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Issue 114 **Winter** 2020 *Time of Makuru and Djilba in the Noongar calendar.*

WA Feral Cat Working Group

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

PARKS AND WILDLIFE SERVICE

Bushland News *is a quarterly newsletter of Urban Nature, a Department of Biodiversity, Conservation and Attractions Parks and Wildlife Service program to support community involvement in bushland conservation.*

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Contents

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Next issue

Spring Bushland News

Spring *Bushland News* contributions should be sent to Urban Nature by **9 September 2020**. *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.

WA Feral Cat Working Group

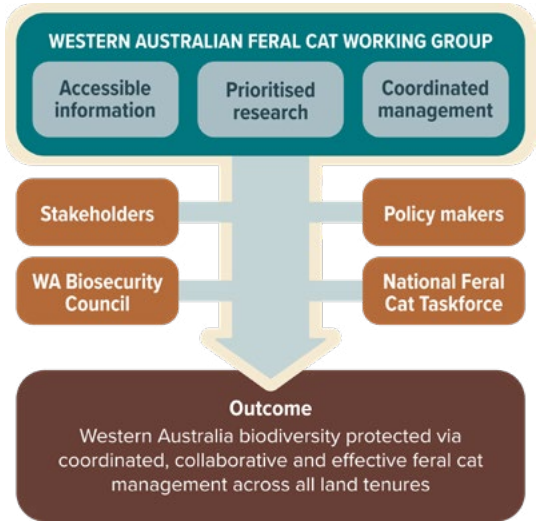
By Jane O'Malley

In a collective effort to reduce the devastation of native animals by feral cat predation, a community initiative has seen the launch of the WA Feral Cat Working Group.

After a year of preparation, the Hon. Alannah MacTiernan MLC, Minister for Agriculture and Food, officially launched the WA Feral Cat Working Group on 6 April, and the first meeting was held on 28 April 2020. The ten members, encompassing a diversity of stakeholder interests, is chaired by former Governor of Western Australian, the Hon Kerry Sanderson.

The working group will drive a unified approach for the control of feral cats across WA, making information on feral cat management easily available to end users, facilitate a collaborative approach to feral cat management and help guide the implementation of a new research program. Member organisations are the National Feral Cat Taskforce, Department of Biodiversity, Conservation and Attractions (DBCA), Department of Primary Industries and Rural Development, Australian Wildlife Conservancy, Bush Heritage Australia, Indigenous Desert Alliance, NRM WA (Peel-Harvey Catchment Council) and the Western Australian Biodiversity Science Institute (WABSI).

The objective of the working group is **to improve the trajectory of WA native fauna conservation outcomes through collaborative, effective, resource-efficient and humane management of feral cats.**



The three pillars of the WA Feral Cat Working Group #WAFeralCatWG will guide actions to improve the trajectory of WA native fauna conservation outcomes through collaborative, effective, resource-efficient and humane treatment of feral cats.

Cover photo: It is estimated that cats kill up to 2.2 billion animals each year in Australia making them the single biggest threat to our native animals. This feral cat was photographed approaching a scent lure for a camera trap at Karlamilyi National Park in the Pilbara as part of a nine-month study on endangered northern quolls and black-flanked rock wallabies. This study found cats on all 25 deployed cameras. But the good news is that northern quolls were detected too! Photo – Judy Dunlop.

Farmers for Fauna and Numbat Neighbourhood are PHCC programs which assist the community surrounding Dryandra Woodlands to increase their effectiveness of their efforts to control feral cats and foxes and take other on-ground measures to protect the threatened numbat, woylie and chuditch from extinction. Participant Bob Little has captured this feral cat on his farm as part of this effort. Photo – Bob Little.

The working group was identified as a priority action at the expert panel workshop that followed the 2018 WA Feral Cat Symposium, run by the Peel-Harvey Catchment Council (PHCC) with the support of WABSI and others active in this space. The symposium brought together nearly 200 people from across Australia to tackle the complex issue of protecting WA's native animals through effective, humane feral cat control. The interim working group, with representatives of PHCC, WABSI, Bush Heritage Australia and DBCA, have worked together to establish the group.

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In 2018 the State listed feral cats as a pest under the *Biosecurity and Agriculture Management Act 2007*, across all land tenures. The declaration has been welcomed by end users, opening doors to more collaborative efforts for management and recognising the huge role that a diverse range of land managers, including private landholders, can play in the management of feral cats.

Kerry Sanderson has been appointed as the inaugural chair of the working group which will lead the translation of research findings into effective on-ground outcomes. The National Feral Cat Taskforce and the Western Australian Biosecurity Council will be key allies in ensuring the Group maximises its impact.

Cuballing farmer Daniel Christensen with the 6.5kg feral cat he saw chasing his new born lambs (June 2020). Daniel is an active participant in the PHCC's #Farmers4Fauna and #NumbatNeighbourhood projects and so far this year has removed about 20 feral cats from his property near Dryandra Woodland. Photo – Lisa Christensen.

"It is important that we all work together to enhance the conservation of our native animals. I look forward to leading a truly collaborative body that brings together diverse stakeholders so we can address agreed gaps in knowledge, improve knowledge sharing, and enable the adoption of research findings to mitigate feral cat impacts," said Kerry Sanderson.

Despite vast research and control efforts to date, managing feral cats remains challenging, with no single, consistently effective control method available at a landscape-level, and local context being critical to management outcomes.

The new WABSI-developed research program Increasing knowledge to mitigate cat impacts on biodiversity will be translated into on-ground impacts via the working group. Addressing these prioritised knowledge gaps will help mitigate the impacts of feral cat predation, improve stakeholder outcomes, and address key knowledge gaps to enhance management.

According to experts, cats are the single biggest threat to our native animals, killing more than 2.2 billion birds, reptiles and mammals across the country every year and having contributed to 27 animal extinctions.

At the inaugural meeting the group endorsed their objective, membership of both the WA Feral Cat Working Group and WA Feral Cat Advisory Group (recommending a further two member organisations), and set priorities against each of the three pillars (Accessible Information, Prioritised Research, Co-ordinated Management) as the starting point for the plan of action #ProtectingWAsBiodiversity.

The first meeting of the WA Feral Cat Working Group was held in late April this year. Via videolink the group endorsed their objective and set priorities for a plan of action.

On behalf of the working group, PHCC and WABSI led an application for funding to Lotterywest for the employment of an officer to help drive actions, including developing a website to allow for knowledge sharing and to hold another symposium. This application was not successful because Lotterywest have diverted funds to COVID-19 relief and rebuilding for at least the next financial year. As such, the working group will continue to search for funding to cover this essential appointment and have applied for the State NRM Community Grants.

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Urban Nature update *by Julia Cullity*

The past three months of the COVID-19 pandemic has thrown out so many challenges for all of us. Here in WA we have managed to avoid community spread of this disease and as restrictions relax we need to keep practising good hygiene and distancing to prepare for when borders lift, including to the rest of the world. This is going to be really hard as we go about our daily lives, including our bushcare activities, especially when we are in a bubble of local good health.

Once again we won't be including the What's on calendar of events because too much change can happen in the next three months. Likewise, our tuart symposium has been postponed. I'll let you know when we set a new date. However many groups will have resumed their workdays, working safely within the health guidelines. Contact groups using the Find a conservation group app to find out how other groups are working through this and if they need extra volunteers.

I've been reading newsletters, and these are some of the precautions groups are using to work safely. Groups are asking people to supply their own gloves, tools, water bottle and morning tea and are asking people to maintain a 1.5m distance from others whilst working in their bushland. Instead of an open call many are asking for RSVPs to keep numbers within limits and as restrictions were lifted gradually, earlier work in May had groups working in relay to comply with the gathering limits. Let me add a suggestion. Do take care to keep a record of everyone's name and phone number for each workday.

