AUSTRALIAN Wildlife

SUMMER Volume 1/2024
$10 (non-members)

Journal of the Wildlife Preservation Society of Australia

Celebrating a new century of wildlife preservation in Australia

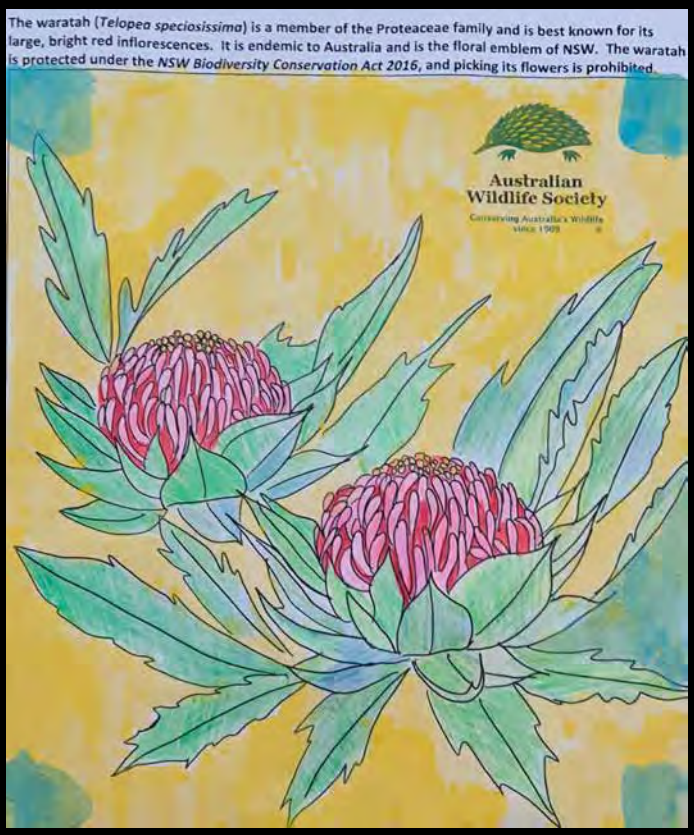
(Founded 1909)

2023
Colouring-in Competition

Eleven-year-old Naharrah
from New South Wales

Eight-year-old Sam
from Northern Territory

Nine-year-old Louisa-Eliza
from Queensland



Nine-year-old Isaac
from South Australia

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Megan Fabian
Editor, *Australian Wildlife*

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Greater gliders are three species of large gliding marsupials in the genus Petauroides, all found in eastern Australia: Central greater glider (*Petauroides armillatus*), Northern greater glider (*Petauroides minor*), and Southern greater glider (*Petauroides volans*). Unfortunately, these species are threatened with extinction. We look forward to raising their profile, providing additional support, and encouraging successful conservation outcomes. Images: Josh Bowell.

Australian Wildlife Society
Conserving Australia's Wildlife since 1909 ®

Australian Wildlife

is the official journal of the Australian Wildlife Society (Wildlife Preservation Society of Australia Limited).

Founded in 1909, the Society is dedicated to the conservation of our unique Australian wildlife in all its forms.

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Directors

Member Notice

The Australian Wildlife Society (Wildlife Preservation Society of Australia Limited) is managed and controlled by an elected Board of ten volunteer Directors. The Society is a tax-deductible gift recipient and registered with the Australian Charities and Not-for-profit Commission. Its public fund is listed on the Register of Environmental Organisations under item 6.1.1 of subsection 30-55(1) of the *Income Tax Assessment Act 1997.*

Any member who might like to consider serving as a Director of the Society is invited to contact the national office for more details. The most important qualification to serving as a Director is 'a commitment to and love of Australian wildlife'.

The Society holds regular monthly meetings on the first Wednesday of each month in Sydney.

The Editor would like to feature a member's profile in the fortnightly email newsletter and occasionally in our quarterly magazine. Members are invited to consider submitting a short article with a photograph for possible publication.

Our Mission

The Australian Wildlife Society (Wildlife Preservation Society of Australia Limited) is a national not-for-profit wildlife conservation organisation, formed in 1909, and is committed to the preservation of Australia's precious flora and fauna. We act as a watchdog and provide advice to government agencies and institutions regarding environmental and conservation issues concerning all aspects of wildlife preservation.

Our mission is to conserve Australia's fauna and flora through education and involvement of the community. We are dedicated to the conservation of our unique Australian wildlife in all its forms through national environmental education, advocacy, public awareness, community involvement, and hands-on conservation work.

Our Society has always known that a conservation battle is never really won until the victory is enshrined in legislation. We have always attempted to convince politicians of the necessity to include the preservation of Australia's precious wildlife and its vital habitat in all their planning, environmental issues, and discussions.

From the President's Desk

Stephen Grabowski – President

I am delighted and truly humbled to be appointed to the role of President of the Society following Dr Julie Old's recent resignation. As a long-standing member of the Society, Board Member, and Life Member, I am dedicated to supporting the ongoing wildlife conservation work of the Society.

Welcome to the Summer 2024 Edition of *Australian Wildlife*

I am pleased that we have a strong team of dedicated and experienced Directors on the Board to assist me in our ongoing wildlife conservation work across Australia. We are focused and completely committed to saving native wildlife in all its forms for the next generation of young Australians.

I want to acknowledge and thank our resigning president, Dr Julie Old, for her valuable contribution to the Society and wildlife conservation. We publicly thank Julie for her contribution and wish her well in her future endeavours.

We are excited to announce our 2024 Wildlife of the Year – Greater Gliders! The greater gliders are three species of large gliding marsupials in the genus Petauroides, all found in eastern Australia: Central greater glider (*Petauroides armillatus*), Northern greater glider (*Petauroides minor*), and Southern greater glider (*Petauroides volans*). Unfortunately, these species are threatened with extinction, and we are looking forward to raising their profile, encouraging successful conservation outcomes, and providing additional support.

Australian Wildlife Society delegates attended the 2023 Annual General Meeting of the Nature Conservation Council of NSW in October 2023 and presented a significant motion calling on the government to stop the logging of native forests. Our motion was passed, and the Nature Conservation Council will now write to the NSW Government with our request to stop the logging of native forests to protect our threatened greater gliders and other species that call our native forests home.

As we move forward, I am pleased to advise our members that the Board has decided and approved a major decision to diversify our Society's assets into commercial property for a national office and education centre for our young generation. The Board has been searching for a suitable National Office for some time but felt it must also be a commercially viable property to ensure the protection and preservation of our major assets for the future generation of our membership.

It is a policy of the Board that one hundred percent of all donations go to wildlife conservation projects and are not used for administration purposes. We are committed to honouring this long-standing tradition.

Therefore, I now make an appeal to all our wider membership to consider making a contribution towards the purchase and acquisition of the National Office and Education Centre to help grow, protect, and ensure the Wildlife Preservation Society of Australia, trading as the Australian Wildlife Society, is still here for the next one hundred years. Please contact me or the Company Secretary at any time to discuss how you can help.

An endangered southern greater glider (*Petauroides volans*) in Barrington Tops National Park. Image: Dr Hayley Stannard.

We must end native forest logging in New South Wales to protect threatened species and natural ecosystems for future generations! Image: Megan Fabian.

HAVE YOU SEEN THIS MOTH?

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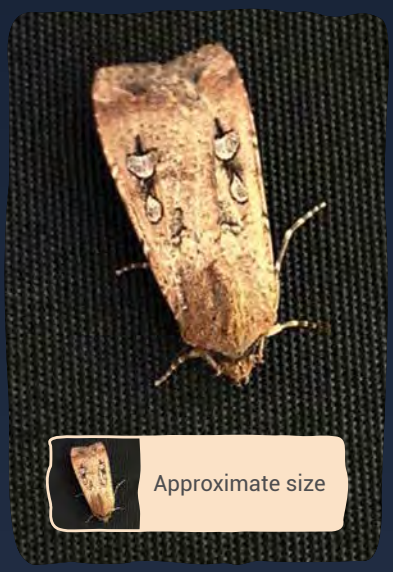

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ZOOS VICTORIA
Fighting Extinction

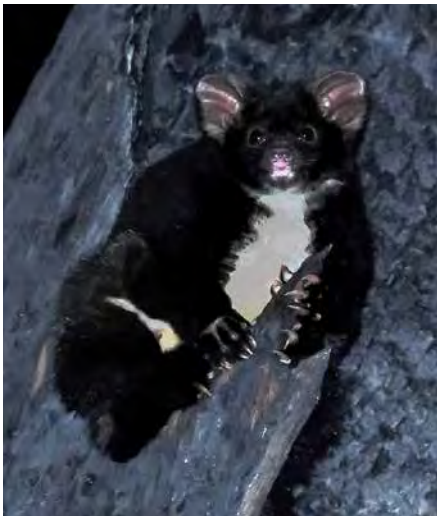
Conservation Efforts

for the Greater Glider in Australia's Eucalypt Forests

Jordyn Clough and Dr Katarina Mikac

The Plight of the Greater Glider Amidst Megafires

In New South Wales, the Endangered southern greater glider (*Petauroides volans*), a nocturnal marsupial, is facing a possible extinction crisis due to the catastrophic 2019-2020 bushfires. The bushfires have not only ravaged their eucalypt forest habitats but have also significantly impacted their population sizes. The threat to greater glider survival extends beyond the immediate effects of the bushfires, encompassing broader climate change issues such as rising temperatures and more frequent heatwaves.



A southern greater glider (*Petauroides volans*) – black and white colouration
Image: Monica Knipler.

Genetic Insights: A Toolkit for Conservation

A team of ecologists from the University of Wollongong, led by Dr Katarina Mikac, turned to conservation genomics to tackle these challenges. Their research revealed a complex genetic structure among the glider populations across fourteen locations, marked by low genetic diversity in isolated areas and significantly unique population genetic structure across regions. This genetic uniqueness in each group is crucial for conservation, indicating that indiscriminate mixing of these groups could have unintended consequences for their conservation. However, there is a ray of hope: some gliders are showing signs of adapting to temperature changes, though the pace of this adaptation may not be enough to keep up with the rapidly changing environment.

A southern greater glider (*Petauroides volans*) – white and grey colouration.
Image: Monica Knipler.

The Importance of Habitat Connectivity

The research underscores the importance of protecting and reconnecting glider habitats. By facilitating movement across larger, connected forest areas, gliders can interbreed more effectively, ensuring their genetic diversity and adaptability. This approach is vital to the survival of these marsupials amid escalating environmental pressures.

