guidelines outline the benefits, challenges, design considerations and treatment methods to increase biodiversity along pathways. The guidelines also include many helpful links and resources, clearly illustrating the message in an engaging and easy-to-understand way.

Biodiversity can be a tricky concept to understand, as it can be defined and measured in different ways. To ensure all aspects of biodiversity are considered, Rachel has designed an easy-to-use biodiversity rating system. The system is based on an ecosystem's main features: structure, composition and function, and comprises six measures.



An example of the biodiversity rating system as found in the Biodiversity for Cycleways and Walk trails guide. Image – NatureLink Perth.

Rather than be prescriptive, the rating system is designed to inspire designers to optimise the benefits at their site. It provides a range of options to include, with the goal of incorporating as many options into an area as possible. It also provides potential key performance indicators (KPIs) for managers wishing to assess the value and improvement of their biodiverse path. The guidelines aim to inspire action, increase biodiversity and connectivity in urban areas to support our native fauna, and bring people closer to nature by creating naturelinks.

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Discover how your backyard can contribute to conservation!

By Dr Bronte Van Helden and Dr Laura Skates

Over the past 18 months, residents across southwestern Australia have turned into backyard scientists as part of the 'Turning Gardeners into Conservationists' citizen science project.

Led by the University of Western Australia Albany and Perth NRM, this initiative connected people with the biodiversity in their own gardens by training and supporting citizen scientists to identify and monitor wildlife, and to take action to create wildlife-friendly garden habitats. The project aimed to build community capacity to contribute to urban conservation, enhance the habitat values of a large network of gardens, and discover new information on the value of urban areas for conservation, including the benefits of wildlife-friendly gardening for both wildlife and people.

The 'Turning Gardeners into Conservationist' Project Team: Hannah Gulliver (from left) and Dr Laura Skates (Perth NRM); Dr Paul Close and Dr Bronte Van Helden (UWA Albany). Photo – Perth NRM.

The interest and effort from the community was enormous! Over 200 residents from 30 towns and cities in south-western Australia embraced the opportunity to enhance their gardens and improve scientific knowledge. Citizen scientists completed over 15,000 wildlife surveys for birds, frogs, mammals and reptiles and installed over 200 wildlife-friendly structures including nesting boxes, frog hotels, reptile shelters, ponds and bird baths.

But it wasn't just about the critters – citizen scientists were also invited to share their thoughts and experiences through sociological questionnaires and interviews, revealing how connecting with and supporting wildlife in their gardens impacted their own health and wellbeing. Through their dedicated efforts, citizen scientists across south-western Australia have contributed important insights about the wildlife that use gardens, the benefits that different wildlife-friendly structures provide, and how engaging with nature can benefit people too.

Red-capped parrot nesting in a garden bird box. Photo – Sally Malone, Citizen Scientist.

For more information about the project, and to see our freely available Species ID Guide, Wildlife Monitoring Guide and Garden Structure Installation Guide visit the website. The 'Turning Gardeners into Conservationists' project is proudly delivered by UWA Albany and Perth NRM, through funding from the Australian Government's Inspiring Australia Science Engagement Programme.

Continued next page ...

... continued

Citizen science project wrap-up

As the project is wrapping up, it's time to celebrate! Join us for a series of events where we'll unveil the ecological and sociological findings of the project and give a well-deserved round of applause to our citizen scientists. Come along to discover which creatures are frequenting gardens in southwestern Australia, learn which gardening activities make the biggest difference for wildlife, and find out how you can pitch in for backyard conservation.

Everyone's invited, so don't miss out! Registration is free but essential – pick the event closest to you:

- Albany (10th March 2024): Register now
- Perth (16th March 2024): Register now
- Bunbury (17th March 2024): Register now

Contact

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Celebrating Dr Gerald Kuchling AM *By Alex Hutchinson*

Congratulations to DBCA's Dr Gerald Kuchling, who was recognised in the 2024 National Honours List being awarded the Member of the Order of Australia.

Gerald is known to many for his ongoing devotion and hard work relating to conservation and management for one of Australia's most endangered reptiles– the western swamp tortoise.

Being a long-standing member of the Western Swamp Tortoise Recovery Team, Gerald has ensured the conservation of the last self-sustaining wild population of the tortoise and set up the successful collaborative breed-for-release program between the Parks and Wildlife Service and Perth Zoo, providing a lifeline to one of the world's rarest and most critically endangered reptiles. Beyond the western swamp tortoise, Gerald has been recognised for significant service to turtle research, preservation and conservation over the last 50 years in Australia, Europe, Madagascar, South Africa, Burma, Thailand, China and the United States. He also sits on the executive board of the Tortoise and Freshwater Turtle Specialist Group-International Union for Conservation of Nature and holds several other key research and academic positions.

Dr Gerald Kuchling AM. Photo – DBCA Media

One of Australia's most endangered reptiles

The critically endangered and charismatic western swamp tortoise (*Pseudemydura umbrina*) has its own friends of group, which is very active. The Friends of the Western Swamp Tortoise primary purpose is to encourage the public to assist in western swamp tortoise recovery activities that seek to support a sustainable population in Western Australia, and to complement the work of the western swamp tortoise recovery team. Some of the activities run by the group include educating school and community groups, undertaking fieldwork such as revegetation, seed collecting and installing aestivation tunnels, sourcing grants and seeking out fundraising opportunities. Membership is free, and all who are interested in supporting western swamp tortoise recovery are encouraged to get involved. To find out more, head to the Friends of the Western Swamp Tortoise website.