Barry Goldspink (left to right), Ian Genge, Amanda Genge, Margaret Fowler, Sandra Hall founding members of the Friends of Wilkins Road posing with some of the rubbish that was picked up at the first event for the group. Photo – Julia Cullity.

I was delighted to be able to attend the inaugural event of the Friends of Wilkins Road in late May. It was challenging to brief the group of 15 with physical distancing. We just aren't used to having so much personal space between us and still be able to hear each other and welcome and connect people who have never met before. The task was a one-hour rubbish pickup and it was much easier to spread out with physical distancing once we got on the job.

A huge deal of rubbish was picked up – loads of glass and special brownie points to Barry for his removal of rotting meat! There was a good feeling amongst the group. The community fought a proposal for the 10.7ha being cleared for an aged care village and it took two years for permission to work on this patch of unclaimed crown land, and then the hiatus of COVID-19, to start this friends group. Excellent start, I wish them every success.

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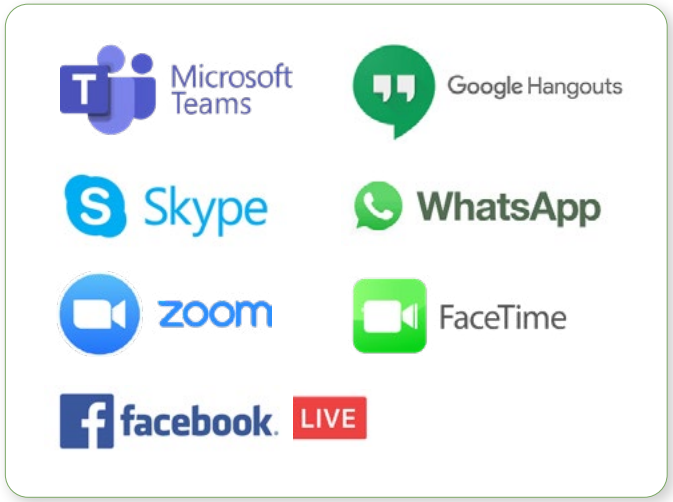
On the upside of COVID-19, loads of us have been forced to learn how to use the internet to connect with our community. We have moved beyond the phone, email and Facebook to keep in contact without meeting face-to-face. Virtual communication can be effective and one-off events can be recorded, uploaded and shared later to those who missed it. Here is a grab bag of ways to virtually connect with your community using live video-link technology. This can be great for committee meetings and can include sharing documents, as well as seeing each other's face, in the planning for on-ground events. Some require you to download software or be part of an existing network and others don't, some are free and others have greater options when you have a paid subscription. At DBCA we use Office 365 and are using Teams as the app for video conferencing and more. Other programs are linked below. Try one out with your group.

There are also loads of web events, programs and resources that you can delve into.



Inspiring Australia has released Virtual Excursions, an online training series exploring how to create and conduct amazing science events online. This comprises three distinct modules, including videos and cheat sheets, to maximise your digital program's potential. Web Conferencing 101 Essentials on getting your setup, technology and security working for you. Best Practice In Engaging Audiences how to make the most of your resources and talent, actively engage your audience and appropriately target online programs to gain participation. Partnering for Impact extend the reach of your online program beyond your own community by partnering and finding creative ways to promote what you are offering.

Landcare Checks In is a fortnightly online chat hosted by WA Landcare Network that allows people to come together and chat about landcare issues every second Monday between 2–3pm. You need to register to receive to Zoom meeting link. The 6 July meeting will be on feral cat control.

The WA branch of Birdlife Australia is hosting a free webinar Keeping Watch for Black-Cockatoos 4–4.30pm Thursday 2 July. Join Vicki Stokes to learn how to identify Western Australia's three black cockatoo species, how to contribute a survey to their Cocky Watch citizen science project which involves counting and recording flocks of black cockatoos as you travel and how to use the Birdata phone app to record and submit your survey. Nationwide, Birdlife Australia is bringing you Birding at home. They are also hosting a weekly seminar series as interactive Facebook Live events on a Thursday 10am Perth time and sharing them on YouTube afterwards.

Backyard Biodiversity Blitz brought to you by NatureLink Perth is a hub for exploring nature in your backyard and it will lead you to many citizen science projects.

The Baigup Wetlands BioBlitz on iNaturalist currently has 700 observations. Join in or set up your own project on iNaturalist. I recently read the results from the autumn 2020 Wild Pollinator Count. They reported an almost threefold jump in participation last April over their five-year history. It's great to see people taking the opportunity to observe nature and contribute to citizen science while under the social restrictions brought about by COVID-19. It'll be interesting to see how many other citizen science projects have experienced this increased participation and if it will continue.

The University of Western Australia School of Biological Sciences Seminar Series has gone online at 3-4pm every Friday on Zoom. Subscribe to their newsletter for details of how to access recordings of seminars and flyers for future events.

Something for the kids is Australian Reptile Park Live or Perth Zoo Facebook with livestreams and educational videos of animals.

I attended the Knowing Fire, Caring for Country symposium held by the Danjoo Koorliny Walking Together Social Impact Festival on 30 April via Zoom. More than 320 people came together online to listen to a Noongar-led symposium about the way Aboriginal people have made fire their friend, how fire forms part of caring for boodjar/country, and how this knowledge can help all of us to better care for this place moving forward. It was inspiring. On top of the content, I was super impressed by the relaxed and natural way all the speakers interacted with the video technology, the audience chat and most of all the artists who scribed the conference and each presented an artwork of their reflections towards the end.

Maybe you can generate your own online events? If you do please share them with me and the readers of Bushland News.

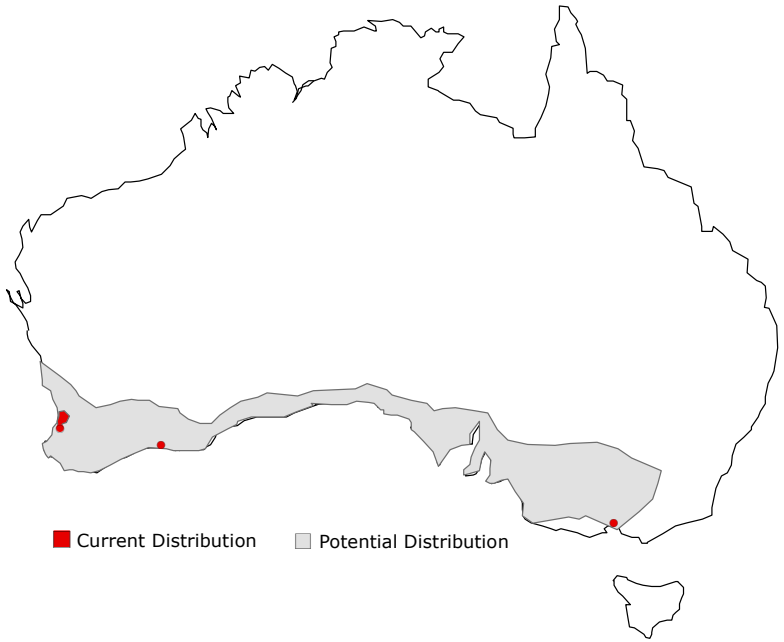
The flowers are either green or a purple-green colour which fade to gold over summer. Photo – Julia Cullity.

Haas Grass *By Julia Cullity*

Haas grass (*Tribolium uniolae*) is in its early stages of invasion in Western Australia. It also goes by the common names of wheat grass and hare grass. Like many of the weedy African perennial grass species it can form dense clumps, increase fire intensity and displace annual and perennial herbs. Collections have been made from the Darling Scarp and Plateau, clay-based wetlands in Forrestfield and Kenwick, with satellite populations in Mount Barker and Esperance. The only other records in Australia are from Melbourne and associated with a railway. However, analysis using climate data shows haas grass has potential to spread throughout southern Australia. This grass has been identified as a high priority for management within DBCA managed land in the Swan Region because it is rapidly invasive, has a high ecological impact, and its potential distribution is high though currently it is not widespread.