The Microbial Angle: Gut Microbiome Insights

Parallel to the genetic studies, Dr Mikac and her team of scientists explored another critical aspect of greater glider survival: their gut microbiome. The glider's gut hosts a rich microbial community essential for the digestion and metabolism of its specialised *Eucalyptus* leaf diet. Their research found that the glider's local environment significantly affects its gut microbiome, with signs of adaptation of the microbiota to suit the varying habitat conditions found across New South Wales.

Top: A southern greater glider (*Petauroides volans*) in the hollow of a gum tree.
Image: Monica Knipler.

Two researchers conducting a health assessment and taking measurements of a southern greater glider (*Petauroides volans*). Image: Jordyn Clough.

A researcher releasing a southern greater glider (*Petauroides volans*) back into its tree after being health checked. Image: Jordyn Clough.

Disturbed habitats impacted by human activities show reduced gut microbial diversity, potentially affecting the gliders' health and dietary flexibility. The 2019-2020 bushfires were also shown to shape aspects of the gut microbiome, including the diversity and abundance of key bacterial groups.

This research highlights the importance of considering the gut microbiome in data-driven conservation management efforts. Preserving diverse eucalypt species and safeguarding habitats from degradation is crucial for maintaining a healthy gut microbial community, vital for the gliders' survival.

Securing a Future for the Greater Glider

Both genetic and microbiome studies represent significant advances in understanding and conserving the greater glider. They offer a holistic view of the challenges these marsupials face and provide a framework for effective conservation strategies. These findings emphasise the intricate relationship between wildlife, their environment, and ecosystems, forming essential pieces of the conservation puzzle. The research sets the benchmark for future conservation research on understudied threatened species at risk of a changing climate and increased unpredictable environmental events that can have potentially catastrophic outcomes for species and their habitats.

A Call to Action

The plight of the greater glider in Australia's eucalypt forests is a stark reminder of the delicate balance that exists in our ecosystems. It is a call to action to protect these unique marsupials against climate change and bushfires. Through concerted efforts in habitat protection, understanding genetic needs, and considering the crucial role of their gut microbial communities, there is hope for the future survival of the greater glider.

A team of scientists simultaneously release three southern greater gliders (*Petauroides volans*) back into the wild. Image: Jordyn Clough.

Bangalow Koalas
Planting Trees for Hope

Karen Fittall

In 2022, koalas (*Phascolarctos cinereus*) were listed as an endangered species on Australia's east coast, recognising that one of the country's most beloved animals is one step further along the pathway to extinction. The reality is, without action, koalas on the east coast are at risk of disappearing – but it is not too late.

Habitat saves koalas, and planting trees creates habitat. Consequently, a New South Wales-based community group called Bangalow Koalas strives to plant hundreds of thousands of trees. Founded in 2016, the group started as a handful of concerned neighbours determined to save a 400-metre stretch of thirty-year-old koala food trees in Bangalow, Northern New South Wales, just up the road from Byron Bay. Eight years on, Bangalow Koalas has grown into an active, change-creating group led by inspirational Bangalow local and Bangalow Koalas President, Linda Sparrow.

Bangalow Koalas connects vital koala habitat by creating a wildlife corridor across the Northern Rivers region. Consequently, this connection and growth will allow koalas to move freely and safely across the landscape as they source food, reducing the main threats of disease, dog attack and vehicle strikes resulting from habitat loss.

The Story So Far

Bangalow Koalas has planted more than 335,000 trees, getting more than 95,000 in the ground in 2023 alone. It has been achieved thanks to support from the Australian Wildlife Society, a collection of empathetic landholders who desire to become part of the corridor, and vital support from local councils.

A dedicated group of passionate members and volunteers, many of whom bring their 'day job' expertise to the table and many more who are willing to get their hands dirty on planting days, is also vital and has been integral in helping Bangalow Koalas work towards its goal.

"*With the biggest threat to koalas being habitat loss, Bangalow Koalas is on a mission to plant 500,000 trees by the end of 2025*," says Linda, who was named Australian Geographic Society's Conservationist of the Year in 2022.

"*Having planted 335,941 trees so far, we are more than halfway there, which is truly incredible.*"

Planting Habitat and Hope

As well as planting habitat, Bangalow Koalas is also planting hope for koalas, hope for the planet and, in the face of climate change, hope for the mental health and wellbeing of Australia's younger generations.

"*Given the state of the world and the incredibly devastating impact we have already seen climate change have here*

Top: The ground and soil are prepared and ready to welcome the eucalyptus seedlings. Image: Linda Sparrow.

Bottom: Linda Sparrow and Pat Rafter are ready to plant some eucalyptus trees on Pat's property. Image: Saul Goodwin.

Pat Rafter welcomed guests to the Bangalow Koalas tree planting event. Image: Linda Sparrow.

Eucalyptus seedlings ready for planting on Pat Rafter's property in 2023. Image: Linda Sparrow.

Bush Regenerator, Seamus Faithfull, is geared up with a variety of eucalyptus trees ready to be planted. Image: Linda Sparrow.

A koala (*Phascolarctos cinereus*) relaxing in a tree. Image: Linda Sparrow.

in Australia, as well as in so many other countries recently, I think everyone would agree that now more than ever, we need hope," says Linda.

"*But in order to achieve our goal, there are still 164,000 hope trees to get in the ground, and that means we need funding to plant and maintain more than 80,000 trees a year for the next two years.*"

All funds raised will be used to prepare, plant, and maintain trees over the next three years in strategic locations as part of Bangalow Koalas' essential wildlife corridor.

"*So*," says Linda, "*If you are a government agency, a non-governmental organisation, a corporation, business, foundation, community group or simply an individual who wants to save koalas, we need your help.*"

To learn more about Bangalow Koalas, including how to donate or get involved, please visit: bangalowkoalas.com.au

A eucalyptus tree. Image: Linda Sparrow.

A group of volunteers, in action, planting the eucalyptus seedlings in the soil. Image: Saul Goodwin.

A LIGHT TOUCH: Reflections on Using Additional Light When Photographing Wildlife

| Doug Gimesy

I never used additional lighting when I started as a wildlife and conservation photographer. Over time, I started playing with flash here and there, adding one light, then two. As my skills improved, I began using it more often, but always during the daytime. Why? I liked how it felt; there was no other reason.

Then, about six years ago, I was photographing the little penguins (*Eudyptula minor*) of Melbourne, trying to capture their silhouette in the dark against an evening city skyline. Not far from me were a lot of tourists trying to photograph them before they entered their burrows. Some were using on-camera flashes, others just their mobile phones, with the built-in flash going off. Some signs said, 'No Flash', and the volunteer guides did what they could to educate the public. However, the relentless explosions of light continued throughout the evening. Bothering me in the distance, I could only wonder what it must have been like for these little penguins close up.

What I saw that night started me thinking about how a photographer's lighting could impact wildlife – whether using flash in the field or even on captive animals. Having been trained as a bioethicist, I wanted to ensure I was doing the 'right thing'. And having a zoology degree, I wanted the 'right thing' to be evidence-based. I hoped I could develop a simple checklist to guide me, but as I delved deeper, I found little research to draw on (more on that later) and even defining the right thing was a challenge.

For example, is it justifiable to potentially stress an animal if the resulting image significantly helps the species? Many field researchers capture, tag and release animals, knowing that this process stresses the individual animal, hoping to gain knowledge to help the species. Did working with scientists and researchers (with ethics approval) provide some moral stamp of approval?

With all these thoughts rattling around in my head, I decided I first needed to understand precisely what negative impacts can come with using additional lighting.

Potential Negative Consequences

To figure out the negative impacts of additional lighting, I read articles and spoke with academics and zoo-based wildlife welfare experts and discovered there were generally three types of effects I should be considering – the physical, the emotional, and the behavioural – and that these can sometimes influence each other. For example, many people realise how car lights can stun animals, stopping them in their tracks as a considerable threat bears down. But not everyone knows, for example, that some penguins will abandon their nests if they feel stressed; this emotional response results in a physical impact (i.e., the death of a chick). Indeed, prolonged and repeated stress takes a significant physiological toll on many animals like it does us, ranging from immunosuppression, reduced reproduction, and ultimately shorter longevity.

And, of course, different lighting on different animals in different situations can result in very different consequences. One example is the Australasian gannet (*Morus serrator*), which keeps its eyes open when penetrating the water to catch food, adjusting focus instantaneously. Knowing this, is it not okay to use a flash when they dive into darker water – potentially blinding them and preventing their hunt – but okay as they return to the surface, knowing the latter is no more intense than mid-day water reflection?

Top: Tourists crowd and use flash to take a photo of a little penguin (*Eudyptula minor*) found on St Kilda Breakwater in Victoria. Image: Doug Gimesy.

Potential Impacts

1. **Physical (i.e., direct impact on an animal's body):**
   a. Damage to their eyes (short/long term),
   b. Startle response triggered, causing animals to hurt themselves (plus stress response), and
   c. Loss of visual acuity impacts their ability to navigate, hunt, or protect themselves (and risk an injury).
2. **Emotional (i.e., how they feel):**
   a. Distress (e.g., anger, fright, panic, anxiousness, helplessness, apprehension, irritability) with consequential physical (e.g., cortisol increase, immune effects) and behavioural impacts (see below).
3. **Behavioural (i.e., what they do):**
   a. Changes in both immediate and long-term behaviour (e.g., eating, hunting, defence, parenting, choosing less appropriate but less disturbed roost site, and sleep/rest patterns), and startling, which impacts hunting ability or danger/predator avoidance.

Conversely, as platypuses (*Ornithorhynchus anatinus*) close their eyes when diving (using electrical receptors in their bills to find food), is it okay to use a flash at night when they are underwater but not when they are above it?

And what about the colour of the light? Microbat species like *Myotis* and *Plecotus* do not seem bothered by red light (possibly because they do not see it as bright, if at all), so is it okay to use a flash if I put a red gel on?

I have always intuitively disliked the use of a (white) flash on nocturnal gliding mammals. With their super-light-sensitive eyes, what must it be like to have a flash blasted mid-flight, blinding them whilst attempting a landing? What could go wrong?

Interestingly, I learnt one bit of information that my diving friends may love or hate. An Australian study recently demonstrated that the use of flash had no negative impact on seahorses because of what they called the 'ripple effect'. When sunlight focuses through waves or wavelets on a sunny day, it causes very short-duration high-intensity bursts of light (up to 100 times stronger than calm days) like a flash. Consequently, using a flash does not bother them or cause a stress response – that is the good news. The bad news is the researchers also found that getting close enough to use a flash stressed them.