Preserving natural treasures on private land

By Kristy Hitchens

Helping 19 private landowners ensure the long-term protection and conservation of significant natural treasures found on their properties is the aim of work being undertaken by South West NRM's environmental experts.

A large percentage of Australia's significant natural heritage – including endangered species of flora and fauna – is located on private land, making partnerships with landowners for its ongoing protection a critical part of conservation work. South West NRM's environmental scientists visit the landowners to conduct a site assessment to identify ecological condition, threatened or priority species and conservation priorities. A bushland management plan is then developed for implementation by the landowner, with site monitoring continuing over time to assess progress toward priorities.

*Marri (*Corymbia calophylla*)– Jarrah (*Eucalyptus marginata*)– Banksia (*Banksia attenuata, B. grandis*) woodland, Wellesley. Photo – Lorraine Duffy.*

As a result of the work, a combined area of more than 1,118 hectares of bushland is being preserved, contributing to increasing protected habitats, species resilience and maintaining landscape connectivity. All of the participating landowners have a voluntary undertaking with the National Trust of Western Australia to work in partnership towards conservation under the National Trust's Conservation Covenant and Stewardship Program. South West NRM has been appointed by the National Trust, with funding support from Lotterywest, to undertake the work.

South West NRM Sustainability and Environment Lead Linda Metz said the team had located a few new populations of priority-listed flora during their site visits which added to the positive outcomes of the project. "This is a critical program of works to enable the continued support of landowners who are doing their bit to protect and enhance natural heritage assets on their properties," Ms Metz said. "We applaud landowners for making this contribution to conservation outcomes through the covenanting program under National Trust."

*Swamp paperbark (*Melaleuca rhaphiophylla*) wetland, Wellesley. Photo – Lorraine Duffy.*

This project is undertaken as part of South West NRM's commitment to driving and championing initiatives which improve the environment of the South West. For more information about our work please visit our website.

Contact

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Please send us your regional report (400 words) and one or two photos by Thursday 9 May 2024. Text may be edited in response to volume of submitted reports.

Success at Success Hill Reserve *By Caitlyn White*

Success Hill Reserve is a bushland reserve and urban parkland along the Swan River (Derbarl Yerrigan). The site is a significant bushland area within the Town of Bassendean; it is a Class A Reserve, forms part of Bush Forever site number 305, is a registered Aboriginal Sacred Site 3757, and is the only bushland area containing remnant banksia trees within the town.

As with most urban bushland areas in Perth, Success Hill Reserve has suffered from anthropogenic disturbances, and as a result there is a significant weed infestation, with perennial veldt grass (*Ehrharta calycina*) dominating the understorey of the upland bush area and woody weeds such as lantana (*Lantana camara*) dominating the slope between the upland bush area and the river. Whilst there has been a documented increase in native canopy cover since the 1970s, the weed burden in the mid and understorey is still high.

The Friends of Success Hill Reserve formed in 2013 with a vision for the care and restoration of the reserve that recognises the sacredness of the site and respect for the continued cultural practice of the Noongar people. Since its formation, the Friends group has focused on hand weeding to manage perennial veldt grass and promote seedling establishment, and the installation of tubestock provided by the Town of Bassendean to increase native vegetation cover.

In addition to hand weeding, the town is assisting the group with a solarisation trial in preparation for planting. The town has been trialling solarisation across a few locations with different types of materials and canopy shading, to determine what materials perform best and how long materials need to be left in place to achieve optimal outcomes. The trial at Success Hill Reserve is using weed matting, which is UV stabilised and narrower than UV stabilised polyethylene sheeting (1m compared to 6m wide). Traditionally used in nursery and landscaping situations to suppress weeds, the weed matting was trialled as the narrower width meant it could potentially be applied in areas with existing vegetation. The trial is still ongoing, though preliminary results suggest the polyethylene sheeting is better at suppressing weeds that the weed mat, likely due to more light penetrating the weed mat.

In 2021, the town and Friends group successfully applied for and received funding through the Community Rivercare Program. The Friends group removed significant quantities of veldt grass and planted over 1900 seedlings, contributing over 160 volunteer hours to the project, and the town removed significant stands of lantana and revegetated the midstorey on the slope.

The town received further funding in rounds 1 and 2 of the Swan Canning River Urban Forest Program in 2022 and 2023 to continue lantana removal and expand the project to include other woody weeds, arum lily and bridal creeper. Removal of weeds on the slope has been difficult due to the terrain and the dense stands of bracken fern making access difficult. Due to the deficit in native midstorey on the slope, small birds are utilising the lantana as habitat. By adopting a mosaic treatment approach, the town can control and replace woody weeds with native species in manageable sections, and a staged removal ensures habitat is maintained.

Success Hill Reserve overlooking the Derbarl Yerrigan, image taken in March 2022 (above) before and in June 2022 (below) after lantana control was implemented in this patch. Photo – Caitlyn White.

Contact

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Friends of Success Hill Reserve

If you are interested in finding out more about the Friends of Success Hill Reserve, or to get involved, connect with them via Facebook or send Jane an email at acejane@bigpond.com.

Friends of Success Hill Reserve have been involved with planting seedlings to revegetate areas. The area is known for its banksias which are being included in the revegetation mix.

Felix (from left), Justin and Antonia at a planting day held by the Friends of Success Hill Reserve. Photos – Jane Bremmer.