Description

Haas grass is a clumping, tufted, upright, perennial, summer-dormant grass. Occasionally it grows a short rhizome. It grows between 30–60cm high and is mostly non-hairy with leaf blades 0.3cm wide by 20cm long. Green-purple flowers appear in July to December. Inflorescences are single, held on the end of the stalk, about 7cm long with paired spikelets along the stem, similar to an ear of wheat.



Origin and introduction

Haas grass is native to South Africa in the Cape Region. In its native range it prefers richer well-drained soils, grows at a range of altitudes 1–1,000m above sea level and is common in both disturbed and undisturbed areas. It is often found in long linear populations on roadsides where it spreads aggressively. Haas grass prefers clay-based soils and lateritic gravels in WA. It is likely to have been introduced to Perth during the 1940s for trialling as a pasture grass.

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Similar to wheat, haas grass has a single flower spike at the end of the stalk with paired spikelets up to 7cm long. Photo – Kevin Thiele.

Spread

Haas grass is mainly spread by seed, although it can reproduce vegetatively by buds breaking off from the base. The highest seedling survival rates are found in wetter habitats such as creek lines. The longevity of the seed in the soil is unknown. Seed is easily dispersed by water flow, the movement of contaminated soil particularly with roadside grading and to a lesser extent by wind and ants.

Fire kills most adult plants, with the remainder resprouting, but stimulates mass germination and is a significant cause of invasion into bushland. Haas grass doesn't appear to tolerate grazing.

Management

Haas grass is dormant over summer and begins actively growing with the first autumn rains. Weed management and monitoring needs to be scheduled for a number of years. Herbicide is best applied over winter before flowering begins but can be scheduled after the first autumn rains in areas affected by summer wildfire. Use the grass selective herbicide Fusilade Forte at 19ml/L plus wetting agent. Glyphosate at 10ml/L is also effective where the weed is not growing amongst native vegetation. It is also possible to hand remove very isolated populations or small plants by using a knife to cut around the roots when the soil is moist. Care must be taken to remove any small buds at the base as these may resprout if any are left behind.

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Haas grass is most commonly found invading the jarrah forest and wandoo woodlands of the Darling Scarp and Plateau, as in this case at Lloyd Hughes Reserve on the scarp in Kelmscott. However, it has also been recorded from threatened ecological communities of marri woodlands and clay-based wetlands found on the eastern side of the Swan Coastal Plain. The plant has a distinctive upright, clumping habit with the old leaves starting to curl as they die back. Old plants can carry a lot of dead material with only a few green shoots. This can significantly increase fire risk in bushlands starting a spiral of fire and grassy weed invasion. Photo – Kate Brown.

Bats among us *By Diana Prada*

Bats are the only mammals capable of true flight. In Australia, most people may picture a flying fox when thinking of a bat. However, flying foxes comprise only seven of the 81 bat species found in the country and won't be found in the South West. Microbats, the most common group, use echolocation to find their prey and navigate their surroundings. They consume 75% of their body weight in insects every night, and therefore, they are fundamental for insect control in natural and agricultural environments. Since they are small, nocturnal, and most of their calls are above the human hearing range, microbats are easily missed. Many people are surprised to know that there are 13 species of microbats within the South West Botanical Province of WA, an area of the South West bounded by Kalbarri in the north-west to Esperance in the south-east.

The smallest bat found in the region is the southern forest bat (*Vespadelus regulus*), it weighs 5g, as much as an EFTPOS card. Its body is hardly the length of a human thumb. The white striped free-tail bat (*Austronomus australis*) is the largest at around 40g. It is the only bat in the region that produces a call within the human audible range, a "click, click" which can be easily heard on summer nights. The false western pipistrelle (*Falsistrellus mackenziei*), is unique to the jarrah forest of the South West and is not found anywhere else in the world.

As bats are able to fly, it can be easily assumed that bats are resilient to landscape degradation because they can fly to new territories. This is true for some species, such as the Gould's wattled bat (*Chalinolobus gouldii*), which is found in urban and agricultural environments. Other species like the southern forest bats or the false western pipistrelle, heavily rely on matured forest to provide foraging sites as well as suitable roosting tree hollows.

Direct and indirect methods can be used to study bat communities. Indirect methods involve recording bat calls, which are later compared to known references. This consists of deploying specialised equipment and leaving it unsupervised for a few nights. Even though it sounds somewhat easy, identifying species can be challenging. The methodology produces presence/absence data, and it is unable to provide estimates on population sizes.

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*The lesser long-eared bat (*Nyctophilus geoffroyi*) is one of three long-eared bat species in the south-west. They can be differentiated by the muzzle ridge behind their nose. Found throughout Australia, they are one of the most common bats in suburban areas and often choose human structures to nest in. Outside of urban areas they roost in dead trees, under rocks, in bird nests and in caves. Photo – Rianne van der Aar.*

Top left: This pond is surrounded by vegetation and the harp trap was placed in a small opening in an attempt to intercept bats coming to drink or forage. Bats will trip on the tense line, slide down and be captured into the white bank of cloth. The traps pack down into a cylinder, about 2m long, for easy transport.

*Microbats are just that, tiny. Our smallest bat in the south-west is the southern forest bat weighing in at 5g and only the size of your thumb (top right and note the gloved thumb to the left of the bat) and our largest is a whopping white striped free-tail bat (bottom right) at 40g and covering almost the palm of the hand. The white striped free-tail bat is a fast flyer, preferring open spaces and flying above the canopy, while the southern forest bat lives inside the forests, is slower and has greater flight manoeuvrability. The western false pipistrelle (right) (*Falsistellus mackenziei*) is a unique species of the southern jarrah forest and not found anywhere else in the world. It is named after DBCA bat researcher, Norm Mackenzie. Photos – Diana Prada.*

Direct methods require capturing the bats, which is necessary for radio-telemetry studies that investigate bat dispersal or for taking biological samples used to infer population parameters from genetic signatures. Bats can be captured using harp traps or mist nets, which unlike harp traps require constant supervision as bats need to be removed from the nets as soon as they become entangled. Harp traps consist of a frame with tense lines running downwards, like a harp, bats trip on the lines and slide down into a cloth pocket, from which they cannot escape.

During the winter, bats enter into torpor which involves lowering their metabolism in a similar way to hibernating mammals. Therefore, bat spotting is better done in the summer months when bats are most active.

They can be seen at dusk near dams or lakes. Flowering jarrah and marri trees also provide opportunities for bat spotting, as the flowers attract insects and therefore bats. At times, you may see bats hunting insects near streetlights. Near Perth, Dwellingup and Dryandra are great places for bat spotting. In Dwellingup, bats can be easily seen flying between the lights in the town's private campground, and in Dryandra you can stand by one of the dams and see the bats coming to forage or flying down to get a drink.

If you are interested to know more about bats in general, the Australian Bat Society is an active, friendly community of bat researchers, carers and bat enthusiasts.

If you find an injured bat, place a box over it and call either Kanyana Wildlife Rehabilitation Centre 9291 3900 or the Wildcare Helpline 9474 9055 for assistance.

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NatureLink Perth: linking people and nature *By Jane Chambers*

NatureLink Perth is a community of practice of diverse stakeholders, working together to integrate nature into our city, to conserve and enhance our internationally recognised biodiversity and nurture a healthy, liveable city. We seek to create a network of NatureLinks across Greater Perth to increase the area and quality of greenspaces between natural areas and make the urban landscape more friendly for wildlife and people.

Since launching in 2019 and hosting a fully interactive symposium and workshop we have grown into a community of practice with a core leadership group, a host of subscribers and the people of Perth enjoying our programs.

We seek to link, inform and engage people in nature and organically promote collaboration. For example, during COVID-19 restrictions we created Backyard Biodiversity Blitz on the web and on Facebook. We got together a team and created a one-stop shop to cross-promote all the fun things out there to enable people to enjoy and learn from nature in their own backyard during isolation. Concept to launch took just two weeks. Now the team is working out how to create a citizen science framework to gather critical information about biodiversity in Perth.