And what about lighting used with camera traps, especially given we do not immediately see its impact (if ever at all)? Given camera traps are not species-specific, could their use on a well-trod trail be acceptable for one species but result in another being stressed or avoiding that area to its detriment? A study in 2004 described a greater than 50 percent decline in tiger (*Panthera tigris*) capture rates after the first five days, and one in 2007 reported that kinkajous (*Potos flavus*) – a tropical rainforest mammal – basically abandoned a branch where a white-flash camera was aimed.

Every case is different, so what is the solution? For night photography, there are some excellent alternatives to traditional light sources, such as infrared or 'starlight' cameras, but not all additional lighting is at night, and this technology may not be affordable, appropriate, or practical.

Where To From Here?

So far, I have come up with the following fifteen questions I ask myself whenever I think about using additional lighting:

1. What is the species' general temperament?,
2. What is the individual animal's general temperament? (e.g., captive animals may be more used to 'abnormal' external stimuli),
3. What is the species' base light sensitivity? Are they primarily nocturnal, diurnal, or both?,
4. What is the species colour-spectrum perception? (e.g., diving

On a sunny day, I needed to fill the shadows. I chose to use two diffused flashes (though umbrellas as softboxes were impractical and the set-up could have been more stressful) and positioned these to the side to help minimise direct lighting. I also increased my ISO to 2,000 to help reduce flash intensity. Image: Doug Gimesy.

animals may be more sensitive to blue light; some animals see in infrared versus the colour of the light source),

5. Does the species have a specific colour sensitivity or insensitivity?,
6. Will their eyes be open or closed?,
7. What is the intensity difference of additional lighting versus ambient light? (i.e., what percent are you adding?),
8. What is the lighting frequency? (e.g., continuous or flash – as many will become comfortable with continuous),
9. How much of the animal's field of view will the light affect? (e.g., a big softbox placed too close may appear large and scary),
10. Is it harsh or soft light?,
11. What is the line of sight to the light? (i.e., direct, back, rear, or side?),
12. What is the duration between impacts? (i.e., is it a quick, single attempt or multiple attempts in one session?),
13. What is the frequency of light impacts over time? (i.e., could this animal be impacted over multiple periods by multiple people?),
14. How significant is the consequence, especially versus the benefit of the image? (e.g., slight stress, disturbance, injury), and
15. How can I reduce the impact of additional lighting (e.g., increase my ISO or sensitivity of the camera's sensor; do not use flash at night)?

Is this list the definitive checklist? No. Is it evidence-based? Some. But most importantly for me, what it does is help me think more deeply about doing the right thing when using additional lighting by providing a framework to reflect upon and make the best-considered choice. And, of course, no matter what planning I do, when the day comes, I will always pay attention to what the subject is (or is not) telling me and respond accordingly. It is helpful to generalise and ask broad questions, but like all of us, individual animals have temperaments.

Final Thoughts

As a conservation and animal welfare photojournalist, I believe I need to keep creating images that will engage others to care more deeply and help our natural world. The use of additional lighting can often be very important for many good reasons, and I would never suggest it should never be used. I also believe, however, that I must always ask the basic broader questions in all my photography, such as "Am I being considerate?", "Is there a kinder way to do this?", and probably most importantly, "Do the means justify the ends?".

There is a lack of information about the negative impact of additional lighting in photography, and I know I will make mistakes, but when I do use lighting (and I certainly will sometimes) this journey, I hope, has helped ensure one thing – that I will always try to use it with 'a light touch'.

Doug is a professional conservation and animal welfare photojournalist and Senior Fellow of the International League of Conservation Photographers. A four-time finalist in the prestigious Wildlife Photographer of the Year, initially gaining a Bachelor of Science in Zoology and Microbiology, he later completed both a Masters of Environment and a Masters of Bioethics. Together, these two qualifications helped shape his thinking about what type of issues he should focus on and why – conservation and animal welfare issues. He hopes that the images and information he shares will inspire people to stop, think, and treat nature more kindly. If you want to learn more about Doug and his work, please visit www.gimesy.com and follow him on Instagram: doug_gimesy and Facebook: Doug Gimesy Photography.

Taken in 2016, I decided to forgo additional lighting to reduce potential stress, and I also felt it simply told a better story. Image: Doug Gimesy.

Photographed in captivity during the day against a black backdrop, I used a softbox (a light modifier that minimises harsh shadows) and increased my ISO (sensitivity of the camera's sensor) to help minimise the flash intensity and lighting differential versus ambient light. Image: Doug Gimesy.

Australian Wildlife Society

(ACN 134 808 790)

Formed in 1909 and dedicated to the conservation of Australia's wildlife

Australian Wildlife Society
Conserving Australia's Wildlife since 1909 ®

115th ANNUAL GENERAL MEETING

AGENDA

Wednesday 6 March 2024
Commencing at 11.30am

Level 3, Park Room,
Castlereagh Boutique Hotel
169 Castlereagh Street, Sydney, NSW

1. Welcome and recording of those present.
2. Apologies.
3. Minutes of the 114th Annual General Meeting held on Wednesday, 1 March 2023.
4. President's Report for 2023.
5. Treasurer's Report for 2023. Receive and adopt the Balance Sheet and Income and Expenditure of the Society for the year ending 31 December 2023 in accordance with our Constitution.
6. Adoption of the Revised Constitution.
7. Election for the Board of Directors of the Society:
8. a) Dr Robin Crisman retires in accordance with the Constitution (10.3) and, being eligible, offers herself for re-election,
   b) Wayne Greenwood retires in accordance with the Constitution (10.3) and will not stand for re-election,
   c) Trevor Evans retires in accordance with the Constitution (10.3) and, being eligible, offers himself for re-election, and
   d) Patrick Medway AM retires in accordance with the Constitution (10.3) and, being eligible, offers himself for re-election.
7. Appoint the Auditor for 2024 – Peter J Varley CA.
8. Closure.

Issued by authority of the Board of the Wildlife Preservation Society of Australia Limited Trading as Australian Wildlife Society.

Patrick W Medway AM
COMPANY SECRETARY

15 January 2024

All members are cordially invited to attend the Annual President's Luncheon at the conclusion of the Annual General Meeting.

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Telephone: 0424 287 297 | **Email:** info@aws.org.au | **Website:** www.aws.org.au

Encouraging the Future

of Wildlife Conservation at Murdoch University

Trinity Elsom, President, Murdoch University Wildlife Association

Australia's unique and diverse wildlife makes it one of the most important nations on the planet for biodiversity, with roughly ninety percent of its animal species found nowhere else in the world. But these species are disappearing at an alarming rate, with Australia's native wildlife facing constant threats from habitat destruction, urban development, and introduced species. To have a chance at saving these wonderful animals, we need to build a more sustainable future, improve the support for conservation efforts, and develop innovative ideas and recovery strategies. An essential aspect of working towards these goals is encouraging future generations to get involved in wildlife conservation, which is precisely what Murdoch University Wildlife Association aims to achieve.

Murdoch University Wildlife Association is a student-run, not-for-profit organisation within Murdoch University that provides opportunities for students to gain experience, skills, knowledge, and enthusiasm for wildlife medicine, conservation, rehabilitation, and research.

Murdoch University is the only university in Western Australia that provides a Doctor of Veterinary Medicine course, and it offers a variety of other animal health and conservation courses, making it a hub for students interested in these fields. Murdoch University Wildlife Association aims to provide wildlife experiences that complement and go beyond the standard academic curriculum, including wildlife handling practicals, first aid workshops, exposure to current research, and other events incorporating conservation and wildlife. We also organise social events to build a community for students who share our passion for Australia's native animals. Our goal is to inspire and support these students to become future ambassadors for wildlife conservation, whether as veterinarians, researchers, or animal health professionals.

Being a not-for-profit organisation, Murdoch University Wildlife Association relies on our generous sponsors to provide various interesting and engaging events for our members. In 2023, the Australian Wildlife Society kindly sponsored Murdoch University Wildlife Association's Wildlife Necropsy and Quiz Night events.

Wildlife Necropsy

The Murdoch University Wildlife Association Wildlife Necropsy event included presentations on wildlife first aid and necropsy and a practical workshop where students could dissect various wildlife species. The event allowed students to learn crucial wildlife first aid skills, understand wildlife anatomy and physiology, and develop their knowledge of wildlife health. The hands-on and interactive aspects also encouraged students to develop their curiosity and proactively explore aspects of wildlife medicine and conservation.

We began this event with a talk on wildlife first aid that discussed the importance of stress reduction for wildlife patients, proper triaging and assessment of sick and injured native animals, and prompt and effective

Top: Murdoch University Wildlife Association committee and club members at Bibra Lake in Perth, Western Australia. Image: Ashley Chan.

Murdoch University Wildlife Association Quiz Night Attendees. Image: Ashley Chan.

Murdoch University Wildlife Association Quiz Night prizes. Image: Trinity Elsom.

Presentation on anatomy pathology and wildlife necropsy by Dr Flaminia Coiacetto. Image: Ashley Chan.

first aid for these patients. The talk introduced skills such as intragastric gavage fluids and food administration, subcutaneous fluid injections, and intramuscular medication injections. Common diseases of wildlife, such as magpie throat worm, psittacine beak and feather disease, and the emerging black and white disease, were also discussed.

Dr Flaminia Coiacetto, an accomplished veterinary anatomic pathologist interested in avian and exotic pathology, presented on the purpose, procedure, and findings of wildlife necropsies. This engaging presentation explored how wildlife necropsy and anatomic pathology are vital for investigating current diseases and threats to our wildlife species, further research into these species, and directing future medical procedures and conservation efforts for our wildlife. Dr Flaminia then explained the anatomy of various wildlife species and the necropsy procedures we would use in the following practical workshop.

The highlight of the event was the wildlife necropsy itself, where students had the opportunity to practice their wildlife first aid skills and dissect a variety of wildlife species, including possums, bandicoots, echidnas, bobtails, turtles, cockatoos, and many more. At the start of this practical workshop, students got hands-on experience with examining, providing fluids, and providing medications to these animals. We then examined and compared the anatomy of these species through necropsy and put on our detective caps to explore what may have happened to the animals.

The Murdoch University Wildlife Association Wildlife Necropsy was an incredibly informative and fascinating event that provided students with key practical skills and wildlife knowledge. We hope this engaging and unique experience will encourage these students to continue to follow their interest in wildlife and support wildlife conservation efforts in the future.

Quiz Night

The Murdoch University Wildlife Association presented the all-new quiz night event, a fun evening of wildlife trivia, socialising, and great prizes! This event was designed to provide wildlife knowledge in an entertaining way while fostering a sense of community between Murdoch University Wildlife Association members. By building a community for students who share a passion for wildlife, we hope these students will continue to support and encourage each other into the future.