Friends of North Ocean Reef-Iluka Foreshore

By Don Poynton

The last few months of 2023 was a busy time for the Friends of North Ocean Reef-Iluka Foreshore (FONORIF) who look after 30ha within Bush Forever site 325. Our Spring in(to) Iluka free family discovery morning, held in early November, attracted several hundred people and as it fell within Australian Pollinator Week, the emphasis was on local plants and their pollinators.

In addition to displaying colourful posters of insects, David Knowles from Spineless Wonders led two walks where he explained the likely pollinators of many native plants. The bird observation and beach-side walks were both popular once again. Biodiversity educator Angela Rossen attracted many children to her stand as she showed them how to capture magnified images or videos of microscopic creatures using a digital phone and an iScope.

Other features included a display by the City of Joondalup's Natural Areas team and a bush tucker display and food tasting featuring a variety of biscuits and cakes made from native plant ingredients. The event was made possible by a community fund grant from the City of Joondalup and the assistance of the Iluka Homeowners Association.

Prior to the event, volunteers from FONORIF participated in the two sustainability festival events run by the ECU Joondalup chapter of ENACTUS, the first at Lakeside Joondalup Shopping Centre in August and the second at Hillary's Marina in October. FONORIF was invited as an organisation addressing Goal 15 of the United Nations' 17 Goals of Sustainable Development, Life on Land: restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

FONORIF looks forward to being able to continue engaging with the local community and welcomes those interested in being involved to join the FONORIF Facebook group or to email the group at ilukacoastcarejoondalup@gmail.com.

FONORIF volunteers at the ENACTUS Sustainability Festival in Joondalup. Photo – Dee Farrell.

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Kalamunda Nature Fund proposal *By Steve Gates*

Kalamunda residents value their environment and its protection highly. However, as the City of Kalamunda has limited budget funds, it has slowed progress on some environmental initiatives, which Nature Reserves Preservation Group (NRPG) of Kalamunda consider important and urgent. These include environmental weed by-laws and 'fire-weed cycle' issues, erosion control and water-sensitive urban design (WSUD), and climate change action plan resourcing.

To help address this, NRPG suggested that the city create a 'Nature Fund' supported by a voluntary 'environmental levy' for ratepayers to consider contributing to, in an amount they wish, with their 'rates' payment. Environmental levies have been successfully used in the Ku-ring-gai Council's 'Environmental Levy' (Sydney), and Brisbane's 'Bushland Preservation Levy', to make major progress on environmental projects.

To inspire people to donate, we consider it is useful to remind ratepayers of the amazing environment and surrounds of Kalamunda, and to provide a vision and justification (in brief, engaging and graphical ways) for why their donation is important to make a difference. Further, donors need to be reassured that their money will be used as intended, and that the benefits and outcomes are real and transparent. Details of how and when the funds will be spent, and audited, will be needed.

The city consulted with the community in 2023 via a survey which showed 73% (45 of the 62 respondents) supported the optional donation, with numerous other useful suggestions. It is exciting to see this support and we hope to soon see the Nature Fund Proposal go to council to consider adoption.

Contact

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The vulnerable forest red-tailed black cockatoo (Calyptorhynchus banksii naso) is one of the many amazing environmental values known to the Kalamunda area and surrounds. Photo – City of Kalamunda.

Beelu National Park, on the promontory of a hill near Gooseberry Hill, looking east. The Toornaart Creek Friends group have done weed control there in the past. Photo – Steve Gates.

Native bees thriving in Cockburn's rehabilitated Roe 8 bushland *By City of Cockburn*

Surveys by a wild bee scientist, Dr Kit Prendergast, have confirmed that native bees are thriving in Cockburn's rehabilitated Roe 8 bushland. Dr Prendergast surveyed several bushland areas in January and December 2023, identifying 25 species of native bees in just four hours. Dr Prendergast, a national expert in native bee taxonomy, said the survey results were a strong indicator that despite land clearing, native bees would return if native plants were able to recover.

City of Cockburn Rehabilitating Roe 8 Project Manager Adam Peck said the city and the community had restored the habitat with more than 270,000 native seedlings following controversial clearing in the summer of 2016 and 2017 for the now defunct stage 8 extension of the Roe Highway.

A bee hotel in Roe 8 bushland being used by Hylaeus violacae. Several bee hotels have been erected in the rehabilitated Roe 8 bushland with one nest boasting nearly 40 active nests. Photo – Adam Peck.

"The ongoing Rehabilitating Roe 8 project has also completed surveys that have demonstrated that plants, quenda, birdlife and other fauna are recolonising the area," Mr Peck said. "Dr Prendergast's recent surveys demonstrate that a rarely studied group of insects, native bees, are also thriving."

Rehabilitating Roe 8 recently hosted a presentation and workshop by Dr Prendergast, attracting more than 70 people keen to learn about native bees and how to build their own bee hotels to attract the insects into their gardens. Six bee hotels have now been installed in the project area, with one hotel already boasting 36 active nests. "This project is a great example of how to restore habitat and monitor recovery. Native bees are very important pollinators of native plants, so they can enhance ecosystem recovery," Dr Prendergast said. "They are also excellent bioindicators, so high abundance and diversity can be seen as a sign of ecosystem health. These surveys show that despite land clearing, native bees have returned to the revegetated areas and the ecosystem is robust and healthy."

Other discoveries revealed that the most visited plant species in the project area was *Jacksonia sericea* or waldjumi, recognisable by its orange pea flowers, with single plants often covered in many hundreds of individual bees.