Another example is the Woody Meadows project which started when one subscriber watched the ABC Gardening Australia program. She emailed us and said, "Isn't this a great idea?" And now our first four woody meadows are about to be planted this winter thanks to the City of Canning and a team of landscape architects, ecologists, a nursery, and students and academics from three universities generously volunteering their time and resources. The project is being run in collaboration with University of Melbourne and potentially a new PhD project to ensure rigorous assessment of the technique.

We also have student interns researching critical elements for which we need information for NatureLink Perth's goals. Projects so far include: creating Know your Biodiversity a resource of information for biodiversity in Perth putting native biodiversity into local government urban forest plans, creating a framework to inform urban greening projects (using an example in the City of Cockburn) and critically determining the best location for NatureLinks across Perth using landscape ecology and GIS techniques.

You're welcome to join this amazing group of people empowering themselves to make Perth a better place for ourselves and the many other species who share it.

Urban greening on a front verge forms a NatureLink in Rosehill Waters, South Guildford. Photo – Jane Chambers.

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Rehabilitating Roe 8 update *By Linda Metz*

There has been great excitement at the recent State Government announcement that parts of the Beeliar Wetlands are now a Class A conservation reserve. The new reserve includes a portion of the Roe 8 corridor (approximately 27ha) but while the Beeliar Wetlands Bill has passed through the WA Legislative Assembly (lower house), it still needs to pass the WA Legislative Council (upper house) to enable this zoning to change from a road reserve to Parks and Recreation.

This winter 71,000 plants will be installed across the site. Fortunately, with the easing of social distancing restrictions community planting activities also came back with the first planting on 21 June. Our next planting will be 25 July. A recent community questionnaire indicated that on-ground activities continue to have the highest level of importance for the community followed by educational and wildlife events and scientific information.

With this in mind the inaugural community science conference Hands Healing the Land will occur in March 2021. The conference will bring together environmental restoration practitioners, academics, students and community landcare volunteers to share their skills, knowledge and stories. The call-out for short presentations is open.

Fauna and vegetation monitoring reports are being finalised to help provide guidance on how rehabilitation efforts are progressing.

The invertebrate report is ready to download. Murdoch University have continued their vegetation monitoring and assessing progress against the restoration objectives detailed within the Rehabilitation Management Plan.

In addition to traditional vegetation monitoring, the project is also utilising E-mapper. E-mapper is a cloud-based environmental data platform that uses remote sensing data to track and monitor the progress of restoration. The data is comprised of a series of standard RGB (red/green/blue) and near infrared images which are stitched together to create a composite orthomosaic, which is then further processed to produce information relating to vegetation cover, vegetation height and vegetation health for the project area. Photo monitoring points and other on-ground data is also being added to the platform.

Using this innovative approach, we have been able to get a comprehensive understanding of restoration progress and vegetation condition throughout the entire project area. Typically, vegetation cover varies substantially across the landscape, meaning there are limitations with traditional on-ground sampling methods. A more effective approach to monitoring is one that combines on-ground sampling with remote sensing to provide accurate and repeatable data at a whole of project scale.

Rehabilitating Roe 8 is a partnership project between Main Roads WA, the community and the City of Cockburn.

Work has begun on planting 71,000 plants this winter 2020 in the Roe 8 corridor. If you have the time to spare, please join us on 25 July. Photo – Linda Metz.

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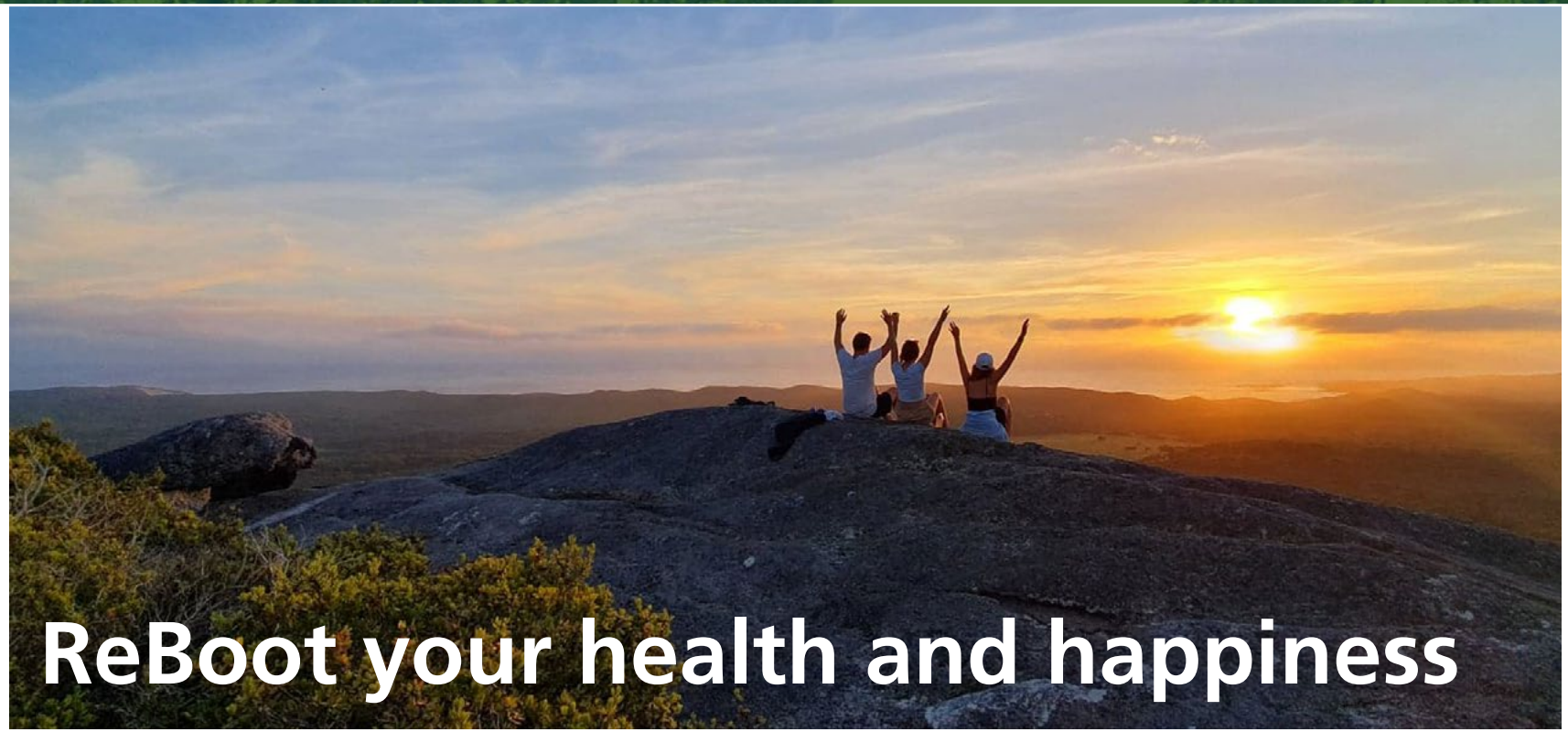

ReBoot your health and happiness

Getting out in nature can really lift the spirits. How's this for enjoying the sunset in Denmark. Photo – Brent Clinch.

By Melanie Wilshin

As COVID-19 restrictions ease, there has never been a more important time to focus on our mental health and wellbeing.

The 30 Day reBoot, a WA Parks Foundation initiative made possible through the support of Chevron Australia, provides safe and simple ways to connect with our beautiful natural surrounds, whether in your own backyard, or at your local or national park. Here are five of our favourites.

1. Dip your toes in the ocean

In wintertime we often neglect one of our most beautiful natural spots: our beaches. Now is the perfect time to rug up, go for a windy beach walk and watch the clouds roll in.