In previous years, the Murdoch University Wildlife Association was a special interest group in the Murdoch University School of Veterinary Science, so most of its members were veterinary

medicine students. But wildlife conservation requires an integrated effort between veterinarians, animal scientists, environmental scientists, and many other professions. So, in 2023, we expanded the Murdoch University Wildlife Association and welcomed students from all disciplines. To celebrate this change and to support communication between Murdoch University Wildlife Association members studying different degrees, we introduced the Murdoch University Wildlife Association Quiz Night event.

To follow the wildlife theme, the Quiz Night questions included wildlife identification, true and false, and wildlife fun facts. The brain-testing trivia rounds were interspersed with interactive mini-games and breaks to enjoy the natural scenery around the Murdoch Guild Tavern. Everyone had a chance to win, with various prizes, including first-, second-, and third-place prize packs, free drinks, and bonus prizes! The Quiz Night was entertaining, informative, and enjoyable for all involved!

The Future of Wildlife Conservation

The Murdoch University Wildlife Association aims to motivate and inspire the next generation of wildlife conservationists to save Australia's incredible wildlife. These bright minds will bring new perspectives and ideas to our current conservation challenges. By working together, not giving up hope, and finding new solutions, we can create a future where humans, animals, and the environment can exist in harmony.

A student dissecting a short-beaked echidna (*Tachyglossus aculeatus*). Image: Ashley Chan.

Demonstration and practice of subcutaneous fluid injection on a kookaburra (*Dacelo novaeguineae*). Image: Ashley Chan.

Students dissecting a giant petrel (*Macronectes giganteus*). Image: Ashley Chan.

Demonstration of wildlife triaging and assessment of a variety of wildlife species. Image: Ashley Chan.

Celebrating the Conservation Success of a Wildlife Champion! by Megan Fabian

Dr Julie Old joined the Society as a Director on 6 June 2018 and became Senior Vice President on 6 April 2020. On 3 March 2021, Julie was elected as the 119th President of the Society and held the Presidency for two years and eight months. It was with a heavy heart that Julie resigned from the Board on 2 November 2023. Overall, Julie served as a volunteer Director on the Board for five and a half years.

During Julie's tenure, we saw enormous growth in our University Research Grants and Scholarships, which have provided countless opportunities for researchers to delve into critical areas of study related to wildlife conservation. Her efforts in raising awareness of wildlife conservation issues through social media have increased engagement and fostered a sense of responsibility from a wider audience towards protecting our threatened flora and fauna.

Furthermore, Julie's passion for wildlife conservation and extensive research on various species made her an asset to the *Australian Wildlife* magazine. Julie's contribution provided national and international readers with fascinating insights into Australia's unique and diverse wildlife and shed light on the conservation efforts undertaken to protect these species. Julie also provided practical tips and suggestions to inspire individuals to engage in wildlife conservation efforts.

What set Julie apart was her relentless commitment to bringing informed scientific knowledge and expertise to environmental issues. She understood the importance of informed decision-making and ensured her actions were backed by solid research and data, strengthening her credibility but also making her an invaluable asset in the field of wildlife conservation.

In 2020, Julie was short-listed for the NSW Nature Conservation Council Allen Strom Hall of Fame Award for demonstrating outstanding commitment to conserving the New South Wales Environment and courageously challenging government and non-government decision-makers in honour of Myles and Milo Dunphy.

In 2021, Julie was elected as President of the Society. Not only did she hold the esteemed position, but she also served as the chairperson. With her experience and knowledge, she skilfully managed the responsibilities and obligations of these roles. Julie's ability to navigate the complexities of governance was instrumental in ensuring the smooth functioning of the Society.

In 2022, under Julie's leadership, the Board of Directors of the Society were awarded the NSW Volunteer of the Year Not-for-Profit Voluntary Governance Award – awarded to an unpaid Board of Directors who exemplify excellence in governance.

In 2023, Julie was nominated for the Premier's NSW Woman of Excellence Award as part of NSW Woman of the Year 2024, awarded to a role model who has excelled in her chosen field, creates lasting change, and inspires others.

Julie's commitment to wildlife conservation has garnered recognition and admiration from her peers and the wider community. Her achievements serve as a beacon of hope, motivating others to follow in her footsteps and positively impact nature and the world around them.

Julie's leadership has been instrumental in driving the Society's mission forward and making significant strides in conserving Australia's biodiversity for future generations. She has become an influential figure in Australian wildlife conservation, and her passion for protecting our natural world is commendable. We thank Julie for her leadership, resilience, and dedication and wish her all the best with her future endeavours.

Dr Julie Old celebrating the Platinum Jubilee Ball at Government House in Canberra, Australian Capital Territory, in 2022.

Dr Julie Old holding a bare-nosed wombat (*Vombatus ursinus*) at Cedar Creek Wombat Hospital in Cedar Creek, New South Wales, in 2022.

Dr Julie Old was invited to speak about all things wildlife on ABC Radio Sydney with Simon Marnie in Sydney, New South Wales, in 2023.

Dr Julie Old holding a bare-nosed wombat (*Vombatus ursinus*) during the opening of the new Cedar Creek Wombat Hospital, supported by the Society, in Cedar Creek, New South Wales, in 2020.

Dr Julie Old with 'William', the hairy-nosed wombat (*Lasiorhinus krefftii*), in Thallon, Queensland, in 2021.

Dr Julie Old introduced the Society's Youth Conservation Award recipient at the 2021 Annual President's Luncheon at Parliament House in Sydney, New South Wales.

Dr Julie Old celebrating the opening of the Society's art exhibition at Hurstville Museum and Gallery in Hurstville, New South Wales, in 2022.

Dr Julie Old at the 2023 Annual Scientific Meeting of the Australian Mammal Society in Adelaide, South Australia, speaking about wombats and the Society.

Dr Julie Old holding two Tasmanian devil (*Sarcophilus harrisii*) joeys at Aussie Ark in Tomalla, New South Wales, in 2022.

Annual President's Luncheon

The President and Directors of the Board of the

Australian Wildlife Society

cordially invite you to the

Annual Luncheon to celebrate 115 years of wildlife conservation of the Society and the presentation of our prestigious Annual Awards

Wednesday 6 March 2024
Commencing at 12 noon

Level 4, Adam Room
Castlereagh Boutique Hotel
169 Castlereagh Street, Sydney

Australian Wildlife Society
Conserving Australia's Wildlife since 1909 ®

RSVP 17 February 2024
Booking/Prepayment Essential

Acceptance form:

I am pleased to accept your kind invitation to the Annual Luncheon.

$..... for ..... Ticket/s at $75 per person
2 course - main, dessert, and drinks

Name.....

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Cheques can be mailed to:
Australian Wildlife Society
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Confirm details via email at accounts@aws.org.au

Australia in the Firing Line from Fire Ants

Reece Pianta, Invasive Species Council

The sports ground is closed. The playground is not open to the public. Our BBQ has been cancelled. We found fire ants (Solenopsis invicta). This will be a new Australian experience if fire ants continue to breach containment. It is already a reality in southern Queensland. These invader ants are damaging farmlands and closing parks, sports fields, and businesses.

Fire ants will be a multi-billion dollar hit to Australia's economy. They will cause 140,000 medical appointments each year. Fire ant attacks can be fatal to humans. Overseas, fire ants are causing agricultural land to become unviable. Impacts on the economy, agriculture, and social amenity from fire ants are well publicised. The idea of marauding hordes of ants spreading out from south-east Queensland has captured the attention and imagination of media and the public alike. But – what would fire ants mean for Australia's natural environment?

Unbelievable Environmental Impacts

It is hard to convey potential environmental impacts from fire ants without seeming hyperbolic. Fire ants will be devastating to our environment and will push some species to the brink of extinction. They are listed as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999*. They are successful survivalists with an uncanny ability to consume a wide range of plants and animals.

Australian Government research has mapped the impact of fire ants on the south-east Queensland biosphere. If fire ants had not been controlled or suppression work stopped, they would cause population declines in 45 percent of birds, 38 percent of mammals, 69 percent of reptiles and 95 percent of amphibians. Along with impacts on animals, fire ants feed on plant stem and root systems and have a symbiotic relationship with aphids, which can also be detrimental to healthy vegetation.

Ground-nesting birds, such as the critically endangered plains wanderer (*Pedionomus torquatus*), and animals that burrow or forage at ground level will be the most impacted by fire ant invasions. While fire ants are not well adapted to heavy canopy forest environments, almost all of Australia is climatically suitable for infestation. In the United States, fire ants are proving extremely adaptable – unexpectedly moving into colder areas where viable infestation was not expected. Climate change will accelerate this habitat expansion.

Fire ants in Australia have been found on Minjerribah (North Stradbroke Island). This was unexpected as the sandy soil on the island is not ideal habitat for fire ants. Over one hundred nests have now been found at old mine sites, a worrying development for other ecologically sensitive offshore islands. This invasion mirrors the American experience of fire ants in Florida, where turtle nesting grounds are threatened by infestation.

A Case Study of a Failed Response

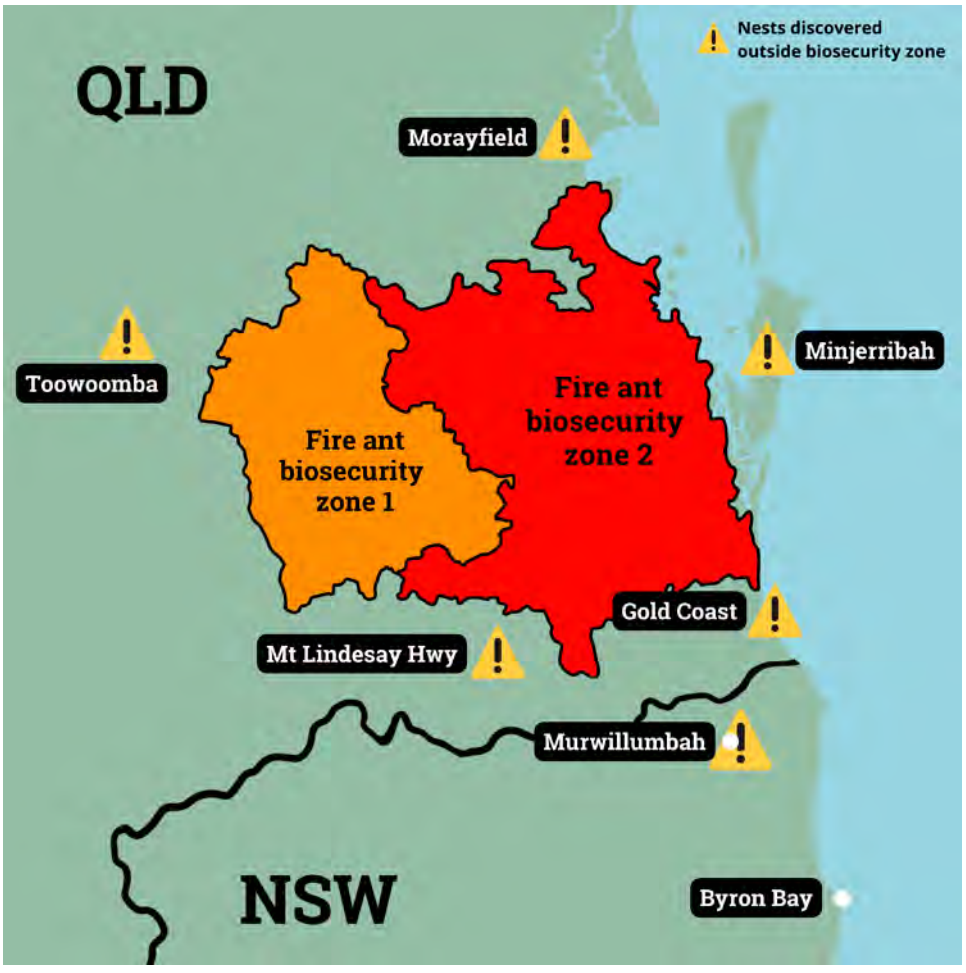
It was a shock to see a fire ant sign at the local park I took my daughter to. It was a clear indicator that the infestation had not been successfully contained since major eradication efforts resumed in 2017. If it had happened here, maybe it was happening across the fire ant biosecurity area.