Wild bee scientist Dr Kit Prendergast pictured capturing bees from Jacksonia sericea shrubs in Roe 8 bushland during surveys. Photo – Adam Peck.

A blue banded bee (*Amegilla chlorocyanea*) was seen pollinating a snottygobble (*Persoonia saccata*), which Dr Prendergast said may be the first official record of a native bee pollinating the plant species. City of Cockburn Mayor Logan Howlett said he was proud the bushland tract had been transformed by the community and the Rehabilitating Roe 8 partnership, with the support of the City of Cockburn. "This hard work since 2018 by this vital partnership is really bearing fruit. And birds and bees! The city is very proud to be involved in a project that is successfully regenerating our precious local bushland for the future."

Find out more by reading the survey results or visit the Rehabilitating Roe 8 website.

Contact

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Tiger snakes of Perth and the pollution within

By Dr Damian Lettoof

Herdsman Lake is probably the best-known location to see tiger snakes in any major city of Australia, and yet the snakes from this lake often seem to be in poor health. This was the observation that ignited the focus of my PhD research: why do the snakes here look so sick?

When seeing the surrounding industrial areas and stormwater drains feeding into the wetland my first thought was introduced chemical pollution. When Tiger snakes reach a certain size and none get predated themselves, they become a top predator in these ecosystems, which means they take up all the contaminants from the animals they eat, who have taken the contaminants from the plants, insects, or animals they consume. This process is called bioaccumulation.

To assess health and contaminant levels we needed to compare snakes from several sites, especially a 'clean' site, to see what a 'normal, healthy' population should look like. To be comparable, I needed the sites to be on the Swan Coastal Plain, close-by so they experience similar climate conditions, easily accessible, and of course, with tiger snakes. Since we had to find snakes on foot and hand catch them, we needed wetlands with decent populations. Four sites fit these criteria: Herdsman Lake, Bibra Lake, Lake Joondalup and Loch McNess in Yanchep National Park (this was the urban-free, 'clean' site).

Urban waters and wildlife can be exposed to thousands of chemicals, both recent and historical – this makes it difficult to choose which ones to look for. Over the years we have done comprehensive chemical screening of tiger snake livers (the organ most contaminants end up in) for common toxic pesticides, common chemicals found in fuels and oils, heavy metals and trace elements, rat poisons, and 'forever chemicals' (per- and polyfluoroalkyl substances, known as PFAS). Snakes from these wetlands have been found with over 20 different metals, 12 PFAS compounds and one common rat poison. All these contaminants share two common traits: the ability to persist a long time without breaking down, and binding to organic material therefore bioaccumulating in organisms.

The source of the rat poison is clear, these chemicals are publicly available at supermarkets and hardware stores. Most of the metals we found exist naturally in the environment but can be enriched from industrial activity, historical dumping, and by aggravating soils and sediments during wetland building and modifications. PFAS can come from certain fire-fighting foams, non-stick cookware and water-resistant fabrics, ending up in stormwater and treated wastewater.

Being close to the city-centre and subject to over 150 years of urbanisation interference, it was unsurprising that Herdsman Lake tiger snakes had the highest levels of PFAS, rat poisons and most of the metals.

A typical tiger snake from Herdsman Lake showing low body condition (the spine is clearly visible), skin-worm parasites (lumps under the skin near the tail-end) and a damaged lost tail-tip. Photo – Damian Lettoof.

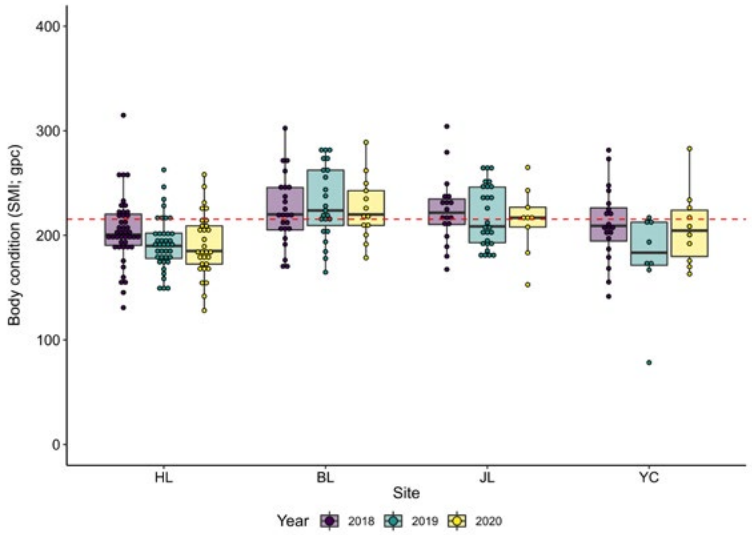
Bibra and Joondalup lakes' snakes had varying levels of metals; Joondalup had more PFAS than Bibra. The surprising discovery was that Yanchep snakes had roughly the second highest metal levels, which we suspect are being released from the now-exposed sediments as the lake recedes from the damaged water table.

Assessing the impact of pollution on animals in the wild is difficult, since we often do not understand how the chemicals alter the functions of the body nor do we fully understand the biology of the animals we study in the first place. By comparing relationships between the levels of pollution and measures of health like body condition, organ biochemistry, and parasites, the strongest patterns I found was that snakes with higher levels of metals or PFAS had lower body condition—meaning less body fat and weaker muscles.