2. Discover bush tucker

Kings Park has been a place of great significance to its traditional custodians, the Wadjuk Nyoongar people. And there's no better place to discover bush tucker in Perth.

3. Try forest bathing

'Forest bathing' is the healing way of Shinrin-yoku Forest Therapy, the medicine of simply being in the forest. Find out how by reading this guide.

4. Get artsy outside

Do you often find that inspiration strikes while you're in nature? Your local park is the perfect place to draw, paint, craft or write.

5. Explore a National Park

Calm your mind and awaken your senses at one of our incredible National Parks. With more than 31 million hectares of bush and marine parks across our state, you're spoilt for choice.

It's never too late to reBoot so download the challenge for tips and activities designed to improve your health and happiness. Share your experiences with #springintoparks #ourwaparks.

Contact

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Please send us your regional report (200 words) and a photo by Wednesday 9 September 2020. Text may be edited in response to volume of submitted reports.

Kennedy Bay Coastcare: preliminary invertebrate survey

By Ian and Vesna Harrison

Kennedy Bay Coastcare is a community group that is rehabilitating a small coastal strip on the north of Long Point in Port Kennedy. The area is environmentally sensitive and borders the Shoalwater Islands Marine Park and is adjacent to the RAMSAR listed Port Kennedy Scientific Park. For the past six years, the group has systematically removed invasive weed species and planted more than 11,000 appropriate dune plants in partnership with our land manager, the City of Rockingham and with grants from Coastwest and Alcoa's ACTION program. After the fourth phase of the rehabilitation we gained funding to carry out a 'mini' invertebrate survey with guidance provided by David Knowles of Spineless Wonders and obtain a partial view of 'who lives in our dunes'.

We used Spineless Wonders collection methodology and hired equipment from them which consisted of a light trap (visible and near UV) and several pitfall traps to catch crawling macroinvertebrates. The methods of collection through to photography are designed to minimise stress for the invertebrates. Captured samples were released into the same area after being measured and photographed.

The first survey was completed at the end of spring, 24 November 2017, and produced a surprisingly large number of species in what is a small coastal area.

With David Knowles' help we identified 73 unique specimens from five classes, 16 orders and 44 families. This was significantly higher than expected by the expert consultant (and the team!). The results of the survey have been written up in a full report by Dr Ian Harrison and Vesna Harrison entitled *Kennedy Bay Terrestrial Invertebrate Survey: Part 1*. In 2019, using data from our 2017 survey and a further grant, two interpretive signs were erected in the rehabilitation area, showing a small snapshot of who lives there.

A follow-up survey has just been completed and the species are currently being identified and catalogued. This survey was designed to provide a snapshot of the ecosystem at the end of autumn (five days after the full moon after the first decent rains). Community involvement was excellent, including from members of the Friends of Point Peron, and 200 insect samples were collected and released over two evenings and two early, predawn mornings. All in all we had a terrific collection and are about to start work on the full report, having received identifications from David Knowles.

Contact

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The two interpretive 'who lives here' signs help spread the word about the incredible diversity of insect life at Long Point. The first 2017 spring survey surprised Kennedy Bay Coastcare and our expert consultant with the number of species recorded from this small coastal area. We wanted to share that with the local community. Photo – Ian Harrison.

Taken on evening one of this year's autumn survey, Vesna Harrison from Kennedy Bay Coastcare (in fluoro) with community volunteers Joel (left to right), Xander and Andrea are working the light trap. Photo – Ian Harrison.

COVID-19 and the Friends of Yellagonga workdays and a new insect and reptile survey

By Jan Richards

The Friends of Yellagonga (FOY) is very much a seasonal group with the volunteers working in the park from late March through to November. We have the nursery volunteers working all year, but more people work during winter and spring planting seedlings.

In late 2019 FOY received funding through the federal Community Environment Program (CEP) to revegetate two new areas within the park. One is a brand-new site, currently a paddock, which we will be working to get back to native vegetation over some years. The other is continuing the good work of FOY and moving to plant local natives where weeds have been removed over several years.

Revegetation takes many hours and many hands are needed to do the work. FOY volunteers have stepped up for over 25 years, planting and weeding, working together and catching up over a shared task, bolstered at the end of the work by coffee and cake (and sometimes scones, party pies and sandwiches!!).

Then came COVID-19 with new working restrictions! Site managers worried that they would not be able to continue rehabilitating the park with no volunteers. Money would need to be sourced through grants to pay contractors to plant our seedlings. A large number of groups would be competing for ever reducing funds. Scary notion indeed.

We were working at one site weeding at a distance and all talking loudly to discuss our options. At the end of the morning, remembering to stand slightly distanced, we realised – we can do this.

Working outside is good for your health, mental and physical. We are planting and weeding in the Yellagonga Regional Park because we are restoring habitat and protecting this world class wetland.

Working in natural area conservation can be quite easy with the new social distancing. We have people work in family groups or 'just' apart. We provide gloves for them to keep and use each time they volunteer. We clean equipment before and after use. We provide pleasant company, many and varied tasks to suit all ages and abilities, and at the end of the day we have a choice of water and packed snacks. We have not missed a workday this year. In fact, we have more volunteers coming to help when they see us out and about in the park. The more the merrier! Email for information on how to volunteer.

Continued next page ...

Above: Working outside is good for your mental and physical health. We've found working in natural area conservation can be quite easy with the new social distancing, once we got used to it. This is our new planting site, it will take a few years to get it from paddock to native vegetation.

Below: We can hear each other if we all talk loudly and get loads of work done at our revegetation sites. Photos – Jan Richards.

We used a variety of active and passive techniques to trap insects and reptiles for survey. Notice the trap lines on the ground and one of our volunteers actively seeking out insects with a swoop net. Photo – Jan Richards.

There's a lot of biodiversity out there in the insect world that we are just not aware of, until you go looking. This is a native species of cockroach that spends most of its time under bark or logs. Photo – Jan Richards.

Recently we have expanded our activities after receiving CEP funding to do a non-lethal survey of arthropods (macro-invertebrates) and reptiles found in the park. We employed a contractor, David Knowles of Spineless Wonders, to set up three survey lines on the western shore of Lake Joondalup. They were established in good through to poor condition vegetation and sampled in May over three days, from 8am– 9pm.

Volunteers from FOY and university students helped collect the animals from pit and light traps and used a variety of active and passive capture techniques to gather species which were then photographed and released back into the area of capture. A report of species present in each of the three areas will be available later in 2020 and funding will be sought for future surveys in the other seasons.

The background information gained from this study will provide an invaluable resource to our group and enable us to assess the success of our revegetation efforts. We hope to show a wider environmental benefit and restore the ecological health of degraded sites when the mix of native vegetation is returned. Bird life is easy to see returning to the rehabilitated areas of the park, however more than 80% of the natural world is made up of insects and reptiles, which are harder to survey. Insects and reptiles play vital roles as recyclers, pollinators, and are the predators and prey of the ecosystem. Any increase in the diversity of these species is of benefit to the system as a whole.

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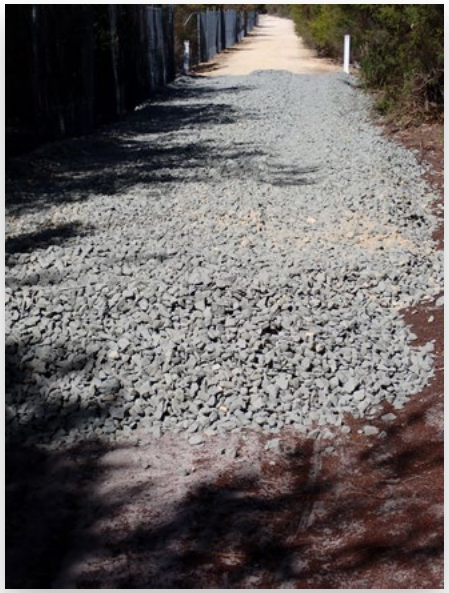
Dieback mitigation continues at Paganoni Swamp Reserve

By Leonie Stubbs

Work is continuing to limit the spread of *Phytophthora cinnamomi* from the eastern boundary of Paganoni Swamp Reserve into the remainder of the reserve, through the provision of a State NRM grant spread over a period of three years. This includes laying limestone over the length of the existing eastern fire access track, the construction of wash down stations with blue metal at entry/exit points of dieback infestation and either the spraying or injection of phosphite to all susceptible plants along the active disease front. Unfortunately, we have identified a recent introduction of *Phytophthora nicotianae* on the northern boundary most likely from the Paganoni Road verge, so blue metal has been laid down at this site to reduce the flow of water off the road as well as minimise the introduction of weeds.