Fire ants in Australia are spreading at a rate of five kilometres per year. In the United States, they are spreading at forty-eight kilometres per year. In China, the annual rate is eighty kilometres.

Top: A red imported fire ant (*Solenopsis invicta*) head. Image: www.antweb.org – CC BY-SA 3.0.

A fire ant nest in Queensland. Fire ant nests have no obvious entry or exit holes and vary in height and shape. Image: Andrew Cox.

Critically endangered plains wanderers (*Pedionomus torquatus*) are just one of Australia's many small, ground-dwelling native species that would be particularly susceptible to fire ants. Image: Alex Pike.



Fire ant (*Solenopsis invicta*) biosecurity zones 2023. Image: Invasive Species Council.

This differential is an endorsement of the tactics being used in Australia for suppression and control. It is evidence, however, of the failed goal of fire ant eradication. So far, Australia's governments have spent $740 million in pursuit of fire ant eradication over twenty years. This funding has been inconsistent and slow to arrive in response to expert advice.

For example, in 2015, a report called for an urgent boost in fire ant eradication resources in line with a new response plan. Funding was not deployed on the ground until 2018. By this time, fire ants had surged and spread. In 2021, the alarm was raised again, and the fire ant plan needed urgent revisions. Two years later, governments are still considering their response.

Fire ants are not waiting for government budget cycles. In six weeks in winter 2023, six fire ant containment breaches occurred. Every mainland state has had fire ant incursions over the past decade. In mid-2023, fire ants were detected within five kilometres of the New South Wales border and were found west of the Great Dividing Range at Kleinton. Now, fire ants have spread into New South Wales at Minjerribah and south of Ballina.

Join the fire ant (*Solenopsis invicta*) fighters. Image: Invasive Species Council.

Reece Pianta, Invasive Species Council's Fire Ant Campaigner, has been a long-time advocate for fire ant action.

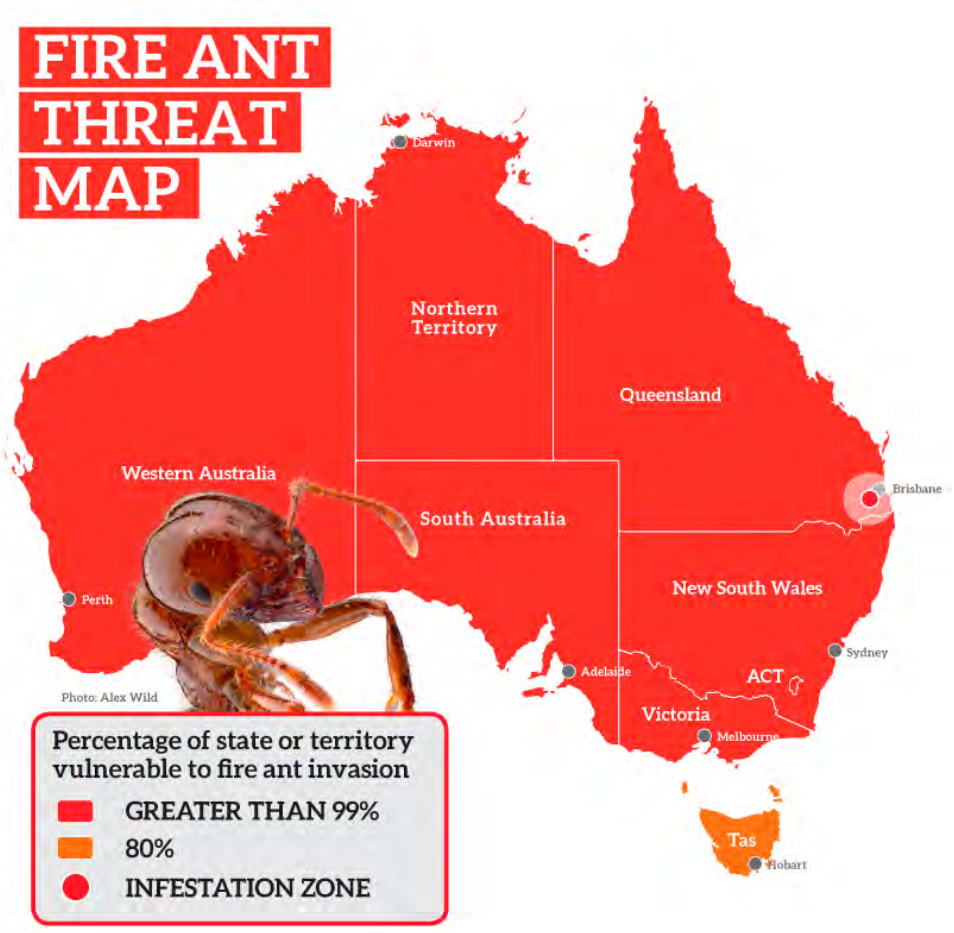
Fire ant queens can fly five kilometres to create new nests. Fire ants form rafts during flood events to reach new areas. Fire ants will spread quickly throughout the eastern states if they enter the Murray Darling River basin. Fire ants cross oceans and continents in cargo – soil, fodder, and hay bales are ideal carrier materials. In wet or dry conditions, fire ants will continue their march across Australia unless containment and eradication efforts are ramped up.

We are at a crucial moment for fire ant eradication efforts in Australia. Governments need to move much faster and understand the time-sensitive nature of the threat we face.

A Narrow Path to Fire Ant Freedom

Australia has been the most successful country in the world at dealing with fire ants. This is despite the sporadic, underfunded, and late response to this aggressive invasive species.

The tactics work – direct nest injection, baiting and community surveillance have slowed their spread. Eradication has been successful in every place they have been found in Australia. The last remaining and largest fire ant stronghold is in southern Queensland.



The 2021 review indicated that at least $200 million per year was required to successfully eradicate fire ants in Australia. The Invasive Species Council supports the government's new response plan – a comprehensive horseshoe to contain and eradicate fire ants. It is a plan for eradication within ten years, but it needs to be funded. According to the review, $593 million has been provided over the next four years – less than half the required amount.

Red imported fire ant (*Solenopsis invicta*) raft.
Image: Stevenw12339.

Our Fire Ant Future

Australia is at a crossroads. The fire ant future that scientists have predicted is coming true. Every night, the Gold Coast news carries reports of a new sports field, showground, beach, park, or school closed because of fire ants. If they take hold, farmers and local governments will bear a new burden, but who will manage fire ants in nature? The truth is fire ants will run amok in national parks, reserves, and wilderness areas. The cost to the industry will be huge. The cost to the environment will be devastating. Join our call for urgent government fire ant action.

A preserved red imported fire ant (*Solenopsis invicta*).
Image: April Noble via antweb.org

Swimming with Turtles

Sarah Jantos, Kristie Morgan and Lexene Busbridge, Directors, Green Heroes

Jungarra Ngarrian (Cook Island Aquatic Reserve) is an iconic landmark to the Tweed Heads on the far North Coast of New South Wales. It resonates as a place of significance to many locals and seagoers of the region. Traditional Descendant, Kyle Slabb, explains, "In our language, Jungurra Ngarrian means the ceremony place of the birds."

The island, only 600 metres off the shore of Fingal Head, New South Wales, is formed by ancient lava flows and protrudes 24.8 metres above sea level. It is a haven for threatened migratory sea birds and the home of two reptile species and twenty-five plant species.

"But that is only on top of the water – there is another story under the water", continues Kyle. The aquatic reserve is famous for its colony of green sea turtles (*Chelonia mydas*) that attract a large (and growing) volume of visitors yearly. This threatened species and several others, such as the Queensland groper (*Epinephelus lanceolatus*), black rockcod (*Epinephelus daemelii*), goldspotted rockcod (*Epinephelus coioides*) and the grey nurse shark (*Carcharias taurus*), all occur within the waters of the stunning reserve – the only aquatic reserve in New South Wales to host both soft and hard corals.

A small number of local tour operators have enjoyed sharing the aquatic reserve with locals and tourists for many decades. In recent times, however, a rapid expansion in tourism and an increased demand for the most popular 'Swimming with the Turtles' tour has raised questions of concern for our favourite locals, the green sea turtle, loggerhead turtle (*Caretta caretta*) and hawksbill turtle (*Eretmochelys imbricata*). Operators have reported a decrease in turtle numbers, and others have observed an increase in inappropriate encounters with these animals, such as touching, 'riding', and obstruction of passage (by both individuals and vessels). Green Heroes Jungarra Ngarrian Conservation Project team felt the need to navigate a solution to reduce the pressures on local wildlife within our local aquatic reserve.

The Jungarra Ngarrain Conservation Project team is a collaboration aimed at preserving and protecting flora and fauna species within the aquatic reserve through cultural empowerment. It incorporates both practical conservation and preservation of culture and story. In working together, Traditional Descendants, NSW Department of Primary Industries (Aquatic Reserves) and Kirra Dive on the Tweed are working to address gaps in knowledge and deepen connections to sea country and opportunities to care for sea country.