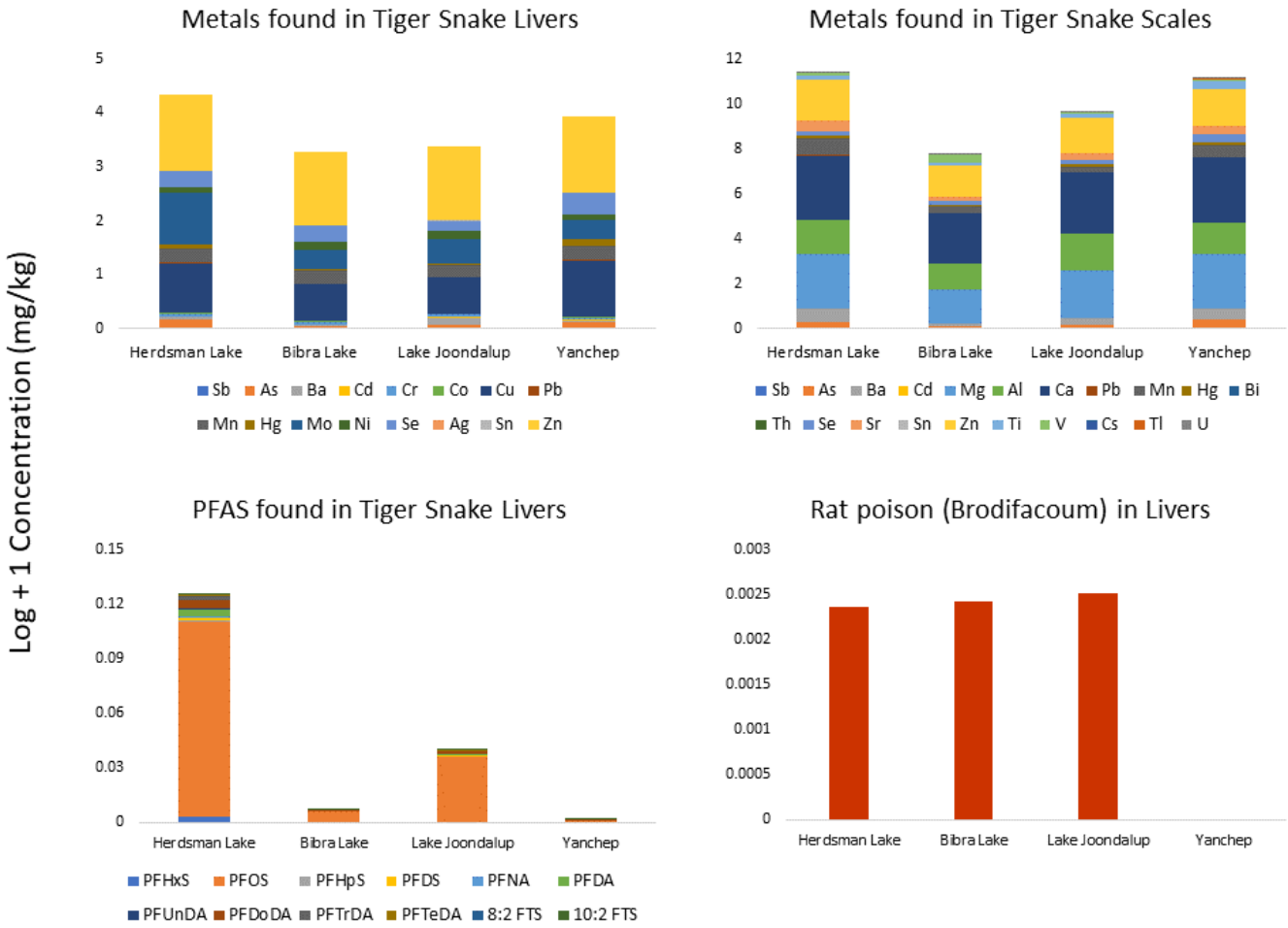
Continued next page ...

We also found chemicals in the snake muscles associated with energy production and cell growth were altered in snakes with higher PFAS. Interestingly, snakes from Herdsman Lake had the least number of parasites and overall parasites were generally more abundant in healthier snakes.

As a top predator of these wetlands, most of the contaminants tiger snakes get are from their prey (frogs, mammals and birds), suggesting that pollutants are bioaccumulating up the food web and the other animals living there might be impacted.



*Western tiger snake (*Notechis scutatus occidentalis*) body condition across sites and years. The red dashed line is the population average. Dots represent individual snakes. HL = Herdsman Lake, BL = Bibra Lake, JL = Lake Joondalup, YC = Loch McNess within Yanchep National Park. Graph – Damian Lettoof.*



Concentrations of all contaminants found in tiger snake tissues, compared among sites studied. Concentrations are log + 1 transformed to scale for large differences. Graph – Damian Lettoof.

At the CSIRO and in collaboration with the Department of Water and Environmental Regulation, I'm continuing research at these wetlands and more. We are currently investigating the exposure and impact from PFAS and legacy metal pollution on motorbike frogs (tiger snakes' main prey). Stay tuned!

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WA Bat Network

By Kelly Sheldrick and Jason Bird

This January, Kelly Sheldrick, Conservation Council of WA and Jason Bird, Wirmabi Landcare launched the WA Bat Network – a space where individuals and groups can share information on bat conservation and research in Western Australia.