The limestone track and blue metal wash down bay help protect the spread of Phytophthora *disease along tracks. It even works to some extent on preventing further disease spread by unauthorised off-road vehicles. Photo – Leonie Stubbs.*

An ongoing issue faced by all our nature reserves in Perth is the unauthorised entry and use of our reserves by off-road motorbikes and cars. They do not realise the deleterious impact of their activities. They do not realise they could be spreading dieback and weeds to other parts of the reserve. They just see trees and tracks and the challenge of sand.

Our bushcare activities at Paganoni Swamp help us re-energise each week. Photo – Leonie Stubbs.

They do not have the inclination or desire to understand the complex relationships that occur within these unique ecosystems which are found nowhere else on Earth. This is in contrast to some of our volunteers who can identify the multitude of plants present and their complex relationships with other plants and fauna, volunteers who have the creativity to draw our remarkable native vegetation in fine detail inspired by their beauty and complexity, and to volunteers who use our weekly activities to re-energise themselves each week (especially in light of the considerable challenges humans currently face).

When everyone works together for a common cause we achieve some remarkable outcomes. We are grateful for the numerous grants which contribute to the protection of Paganoni Swamp Reserve's remarkable plants and animals.

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Working for wambengers

by Danielle Crichton and Simon Cherriman

In the valley where the air is cool is a lovely little place called Sawyers Valley Primary School! It was here that the Jarrah Creek Community RiverCare project began in July 2019.

The school is situated adjacent to the head of the Jarrah Creek, where there is a small but biodiverse wetland. In 2015, the school hosted a Re-Cyc-Ology nest box incursion which saw a select group of students build a range of nest boxes that were installed on the school grounds. When they were monitored in 2017, it was a thrill for the students to find evidence that a small, arboreal mammal had visited two of the boxes. They discovered a latrine (a concentrated deposit of scats) and the beginnings of a small, bowl-shaped nest in the substrate of the box. This may have been an early indication that Jarrah Creek was providing an important corridor for the brush-tailed wambenger (*Phascogale tapoatafa*).

This unique nocturnal marsupial, which is light grey with a long, black, brush-like tail, lives in low densities in forest and woodland throughout the south-west of WA. It is rarely seen, but evidence of its presence has previously been recorded in nest boxes located in the Shire of Mundaring, and road-killed individuals have been recovered throughout the Perth Hills in recent years.

Jarrah Creek Reserve consists predominantly of regrowth eucalypt trees which lack important tree-hollows necessary for wambengers and other species. In 2019 the Friends of Jarrah Creek and Sawyers Valley Primary School arranged another Re-Cyc-Ology nest box workshop through funding from the Community RiverCare Program administered by the Jane Brook Catchment Group. Students, staff and volunteers built more nest boxes to cater for a broader range of hollow dependent wildlife (compared to the 2015 workshop), but with a particular focus on wambengers.

The presentation and interactive workshop generated positive feedback from school staff. "The benefits were clear: more habitat for wildlife and a sense of stewardship for the students. The kids love this wetland and will want to look after it well into the future. They won't forget their interaction with Simon," said teacher Ms Lucy Blair.

The staff and students have been planting riparian vegetation each year on the School's National Tree Day to further enhance the creek's habitat value. The school and friends group have been fortunate to receive plants from the Shire of Mundaring's Seedlings for Landcare Program. All students are involved, with senior students mentoring juniors to ensure each seedling is planted with love and care. Observations of quenda (southern brown bandicoot, *Isoodon fusciventer*) diggings among the revegetation sites are an encouraging sign that local wildlife is already benefiting from the students' work. To give the planted seedlings the best chance of survival, weed control is also being undertaken to limit the spread of invasive weed species.

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With the workshop well underway, Morgan from Sawyers Valley Primary School paints his owl nest box. Simon Cherriman, the tall guy at the back of the classroom, showed the kids how to build a range of nest boxes that were installed on the school grounds. Photo – Danielle Chrichton.

Brush-tailed wambengers or phascogales are brilliant climbers. They are active at night and need to shelter in tree hollows or other protected places when sleeping during the day. Photo – Simon Cherriman.

So have the new wambenger nest boxes worked?

Since their installation in August 2019, monitoring by volunteers has taken place on two occasions. The most exciting discovery was made in Autumn 2020, when wambenger scats and/or nest scrapes were found in 70% of nest boxes designed for this target species. In addition, a number of other boxes contained smaller scats belonging to the mardo or yellow-footed antechinus (*Anthechinus flavipes*). One box even housed a sleeping mardo! A range of other wildlife was recorded either rearing young or denning in the other nest-boxes: Australian wood ducks, Australian ring-necked and red-capped parrots, and of special local significance, common brushtail possums, the primary school's emblem!

Confirming wambengers have successfully used nest boxes designed for them has been incredibly rewarding, both for the students and for the Friends of Jarrah Creek. The monitoring program will continue, with trials of motion-sensitive cameras taking place throughout 2020. The hope is to capture footage of these cryptic, nocturnal marsupials as they move around the landscape.

Although the value of nest boxes for wildlife conservation in south-west WA is still being researched, this project provides an excellent example of how boxes targeting a particular species can, with the right local knowledge, be rapidly exploited. Furthermore, the level of engagement and enthusiasm by Sawyers Valley students and staff alike, demonstrates nest boxes can play an important role in engaging the community with local bushland reserves. This creates a strong sense of custodianship for a generation that will be charged with caring for country well into the future.

Spot the mardo curled up beneath leaf litter! A mardo or yellow-footed antechinus 'latrine' is also visible along the bottom edge. Photo – Simon Cherriman.

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Quenda in urban bushland in a Perth suburb provide a valuable service to reduce fuel loads

By Catherine Ryan, Richard Hobbs and Leonie Valentine

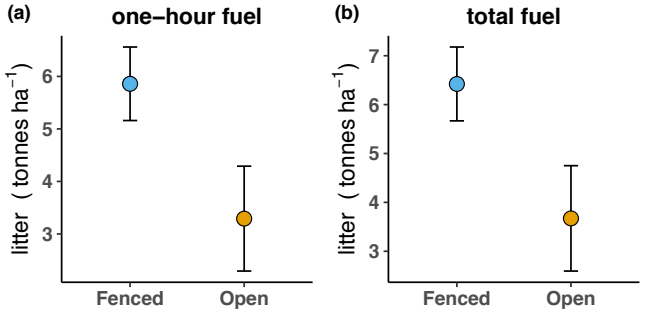
There is increasing interest worldwide in the potential for animals to have an impact on reducing fuel loads in bushland by herbivory and production of bare ground. We undertook an investigation in 2017 to find out whether quenda (*Isoodon fusciventer*) have an impact on reducing surface fuel loads and hence fire risk in an urban bushland reserve. When foraging for invertebrates, plant material and underground fungi, quenda are prodigious diggers producing a spoil heap that covers surface litter, with each 1kg individual turning over about 4 tonnes of soil annually.