The ethics of paid wildlife encounters are globally complex. Arguably, the most ethical solution for animal lovers or wildlife enthusiasts is to select an eco-tourism operator that offers the opportunity to meet wild animals amidst their natural habitats. In the belief that close encounters provide valuable opportunities for learning, behaviour change, and support for conservation efforts, the Jungarra Ngarrian Conservation Project team

Top: A green sea turtle (*Chelonia mydas*). Image: Ashiyana Hilmer.

took action to support appropriate turtle encounters via the creation of resources and suggested guidelines for in-water interactions with sea turtles.

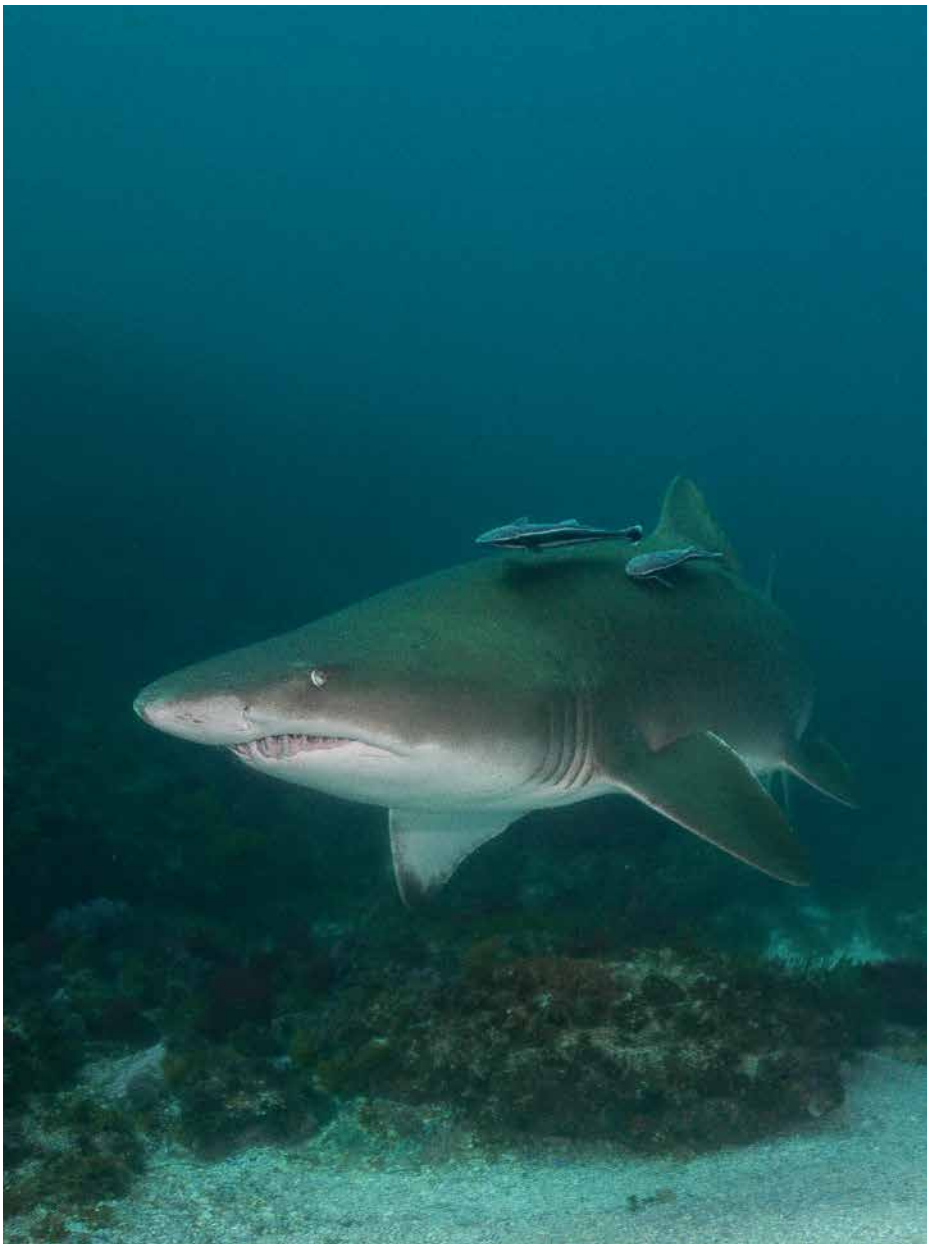
Research into paid animal encounters highlights that the motives of paying customers are often genuine. According to the World Animal Protection Organisation, most people who pay for animal encounters have a pure interest in learning about the species or a genuine endearment to the animal they have paid to see.

Other research suggests that following a positive, up-close animal encounter, individuals were more likely to make lifestyle changes and engage in targeted conservation efforts. Of the many wildlife experiences available, non-captive wildlife encounters impacted individual behaviour the most.

On behalf of our volunteer team, we encourage the distribution of these resources to commercial operators, dive shops, reef-based resorts, and community groups (or any other relevant entities) to promote interactions that do not disturb a day in the life of a sea turtle.

Internationally, all seven sea turtles are recognised as species of conservation concern. Six of the seven species are found in Australian waters and are listed on *The International Union for Conservation of Nature Red List of Threatened Species*.

In the coming months, Green Heroes will continue collaborating with key stakeholders to develop resources targeting other marine animal species. In addition, the team looks forward to launching an exciting citizen science initiative that provides meaningful opportunities for in-water enthusiasts



A grey nurse shark (*Carcharias taurus*). Image: Leigh Edwards.

A hawksbill turtle (*Eretmochelys imbricata*). Image: Green Heroes.

A loggerhead turtle (*Caretta caretta*). Image: Nicole McLachlan.

A green sea turtle (*Chelonia mydas*) hides among hard and soft corals. Image: Leigh Edwards.

to contribute to marine megafauna conservation. In doing so, the team aims to achieve the following outcomes:

1. A decrease in habitat disturbance and habitat destruction by vessels and individuals visiting marine parks and reserves,
2. A change in visitor behaviour and in-water interactions with sea turtles and other target species,
3. A decrease in observed inappropriate behaviours,
4. Increased knowledge and awareness about threats to target species,
5. An increase in awareness and respect of First Nations sea country culture and conservation efforts,
6. An increase in the number of threatened species within a marine park or reserve at any given time,
7. An increase in a broader number of other marine animals and invertebrates within marine parks and aquatic reserves, and
8. Rehabilitation of marine habitats critical to threatened species within marine parks and reserves.

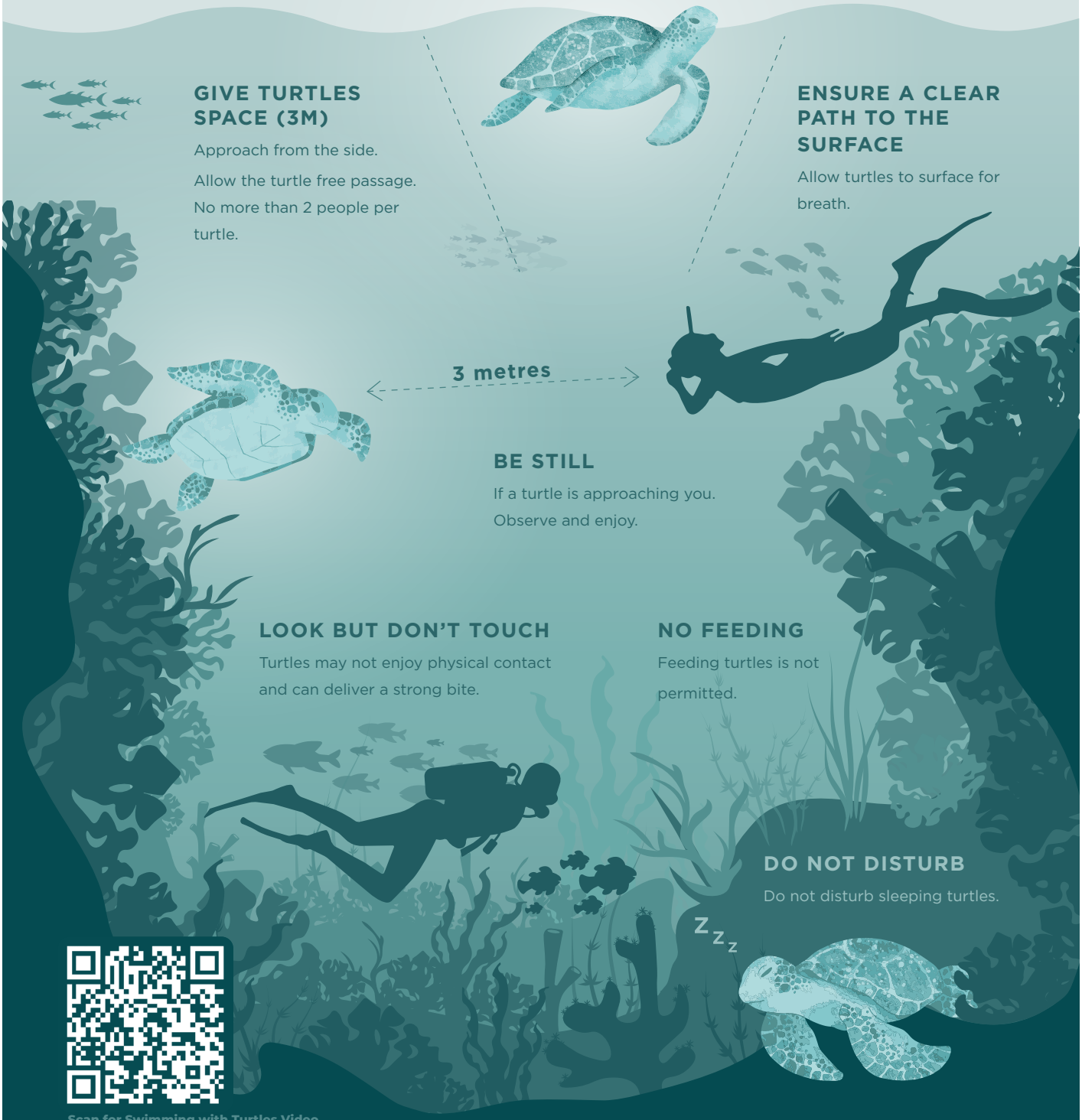
Co-existing with nature is both a privilege and a responsibility. Green Heroes is an Australian registered charity with a vision to empower the community to become environmental visionaries, innovators, leaders, and confident societal contributors. Our community engagement equips volunteers with a deep understanding of their interconnection with all living things. It nurtures a powerful sense of belonging and purpose in their lives, community, and environment. To find out more, visit www.greenheroes.org.au

The Jungarra Ngarrain Conservation Project team. Image: Nicole McLachlan.

Swimming with turtles

STAY CALM AND QUIET

Loud noises, splashing and fast movements can scare turtles away.