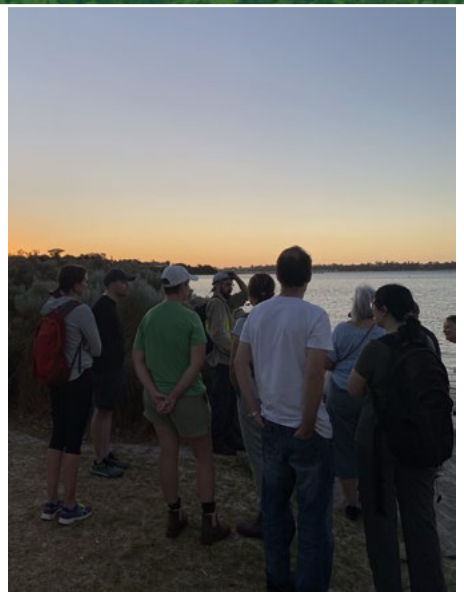
Bats make up about 20% of all mammal species and play a vital role in our ecosystem. According to the WA Museum there are 42 known species within WA, including endemic species found nowhere else in the world. IUCN Red List assessments report many of these species' populations to be in decline. Despite this, there is still a lot of misinformation about bats, and they are still largely undervalued, missed from conservation management plans and from funding opportunities.

Fortunately, we do have some awesome advocates for bat conservation, some amazing bat carers and a handful of superb bat researchers that operate across the state! One of the main aims of the WA Bat Network is to bring these people together, encourage collaborative working and to enable others to get involved in effective bat conservation and research within our beautiful state.

The WA Bat Network also aims to:

1) Increase awareness of bat research projects within WA to reduce the risk of duplicating efforts and encourage collaborative working.
2) Advocating for bat conservation by increasing community awareness and engagement in bat conservation at the grassroots level.
3) Collectively identifying and reporting on the threatening processes that affect our precious bat species.

Kelly Sheldrick delivering a bat walk and talk at Mary Carroll Wetland for World Wetland Day. Photo – Amy Rankin.



Jason Bird delivering a dusk walk at Jeff Joseph and Heathcote reserves. Photo – Kelly Sheldrick.

Want to get involved?

There are a few ways to get involved with the WA Bat Network:

- Do you or someone you know have artistic, creative flare? If so, why not design and submit your ideas for a WA Bat Network logo and/or bat mascot.
- Join the network and attend, share, promote the WA Bat Network, WA bat events, and all things batty in WA.
- Take an active part in the network's planning, organising, fundraising and community engagement. No prior bat experience or expertise required, just passion and enthusiasm.

To get involved or share your batty designs, please email wabatnetwork@gmail.com.

Bat logo submissions will be shared and voted on at the next network meetup, which will be Monday 8th April from 6pm-7:30pm (online and in-person at the CCWA office in West Perth). You can register to attend the meetup here.

Want to join the WA Bat Network?

In January the network held its first meetup and night walk event, and they have more night walks and events planned with details shared in the WA Bat Network Facebook group. For those not on Facebook, you can join the email list to receive information and updates. Please email Kelly.sheldrick@ccwa.org.au to be added to this list.

Contact

WA Bat Network
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web facebook.com/groups/wabatnetwork

For kids to tackle the big issues

By Cathy Levett

Millennium Kids Inc (MK) is a not-for-profit environmental youth organisation that empowers young people to become leaders and change agents in their communities. Millennium Kids exists for kids to tackle the big issues. Through our 'skills for life' approach, young people are encouraged to share their observations of their environment and community, and plan and implement actions.

MK continually surveys young people, asking them:

- What do you like about your community?
- What would you like to change?
- What do you want your future to be like?

The top 3 issues that are raised in every conversation are loss of tree canopy; litter, pollution, waste in the environment; and climate change.

GreenLab is the Millennium Kids program that focuses on the natural environment. It is a citizen science and action program designed by young people where the natural world is their laboratory. GreenLabs can be found in any green area large or small including backyards, school grounds, parks and nature reserves. The project can be delivered in schools, with families, youth groups and other community groups.

Lake Claremont is the site of the current community MK GreenLab project. MK has partnered with Friends of Lake Claremont (FOLC), with support from the Department of Communities' Youth Engagement Grants Program, to engage young people in awareness-raising and action-taking in the Lake Claremont precinct and develop a model for engagement that can be shared with stakeholders. The young people have identified various aspects of the site that they want to build programs around. They are exploring the Lake Claremont area guided by FOLC members, scientists, Noongar elders and other local people. They are talking about the things they see and asking questions.

The MK adults are mentoring a team of youth leaders aged 18–25 to develop workshops that engage younger children, typically aged between 4 and 17, to enable them to find out about things that catch their attention and interest and issues at the lake. Native animals are the current focus with a workshop about native bees with researcher Dr Kit Prendergast in February. Snake-necked turtles, bandicoots and water birds are on the list for later in the year. An idea to create a trail with clues that lead to special places at the lake is evolving into an activity for the younger children developed by the older youth.

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Paperbarks at Lake Claremont are under threat so Millennium Kids are learning all about them. Photo – Millennium Kinds Inc.

MK youth leaders planning workshops from ideas gathered from participants. Photo – Millennium Kids Inc.