Craigie Bushland is a 53ha banksia woodland remnant also consisting of jarrah, tuart and marri. The City of Joondalup constructed a predator proof fence in 2010 and in mid-2013 DBCA conducted a translocation of 46 quenda. At the time of our study, the population was estimated to be about 100 individuals. In 2014 we randomly located five pairs of 10m x 10m plots in the enclosure. We constructed a fence around one of each pair to exclude quenda, but they could access the plot located nearby. Three years after the plots were established (2017), we collected surface litter from the plots and assigned it, based on size, as one-hour fuel, ten-hour fuel and 100-hour time lag fuel classes. Our results showed some incredible differences in the amount of surface fuels in places where quenda can dig and where they can't.

The role of digging animals in altering fuel loads and influencing fire has largely been overlooked, but the loss or decline of many native vertebrates may have subsequently influenced fire regimes in landscapes. Many previously common species are thought to have been important in ecosystem function, and there is mounting evidence to suggest that native digging animals may have an important role in altering surface fuel loads. In urban bushland reserves like Craigie Bushland, where reducing fuel loads is a challenge for land managers, the reintroduction of previously common digging animals may have potential value as a complimentary fire management tool, although this will come with a different set of unique management challenges.

*Quenda (*Isoodon fusciventer*) are endemic to south-west Western Australia and have been translocated into Craigie Bushland. Photo – Leonie Valentine.*

When quenda dig for their dinner, including invertebrates, underground tubers and fungi, they create a spoil heap with the ejected soil that often covers litter. Photo – Leonie Valentine.



The amount of estimated surface fuels (mean and 95% CI) in paired fenced (quenda excluded) and open (quenda accessible) treatments for (a) 1-h fuel and (b) total surface fuels at Craigie Bushland, Western Australia.

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Landcare in the Wooroloo Brook catchment

By Danae Warden

An enthusiastic new landcare group has been established in the Wooroloo Brook catchment! Formed in February 2020, with eight members, the Wooroloo Brook Landcare Group began its work by joining the City of Swan's Adopt-A-Spot programme to organise rubbish clean-ups at Noble Falls Reserve. With two rubbish days, 13 volunteers and 200kg of rubbish, this group has already made a positive impact to the catchment.

Some background

The Eastern Metropolitan Regional Council (EMRC) recognised a gap in volunteer landcare support within the Wooroloo Brook catchment following the disbandment of the original Wooroloo Brook Landcare Group in 2009. A project was developed by EMRC and funded by State NRM to engage the local Wooroloo Brook catchment community and initiate the formation of a new landcare group.

To begin community engagement, a variety of activities and workshops were developed. During the process of advertising these events it was quickly realised that letterbox drops were not an effective way to inform the public but instead utilising social media and advertising in local newspapers was.

Two planting days, one at Cookes Brook in Chidlow and one at Gidgegannup Reserve kicked off the events with a total of 27 volunteers and over 1,200 plants planted. Nature walks at Lake Leschenaultia and Noble Falls Reserve and community events such as the WHIM festival in Mount Helena and What on Earth Open Day in Mundaring encouraged face-to-face contact with potential volunteers and provided a chance to collect contact details.

Within a few months approximately 40 contacts were made with individuals expressing interest in participating in future landcare activities within the Wooroloo Brook catchment. This information was used to create an invitation only cultural/nature walk and talk session at Gidgegannup Reserve, with Aboriginal elder Neville Collard and environmental biologist Simon Cherriman. The talk covered Aboriginal seasons, bush tucker, birdlife and the connection of people with the environment. At the end of this event, participants were asked to write their name on a registration form if they were interested in becoming members of a new Wooroloo Brook Landcare Group. Names were added and the beginnings of the group were formed.

Continued next page ...

Two planting days were held to gauge interest in participating in future landcare activities in the Wooroloo Brook catchment. This one was held at Gidgegannup Reserve. Photo – EMRC.

First steps

The first Wooroloo Brook Landcare Group meeting was a relaxed affair with much discussion on 'where to from here?'. Many participants communicated that they would love some training and on-ground activities to increase their knowledge and confidence in natural resource management.

From these discussions a project named 'Scott's Spot' was established to help new members develop landcare skills. Scott's Spot is located on a private property that has a tributary running through it. It is overrun with weedy wattles, mainly *Acacia longifolia* and has limited native riparian vegetation. The owner is a member of the Wooroloo Brook Landcare Group and it was decided that the property could be used as a case study for members to learn about landcare practices. A few sessions have been organised at Scott's Spot which have focussed on weedy wattle identification, land management considerations (leaving habitat for native fauna, soil types) and bird identification.

The Wooroloo Brook Landcare Group had a total of three meetings before the effects of COVID-19 were felt. As a result, the momentum of the group slowed but with Phase 3 restrictions now in place the next meeting is being organised, there is a planting day at Scott's Spot and the future is full of potential.

If you live within the Wooroloo Brook catchment, (Gidgegannup, Mount Helena, Chidlow, Bailup, Wooroloo, Morangup or Wundowie) and wish to begin landcare volunteer work please get in contact. We meet on the first Thursday of each month at the Gidgegannup Hall.

Aboriginal Elder Neville Collard and local naturalist Simon Cherriman hosted a cultural walk and talk with interested community members to help stimulate the reformation of the Wooroloo Brook Landcare Group. Neville is showing how wounds were treated with marri gum and then wrapped in the leaves. Photo – EMRC.

Contact

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Wooroloo Brook Landcare Group established this February with eight members and they began work by organising rubbish clean-ups at Noble Falls Reserve. Photo – EMRC.

The Scott's Spot project was established to help new members develop landcare skills. Scott, a group member, has a property with a tributary running through it and he has offered it up as a case study for members to learn in a practical hands-on setting. Here, group member Bill Karoll is showing how to identify weedy wattles. Photo – EMRC

Funding opportunities

Peel Harvey Catchment Council **Community Environment Grants 2020/2021** funding on-farm native vegetation and native species fodder, banksia woodlands and black cockatoo habitat. Applications close **21 August 2020**.

NACC Biodiversity Community Grants up to $5,000 for malleefowl and black-flanked rock wallaby. Applications assessed on a first in, first served basis.

Grants up to $1,000 for events on **Thank A Volunteer Day**, 5 December 2020. Applications **close 30 July**.

Regional Economic Development Grants round 3 supports community-driven projects that contribute to sustainable jobs, expand or diversify industry, develop skills and capability, attract new investment or maximise recovery from COVID-19 impacts to the regions. Applications via the nine Regional Development Commissions **close 7 July**.

Canon Oceania Grants offering grants of cash and Canon equipment. Applications **close 31 July**.

Community Litter Grants from Keep Australia Beautiful applications **close 24 July**.

Mary Bremner Bequest Grant Program for members of the Wildflower Society of WA or like-minded groups for projects, activities or events focused on WA flora. Applications **close 1 October**.

Wettenhall Environmental Trust small environmental grants scheme funds research and educational projects on flora and fauna conservation. Applications open 1 July.

Local government community grants

These local governments provide small grants to their communities which can fund environmental groups' management and restoration projects. Eligibility varies. **Armadale** likely to be available in **September**, **Belmont closes 31 August**, **Rockingham closes 7 August**, **Subiaco closes 22 September**, **Swan closes October**.

Resources

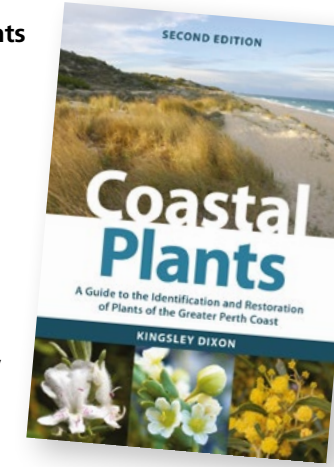
New publications

Cats in Australia: Companion and Killer Woinarski, John, Sarah Legge, Chris Dickman. *CSIRO*, 2019. $60. Across the world, cats are loved as pets or are kept or tolerated for their role in controlling some animal pests. But cats, both pets and feral, also kill many native animals and this toll can be enormous. Cats have been remarkably successful in Australia, spreading pervasively across the continent and many islands, occurring in all environments, and proving to be adept and adaptable hunters. A large proportion of Australia's distinctive fauna is threatened and recent research highlights the significant role that cats play in the decline and extinction of native species.