Scan for Swimming with Turtles Video

Turtles are a much loved, iconic marine species. Time spent in the water with these gentle animals is an exciting and rewarding experience. These recommendations are designed to preserve and protect local turtles - and the opportunity to encounter them for generations to come. For more information visit: **GREENHEROES.ORG.AU**

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2023

Australian Wildlife Society
University of New South Wales
Wildlife Ecology Research Scholarship Recipient

Make Australian Wetlands Wet Again:

The Large-scale Restoration of the Indigenous-managed Gayini Wetlands

Jan Kreibich

At the lower end of Australia's second longest river, the Murrumbidgee, lies a remarkable jewel, spanning 88,000 hectares on the nationally significant Lowbidgee Floodplain – the Gayini Wetlands. This natural mosaic of waterways, with lush vegetation when the river floods, creates a breathtaking spectacle of myriads of waterbirds. It stands as an oasis in this primarily dry landscape.

In this land of stark contrasts, the semi-arid climate intertwines with the rhythm of nature's floods, crafting an ecosystem of tremendous diversity. Here, one can wander through one of Australia's largest expanses of lignum shrublands (*Duma florulenta*), marvel at the towering river red gum forests (*Eucalyptus camaldulensis*) and lose oneself in the intricate black box woodlands (*E. largiflorens*). It also provides a haven for threatened native fish, such as Murray cod (*Maccullochella peelii*) and the endangered Southern bell frog (*Litoria raniformis*). It hosts extensive rookeries where waterbirds such as royal spoonbills (*Platalea regia*), glossy ibis (*Plegadis falcinellus*) and straw-necked ibis (*Threskiornis spinicollis*) breed.

Returning Nari Nari Country

For over 50,000 years, the Gayini has also been a cradle of Indigenous history. Among its trees and tranquil waters lie hidden treasures of the past: scarred trees, stone artifacts, and burial sites. It is a rich cultural landscape, connected and enduring for the Nari Nari people. The abundance of these cultural sites underscores the profound importance of Gayini, not just as a natural wonder, but as country with a long First Nations history.

Tragically, the 1840s marked a turning point, as European colonisation brought upheaval. The Nari Nari were uprooted from their ancestral lands, a loss immeasurable in its impact, severing deep-rooted connections with their Country. The fertile plains of Gayini were reshaped into agricultural lands, altering the landscape that had been nurtured for millennia.

A new chapter began a decade ago when the New South Wales and Australian Governments took a significant step: they invested $180 million to acquire the farming properties on the floodplain, aiming to restore Gayini's ecological balance. Then, in a historic moment in December 2019, the Gayini Wetlands were rightfully returned to their traditional custodians – the Nari Nari Tribal Council. However, the land that greeted the Nari Nari was a shadow of what it once was – a landscape awaiting significant healing.

An Australian pelican (*Pelecanus conspicillatus*) colony in the Gayini Wetlands. Image: Annette Ruzicka.

A River Running Dry

For millennia, the Gayini Wetlands followed the rhythm of nature's pulse. The untamed and free river frequently bestowed life with its regular but variable floods. This natural drying and wetting cycle created a dynamic 'boom-and-bust' environment, sustaining a high biodiversity in the wetlands. But today, the once bountiful floods have dwindled, stifled by the grip of human progress. Upstream, a network of twenty-six major reservoirs, like the Burrinjuck Dam and the Snowy Mountains Hydroelectric Scheme, hold the river's flow in check, diverting its waters from its freshwater ecosystems.

This transformation has cast a long shadow over Gayini. The wetlands now lie fragmented and parched. At least 80 percent of the wetland's former glory in this altered landscape has already been lost or critically damaged. The impact of this change echoes through the ecosystem: once a thriving and vibrant community, waterbirds have seen their numbers plummet alarmingly. From 1983 to 2001, their populations have nosedived by 90 percent, a stark indicator of the fragility of this ecosystem under strain.

Reviving the Pulse of Gayini

In a groundbreaking collaboration, the Nari Nari Tribal Council, The Nature Conservancy, the Murray Darling Wetlands Working Group, and the Centre for Ecosystem Science at the University of New South Wales Sydney have joined forces to breathe new life into the Gayini Wetlands. Supported by government and philanthropic funding, this ambitious initiative aims to reconnect the broken bond between the river and its floodplain, restoring this once-magnificent ecosystem.

In the context of this broader initiative, my PhD research is dedicated to diving deep into the past, unravelling the intricate ways river regulation has affected water availability to the wetlands, and peer into the future, anticipating the challenges posed by climate change. Collaborating with an interdisciplinary team of renowned ecologists, hydrologists and cultural anthropologists, my overarching goal is to contribute valuable insights to environmental flow management for the large-scale restoration of the Gayini. This approach seeks to channel water from reservoirs back into the wetlands. By doing so, the aspiration is to mimic the natural patterns of flows and floods, a rhythm long lost but still narrated by more than a century's worth of scientific data. We used this extensive data to develop models and employed satellite-based remote sensing techniques for our analyses.

Nari Nari Elders Mabel Fitzpatrick and Kerrie Parker. Image: Annette Ruzicka.

The stakes of the endeavour reach far beyond the boundaries of Gayini. Success here means more than just a revival of a single wetland; it represents a beacon of hope for ecosystems affected by similar pressures worldwide. Restoring Gayini aims to safeguard a refuge for threatened and endangered native Australian species, both flora and fauna. These wetlands can also be a buffer against climate change, with their soils capable of capturing and storing tremendous amounts of carbon. But perhaps most importantly, this restoration journey is a step towards healing, providing the Nari Nari people ownership, with our research providing insights and data to guide their stewardship of the land and water so deeply entwined with their culture and identity.

I want to express my profound gratitude to the Australian Wildlife Society for their generous support in funding portions of my PhD research. I am also particularly grateful to Mrs Brittany Mitchell and Professor Richard Kingsford for their constructive feedback on this article. Furthermore, I wish to acknowledge the Nari Nari people as the traditional custodians of the Gayini and recognise their continuing connection to land, water, culture, and community. I pay my respects to Elders past and present.

An aerial view of the Gayini Wetlands on the lower Murrumbidgee River in south-west New South Wales. Image: Annette Ruzicka.

2023

Australian Wildlife Society
University of Technology Sydney
Wildlife Ecology Research Scholarship Recipient

Alpine Plants Cope with Extreme Temperatures In a Mosaic of Diverse Microclimates | Lisa Danzey

With increasing average temperatures (and associated extreme events), climate change threatens fragile ecosystems worldwide. One of these fragile ecosystems, the Australian Alps Bioregion, is particularly at risk, only covering < 0.2 percent of the continental land mass and narrow elevation ranges, with only 10 percent of this area as true alpine (i.e., above the tree line). Despite its restricted range, the Australian Alps have highly endemic species of plants and animals found only in this region.

As primary producers in a fragile environment, plants are the foundation of alpine ecosystems. Concerningly, Australian alpine plants have limited capacity to retreat to higher elevations, where temperatures are cooler, to escape the warmer world below. Instead, they rely on pockets of refuge where climatic conditions differ from the surrounding area. If these climatic changes happen on a fine scale, we call them microclimates.

Microclimates occur across many ecosystems. In alpine systems, microclimates are often associated with differences in snowmelt timing. When walking along the Main Range in Kosciuszko National Park, New South Wales, in summer, have you ever wondered why snow hangs around in some areas but not others? A complex interaction between wind, topography, aspect, and elevation drives snowmelt patterns. Plants, especially small ones in alpine regions, are also experiencing these delicate variations in climate, which may lead to greater resilience to extreme conditions.

Studying ecologically important species routinely used in restoration, such as Alpine grevillea (*Grevillea australis*) and Alpine mint bush (*Prostanthera cuneata*), I get the opportunity to unravel some big questions about the fate of Australia's alpine plants, which will lead to enhanced management and conservation of alpine landscapes.

Searching for Resilient Alpine Plant Populations Through History

One aspect of this research is understanding where alpine plants are found now, where they were thousands of years ago and how that has changed over time.

The geographical area where individuals of a species occur is shaped by historical processes and

Main Range in Kosciuszko National Park, New South Wales. Image: Lisa Danzey.

selection pressures within that range. In alpine landscapes, historical glacial and interglacial shifts have seen populations of species contract during cool-dry glacial periods and expand into uninhabited areas when glaciers retreat in warmer periods. The first step in locating resilient alpine plants is understanding how past climates shaped current distributions.

How do we know where species are found across the landscape?

Occurrence records kept by museums, herbariums, experts, and citizen scientists document known observations of species. Modelling algorithms can find associations between occurrence records and environmental variables such as temperature and rainfall to identify suitable conditions for a species to survive. This information can be used to estimate the probability of a species occurring in a place depending on the environmental variables of that specific place.

Once the model is built, the predicted species distribution can be projected geographically onto a map. Better still, these predictions can be projected thousands of years backwards using Earth's natural records in rings of trees, frozen in glaciers, trapped in ocean sediments, and even forward into the distant future.

Another way to unravel the evolutionary history of alpine plants is through genetic studies. Like any other living organism, plant genetic makeup provides evidence of traits passed down through generations. If a trait is beneficial for an individual in survival and reproduction, the genetic signature of that trait is more likely to be passed down to the next generation. Genetic studies explore the evolutionary factors that explain differences within and among species populations that could lead to the resilience of some populations to extreme temperatures.