Funding opportunities

Aboriginal Ranger Program Round 8 offers up to $16.5 million for Aboriginal organisations undertaking ranger activities within the categories of youth, climate action and/or cultural tourism. Applications **scheduled to open in March for a 6-week period.**

Alinta Energy Community Grants Program offers up to $20,000 to small or medium sized not-for-profits for social disadvantage or environmental sustainability projects. Applications **close 6 April.**

Aurizon Community Giving Fund offers up to $20,000 for not-for-profits in the areas of community health and wellbeing, safety, environment and education. Applications **open in March.**

Birdlife Community Conservation Grants offer up to $20,000 for community groups or volunteer organisations saving birds and nature. Applications **close 30 April.**

Coastal Adaptation and Protection (CAP) Grants and H-CAP Major Project Fund provide $15,000-$400,000 (up to 50% of total project costs) for local projects that identify and manage coastal hazards. Applications **close 17 April.**

Coastal Management Plan Assistance Program (CMPAP grants) offer up to $200,000 for local governments or Aboriginal corporations to prepare a coastal strategy, coastal management plan or coastal hazard risk management and adaptation hazard. Applications **close 17 April.**

Coastwest Grants of $5,000-$60,000 are available to support coastal land managers and community organisations to undertake projects to rehabilitate, restore and enhance coastal sites. Applications **close 17 April.**

Ian Potter Foundation Environment grants of $100,000+ and multi-year funding are available. Check eligibility. **Expression of interests close 26 March and applications close 6 May.**

Keep Australia Beautiful Community Litter Grants offer up to $10,000 for projects that aim to change littering behaviours and work towards a litter-free WA. Applications open in April.

Project Robin Hood by the City of Melville offers grants of $20,000 for community ideas, projects or events that bring people together and build better neighbourhoods. Expressions of interest can be registered on their website.

PHCC: Fencing and Revegetation of Rural Drains and Waterways is for property owners in the Peel-Harvey Catchment to aid with fencing and revegetation to improve water quality of the Peel-Harvey Estuary. Send your expression of interest via the PHCC website.

DBCA Riverbank Funding is for projects that address foreshore issues to protect and enhance riverbanks and shorelines. Applications **close 26 April.**

Community Stewardship Grant offers 1 year ($1,000-$35,000) to 3 year ($35,001-$450,000) funding for community-based projects that help a local natural area, WA's biodiversity, or the capability of NRM community groups. Applications open in the **first quarter of 2024.**

Local government and place-based community grants

These local governments and groups provide small grants to their communities which may fund environmental management and restoration projects. Eligibility varies.

Armadale Community Grants **close 08 April**,
Armadale Habitat Links **open year-round for rural residents**,
Better Bayswater Grant **close 29 March**,
Belmont **closes 31 March**,
Cockburn Sustainability **open March**,
Derby/West Kimberley **round 2 closes 31 March and round 3 opens 01 April**,
Fremantle applications **close 31 March,**
Geraldton applications **open 1 April** and **close 10 May,**
Gingin also supports larger projects over $10,000, applications **close 31 April,**
Harvey Water **open year-round**,
IGA Community Chest **open year-round**,
Kwinana Community Development Fund, applications **close 01 April**,
Kwinana Placemaking Grant **open year round**,
Mandurah Community Grants Fund **closes 28 March**,
Sustainable Melville applications **close April**,
Rockingham round 1 **closes 05 April**,
South Perth **open year-round**,
Swan **open year-round**,
Subiaco **closes 28 March**,
Toodyay **closes 05 April**,
Vincent **close 12 April**,
Wanneroo **open year-round**.

Research

Cowan E, Miller B, Fontaine J, Enright N, Standish R (2023). Soil seed bank development of smoke-responsive plant species in a 23-year restoration chronosequence and implications for resilience to fire. *Applied Vegetation Science* 26 (e12713)

Harvey MS, Wilson JD, Rix MG (2023). Two new species of the open-holed trapdoor spider genus *Proshermacha* (Araneae: Mygalomorphae: Anamidae) from southern Western Australia. *Australian Journal of Taxonomy* 43, 1–13.

Urban native bee assemblages and the impact of the introduced European honeybee on plant-pollinator networks in the southwest Australian biodiversity hotspot. The thesis of Kit Prendergast addressed impacts of urbanisation and introduced honeybees on native bees in southwest Australia. Additionally, efficacy of bee survey methods were evaluated.

Seidlitz A, Bryant KA, Armstrong NJ, Wayne AF (2022) Animal detections increase by using a wide-angle camera trap model but not by periodically repositioning camera traps within study sites *Pacific Conservation Biology* 28 (1), 25-35.

Povh LF, Willers N and Fleming PA (2022) Set free: an evaluation of two break-away mechanisms for tracking collars *Wildlife Research* 50 (10), 782-791

Williamson SD, van Dongen R, Trotter L, Palmer R, Robinson TP (2022). Fishing for feral cats in a naturally fragmented rocky landscape using movement data. *Remote Sensing* 13 (4925)

Websites and videos

For Nature Landowner Stewardship Program is an initiative launched by Nature Conservation Margaret River Region for landowners, whether that be of a small suburban backyard, a bush block or a larger rural property. This exciting, practical, hands-on program is designed to give you the inspiration, knowledge and connections to help conserve and enhance nature. Registering keeps you up to date on information, funding opportunities, loan equipment, incentives, events, workshops, field trips and garden tours.

Conservation Council of Western Australia Eco Events Community Calendar to use as your sustainable activity guide. Check it out for upcoming events. If you would like to see your own activity listed, please message us a link to your Facebook event, and we'll add it. Also have a look the CCWA Citizen Science facebook page.

Fungi identification workshop for beginners video Join Fungimap Presidents Laurton McGurk and Roz Hart for this workshop for beginners. You will learn everything you need to start out on your fungi journey, including how to identify the main parts of a fungus, the different morphogroups and types, other identification tips, and how to record and collect.