Banksias (second edition) Collins, Kevin, Kathy Collins, Alex George. *Bloomings Books*, 2020. $74.

Banksias are Australia's most iconic plants after eucalypts. This extensively revised edition includes the most recently discovered Banksia, *vincentia*, with descriptions and illustrations of all 79 known species with many new photographs and updated species descriptions. It provides the history of their discovery, evolution, how to find and grow them and how they have inspired artists and artisans.

An-me Arri-ngun: The Food We Eat, Traditional Plant Foods of the Kundjeyhmi People of Kakadu National Park Fox, Gary, Murray Garde. *Gundjeihmi Aboriginal Corporation*, 2018. $34. The authors and Kundjeyhmi people have worked closely to photograph and describe 149 plant species: from the toffee-like gum of river wattle to sweet an-badju yams sought by singing children. Each plant's description includes: Kundjeyhmi, scientific and English common names, plant uses, plant preparation and its cultural significance. The information is presented in simple, easy-to-read language, accompanied by more than 500 photographs.



Coastal Plants: A Guide to the Identification and Restoration of Plants of the Greater Perth Coast (Second Edition) Dixon, Kingsley. *CSIRO*, 2020. $45. An updated and expanded second edition to 128 of the most common plants of the Perth coast for restoration. It includes the key species used in coastal restoration, along with important weeds. Each species description is accompanied by a distribution map and diagnostic photographs of the whole plant, flowers, seeds and fruits. The book also contains introductory chapters on the biology and ecology of the coastal plants, their biogeography, and practical approaches to the restoration of coastal dune vegetation.

Dictionary of Botanical Names Perrin, D. *JT Press*, 2018. $29.95. An illustrated dictionary of the meaning, derivation and application of botanical names. First issued in 1988, this current edition is greatly expanded, revised and is more colourful. Author, plant educator and environmentalist, Don Perrin, applied his passion for plants, words and art to compile this dictionary. Purchase through Facebook or by email.

Apps

Questagame is a mobile game that gets players outdoors to engage with, learn about and help protect life on earth. Your sightings contribute to real research and conservation by contributing to national and global biodiversity databases.

Welcome to Country app for iPhone delivers a simple welcome to country video introduction to Australian indigenous culture including basic cultural protocols specific to tribal boundaries.

Website watch

Landcarer is a social media platform to connect, collaborate, communicate, promote and learn about all things Landcare. They've just launched a mobile app so you can snap and share photos or video when out in the field, contribute to discussion, groups, communities or projects on the go and access your Landcarer messages anytime.

RED grant writing video series addresses how to write a quality application regardless of the program.

Science Information Sheets from DBCA aim to communicate research findings and information in a concise and easy to understand manner. Keep a watch out for new publications such as the short paper on prescribed fire in jarrah forest.

Science Friction a podcast of science, culture and everything in between. You might like to test drive with 'A wild and whimsical world of flesh-eating plants' part 1 and part 2

Wildlife, Cake and Cocktails podcast is dedicated to Australian wildlife science and conservation.

The best science discussions often happen after dinner usually over cake, frequently over cocktails, but always in a relaxed atmosphere. Grab some dessert, pour a tasty drink and come join us at the table for a chat with some amazing wildlife scientists and our animal nerd buddies.

Mapping citizen science in Australia have released their participant report based on the findings from a survey of 96 citizen science projects. The research aims to map and characterise citizen science in Australia, determine its diverse goals and practices and design ways for benefiting all citizen science stakeholders. In Australia alone, hundreds of citizen science projects exist with more than 100,000 participants contributing to scientific data collection, classification and analysis.

Wild Orchid Watch new citizen science project and app designed to collect, record and share scientific information about Australian native orchids has launched just in time for the flowering season.

Recent Research

Legge S, Woinarski JCZ, Dickman CR, Murphy BP, Woolley L-A, Calver MC (2020) We need to worry about Bella and Charlie: the impacts of pet cats on Australian wildlife. *Wildlife Research* online early.

Algar D, Johnston M, Tiller C, Onus M, Fletcher J, Desmond G, Hamilton N & Speldewinde P (2020) Feral cat eradication on Dirk Hartog Island, Western Australia, *Biological Invasions* 22, 1037-1054

Lohr CA, Algar D (2020) Managing feral cats through an adaptive framework in an arid landscape. *Science of the Total Environment* 720: 137631.

Cowen S, Clausen, L, Algar D, Comer S (2019). Using genetics to evaluate the success of a feral cat (*Felis catus*) control program in north-western Australia. *Animals* 9 (12), 1050.

Greenwell CN, Calver MC, Loneragan NR (2019) Cat Gets Its Tern: A Case Study of Predation on a Threatened Coastal Seabird. *Animals*, 9, 445.

McGregor H, Moseby K, Johnson CN, Legge S (2019) The short-term response of feral cats to rabbit population decline: Are alternative native prey more at risk? *Biological Invasions* 22, 799–811.

McLeod LJ, Hine DW (2019) Using Audience Segmentation to Understand Nonparticipation in Invasive Mammal Management in Australia. *Environmental Management* 64, 213–229.

Murphy BP, Woolley LA, Geyle HM, Legge SM, Palmer R, Dickman CR et al. (2019) Introduced cats (*Felis catus*) eating a continental fauna: the number of mammals killed in Australia *Biological Conservation* 237, 28-40.

Woolley L-A, Geyle HM, Murphy BP, Legge SM, Palmer R, Dickman CR et al. (2019) Introduced cats (*Felis catus*) eating a continental fauna: inventory and traits of Australian mammal species killed, *Mammal Review* 49, 354-368.

Legge S, Woinarski J, Burbidge AA, Palmer R, Ringma J, Radford J et al. (2018). Havens for threatened Australian mammals: the contributions of fenced areas and offshore islands to the protection of mammal species susceptible to introduced predators *Wildlife Research* 45, 627-644.

Robinson NM, Scheele BC, Legge S, Southwell DM, Carter O, Lintermans M et al. (2018) How to ensure threatened species monitoring leads to threatened species conservation *Ecological Management and Restoration* 19, 222-229.

Valentine LE, Ruthrof KX, Fisher R, Hardy GESJ, Hobbs RJ, & Fleming PA (2018) Bioturbation by bandicoots facilitates seedling growth by altering soil properties *Functional Ecology* 32(9) 2138—2148.

Photo – Brad Maryan.

quacking frogs

By Paul Doughty

Quacking frogs or "quackers" (*Crinia georgiana*) are small-bodied frogs to 4cm long that are native to the wetter parts of south-western Australia and that emerge in the depths of winter. You can hear their calls from June to August in very shallow flooded areas where there is usually fresh running surface water, such as the runoff from rocky areas in the hills.

The call is a loud "quack!" that the males make. Males will match the number of calls that their neighbours give. This even works with people – if you "quack" loudly at a chorus, the males will often answer you back with a matching number of calls. Give it a try!

Females lay their relatively large eggs in a very short period of time, about a half hour. Several males will often wrestle for mating position on the female's back, and males have extremely muscular arms to help them do this. Here we have a photo of a red male with enormous arms and a slender armed brown female. Colour is extremely variable.

The tadpole phase is extremely short with tiny froglets <10mm long metamorphosing only a month after hatching.

Quacking frogs are one of Australia's most studied and unusual frogs, and they live right here in the Perth Hills, with Swan Coastal Plain populations at Bardon Park in Maylands and at Piney Lakes. If you know, or think you hear, quacking frogs near your home or while you're out bush, you can record the call on the FrogID app and it will be sent to the Australian Museum.