NESP Climate Systems videos are freely available to access and watch online. NESP provide a key source for adaptation research and coordinator of adaptation research across their hubs, and beyond.

ALA Labs Do you conduct research using Australian biodiversity data? Do you analyse data or make data visualisations? ALA's newest website provides technical know-how and detailed solutions to specific scientific problems using data in the ALA. There are "how-to" articles on how to conduct specific statistical analyses or how to create data visualisations and team members will share solutions to common problems for users, including those that they have used in their own work.

Publications

Bees of the world: A guide to every family Packer, Laurence. *Princeton University Press*, 2023. $50. Providing clear, accurate accounts of the seven bee families, Bees of the World presents all the key information on generic characteristics, habits, and habitat, illustrated with incredible and often rare photographs that show bees in their natural habitats – foraging, nesting, raising their young, and more.

Birds of Western Australia: The Field Guide (Second Edition). Nevill, Simon J. *Woodslane Press*, 2023. $40.00. An accessible and comprehensive guide to all the species that are commonly – and even not so commonly – found in the State, covering the vast majority of sedentary birds and regular migratory birds. Nearly 500 are illustrated and discussed in some detail, and Over 350 pages of descriptions are prefaced with a 50-page section on habitats, regions and the best ways finding birdlife.

So Many Snakes So Little Time: Uncovering the Secret Lives of Australia's Serpents Shine, Rick. *Taylor and Francis*, 2022. $55. Focuses on research conducted in Australia, especially on snakes and summarizes highly influential conservation studies. It also explores the ways in which research has deepened our understanding of snakes.

How to Do Ecology Karban, Richard, Huntzinger, Michael, Pearse, Ian S. *Princeton University Press*, 2023. $50. This book provides nuts-and-bolts advice for organizing and conducting a successful research program. This fully updated and expanded edition explains how to ask and answer your own research questions using compelling study design and appropriate stats. It also suggests effective ways to communicate your ideas through journal articles, oral presentations, posters, and grant proposals.

Houtman Abrolhos: A Natural History 2nd edition Surman, Christopher *Halfmooon Biosciences – Persephone Publishing*, 2022. $54.50. Illustrated with photographs and maps and detailed descriptions of everything from coral to whales. By ordering this book you are also contributing to long-term seabird research at the Houtman Abrolhos.

Lost taxa and their conservation implications. Lost species have not been observed in decades, yet are not declared extinct. In this report, 562 lost species are identified in various countries around the world.

Apps

Bug Hunt Gotta Snap 'em All! When you take part in Bug Hunt you can satisfy your curiosity, be entertained, and learn along the way. After uploading your bug pics to the iNaturalist app, a clever photo identification algorithm and a community of experts and passionate bug-ologists (entomologists) will check out your uploads and identify what you've snapped – for FREE!

WeedScan app is a free identification, recording and alert system for more than 450 weeds in Australia and includes biology and management information. Simply snap a photo of a plant you suspect is a weed and upload it to WeedScan. An artificial intelligence model trained on more than 120,000 weed images assesses your photo against verified images of weeds. Within seconds, WeedScan suggests possible plant identifications, with degrees of confidence for each suggestion.

There are two new freely accessible **Lucid Keys available**; Key to Native Orchids of WA which is an interactive identification and information package that will help you identify and learn about all the currently known native orchids found in Western Australia (excluding hybrids); and The Australian Mistletoes Key which covers the aerial mistletoes of the families Loranthaceae and Santalaceae.

Smartreka maps make it easier to navigate! The free maps use the built-in GPS on your smartphone or tablet to plot your real-time location onto the Smartreka map. This can be done without a network connection and without roaming charges. Now available are maps of Wellington National Park and Lane Poole Reserve. Look out for more maps coming soon!

the autumn flowering

pearl flower

By Philip Ladd (School of Environment and Conservation Science, Murdoch University) and Mark Brundrett (School of Biological Sciences, University of WA)

The pearl flower (*Conostephium pendulum*) is a low growing shrub occurring in heathy vegetation along the Swan Coastal Plain and Darling Range north and south of Perth. It is one of 13 members in a genus in the family Ericaceae and one of the earliest flowering species in the autumn period.

Pearl flowers have an unusual flask-like shape and hang from the axils of leaves along stems. The apex of the petals is purple and forms a small opening through which the female stigma projects while the white base is contained in yellowish-green sepals.

Despite appearances, flowers are hermaphroditic (having both male and female parts), but the male anthers are hidden in the petal tube. This makes pollen, which needs to get to the female part of a flower, inaccessible to most insects. However, unlike the feral honeybee, some native bees can vibrate their flight muscles to dislodge dry pollen from porose or hidden anthers in a process called 'buzz-pollination'. This process only allows certain bees that visit the flowers to obtain pollen to feed their larvae. The bees vibrate the corolla to dislodge the pollen and catch it on the front of their thorax. Pollen, which is mostly carried in pollen baskets on bee's hind legs, is also transferred to the sigma of flowers, so pollination occurs, and seed is ultimately produced. Pearl flower pollination is rarely observed, but we suspect that suitable bees have also become scarce in Perth's urban bushland.

Buzz pollination by a native bee is shown in the inset image. Note abundant white pollen grains carried by hairs on its legs (pollen baskets).

Inset: Bee on Conostephium pendulum

Photos – Mark Brundrett.