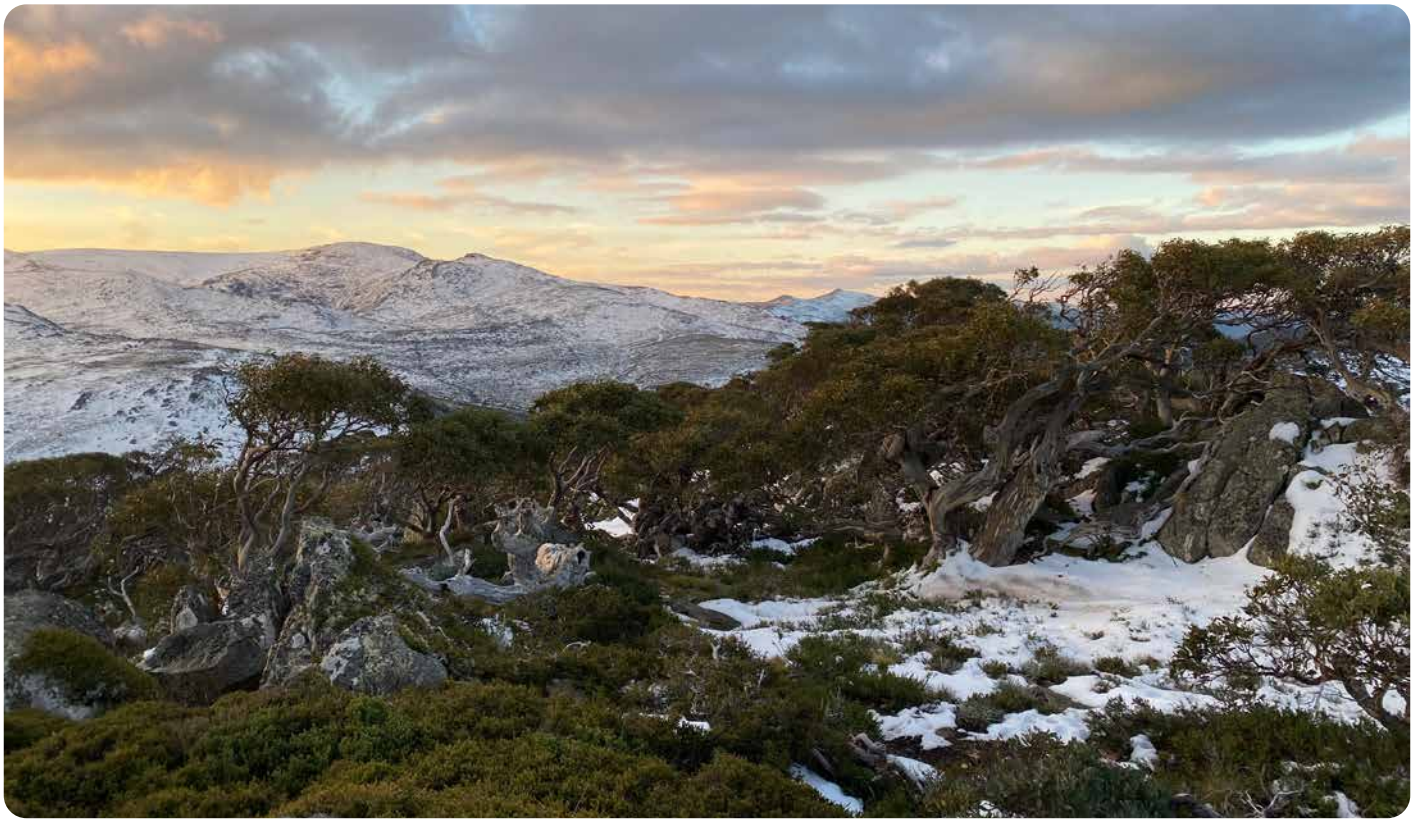
Alpine grevillea (*Grevillea australis*) on Porcupine Rocks walking track in Perisher Valley, New South Wales. Image: Lisa Danzey.

Alpine mint bush (*Prostanthera cuneata*) in Charlotte Pass, Kosciuszko National Park, New South Wales. Image: Lisa Danzey.

Once we know where resilient plants could be, what next?

Measuring the Thermal Tolerance of Alpine Plants

Photosynthesis, converting solar radiation to carbohydrates, operates within an optimum temperature range. This process occurs in chloroplasts, an organ-like structure within leaves.



Sunset over the Main Range in Kosciuszko National Park, New South Wales. Image: Lisa Danzey.

Bespoke heatwave chambers were installed over native vegetation near Mount Hotham summit in the Victorian Alps, Victoria. Image: Sabina Aitken.

Collecting data from microclimate weather stations near Schlink Pass, Kosciuszko National Park, New South Wales. Image: John Hurley.

When sunlight hits chloroplasts, one of three things can happen: 1. It can be used for photosynthesis, 2. It can be dispersed as heat, or 3. It can rebound.

The rebounded light indicates leaf health and thermal tolerance to extreme temperatures. If more light rebounds, less photosynthesis occurs, and the leaf becomes more stressed because of the increasing or decreasing temperature.

When potentially resilient plants are located, we can evaluate their resilience by measuring the photosynthetic thermal tolerance of leaves. This step involves an extensive field campaign across the mountains bordering Victoria and New South Wales. After a morning of hiking and collecting leaf samples, we ran some temperature stress experiments in our makeshift lab, where the rebounding light from the leaf is measured.

Coping with Future Climate Extremes

The final step in the journey is to determine how alpine plants will respond to and recover from future climate extremes such as heatwaves. Heatwaves are expected to intensify further and become more frequent under climate change. Plants will not only have to withstand extremely high temperatures during heatwaves but recover quickly before the next event.

Glasshouse studies, where plants are grown in pots under controlled conditions, have attempted to understand plant responses to heatwaves. But there is also a need to examine how plants respond in nature, where environmental conditions, such as humidity and light, fluctuate across time and space. To address this critical knowledge gap, this research uses bespoke chambers to simulate a realistic heatwave under natural conditions in a sub-alpine grassland of Kosciuszko National Park.

A Journey Through Time and Space

The overarching goal of the research is to understand how alpine plants are coping with current, historical, and future extremes. In combining diverse fields of plant ecophysiology, genetics, and biogeography, these insights will better predict and conserve the future of Australian alpine plants in the face of global environmental change.

2023

Australian Wildlife Society
University of Newcastle
Wildlife Ecology Research Scholarship Recipient

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

Post-Fire Conservation Action for the Endangered Littlejohn's Tree Frog (*Litoria littlejohni*)

Nadine Nolan

As a result of human actions, our precious wildlife is under serious threat, resulting in a rapid decline in biodiversity globally. There is an exceptionally high loss rate among amphibian species compared to other types of animals. Chytridiomycosis, a disease caused by the fungus *Batrachochytrium dendrobatidis*, is the leading cause of amphibian extinctions. However, the situation has been made worse by climate change-induced droughts and extreme temperatures, habitat loss and fragmentation, and the spread of invasive species. Consequently, amphibian populations are under immense pressure, which poses significant concerns for their long-term survival.

In Australia, the 2019-2020 black summer bushfires severely impacted specific populations of the Littlejohn's tree frog (*Litoria littlejohni*), a species already threatened by chytridiomycosis, mining, and habitat loss. Over the last decade, sightings of this species have declined further. However, researchers had no idea how dire the situation was until we discovered their populations were highly isolated and extremely small. Recent genetic analysis of the Littlejohn's tree frog populations revealed significant inbreeding, with only three populations remaining in New South Wales. Dedicated research efforts are underway to protect the Littlejohn's tree frog from extinction.

The project aims to use promising *in-situ* (on-site) and *ex-situ* (off-site) conservation methods to enhance the genetic diversity and size of small, isolated populations in the Blue Mountains and Watagan Mountains, New South Wales. These methods include the creation of additional breeding ponds, establishing a breeding program, using assisted reproductive technologies, and head-starting of propagules (releasing baby frogs back into the wild). Research into conserving the Littlejohn's tree frog is part of a collaborative project within the Conservation Science Research Group at The University of Newcastle.

In the Watagan Mountains, where the Littlejohn's tree frog is experiencing higher rates of inbreeding depression, we have collaborated with NSW National Parks and Forestry Corporation to create clusters of various-sized ponds. A single pond can only support a limited number of tadpoles. Therefore, breeding can be limited by the availability of ponds as well as the number of adults ready to mate. The Littlejohn's tree frog and many other frogs can be particular when choosing a breeding pond and tend not to like fast-running water and the presence of fish. However,

A juvenile Littlejohn's tree frog (*Litoria littlejohni)* in the Watagan Mountains, New South Wales. Image: Penny Harnett.

these frogs need ponds that have water almost all year round, resulting in the correct type of pond being limited in the landscape. Therefore, one of the research objectives is to create artificial ponds to increase breeding habitat availability, thus increasing the overall population size. The Watagan frog population is being monitored before and after the pond creation to measure any increases in population size.

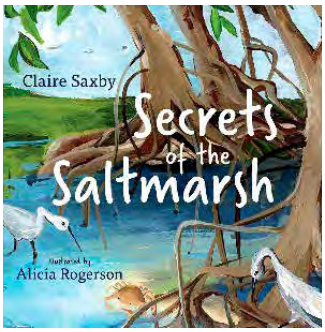
Among the most important aspects of the research is improving our understanding of the breeding biology of the Littlejohn's tree frogs. The project focuses on understanding the link between genetic diversity and reproductive health in male Littlejohn's tree frogs. Evidence suggests that low genetic diversity and inbreeding reduce individual fitness traits and the viability of populations by limiting their ability to adapt to environmental change (e.g., climate change, drought, fire, and disease). The study will employ innovative assisted reproductive technologies and genetic information of individual frogs to enhance the selection process for breeding pairs to determine whether increasing genetic diversity correlates with improving sperm quality. Given the potential detrimental effects of inbreeding on reproductive fitness, understanding the link between sperm quality and genetic diversity is paramount for managing threatened species. The knowledge gained from this research will be highly significant for the breeding program's success, as it will ensure the production of reproductively strong individuals for future release into the wild.

Nadine Nolan releases a juvenile Littlejohn's tree frog (*Litoria littlejohni*) back into a pond in the Watagan Mountains. Image: Penny Harnett.

Efforts to save the Littlejohn's tree frog are vital for this unique species and serve as a beacon of hope for other threatened wildlife. By collaborating with other researchers, citizen scientists, park rangers and land managers to implement proactive conservation strategies, we can make a real difference in protecting Australia's remarkable biodiversity for future generations.

Dr Alex Callen stands next to the newly constructed artificial pond created to boost the Littlejohn's tree frog (*Litoria littlejohni*) population in the Watagan Mountains. Image: Nadine Nolan.

Book Reviews



Secrets of the Saltmarsh – *Claire Saxby and Alicia Rogerson*

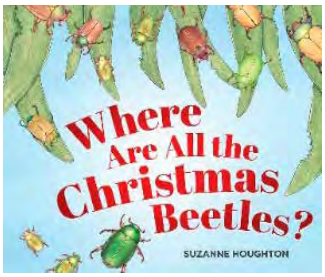
Saltmarshes are vibrant ecosystems that support a diverse range of life forms. They serve as crucial habitats and provide food and shelter for migratory birds and microscopic organisms. Saltmarshes also play an essential role in coastal protection. The dense vegetation helps absorb wave energy and stabilise shorelines, reducing the impact of storms and erosion. *Secrets of the Saltmarsh* is a captivating book exploring the wonders of these unique wetlands through beautiful illustrations and poetic descriptions.

Publisher: CSIRO Publishing | **RRP:** $24.99

One Little Dung Beetle – *Rhian Williams, Heather Potter, and Mark Jackson*

Join One Little Dung Beetle on an exciting adventure as it embarks on a counting journey through the world of beetles and other amazing animals. With vivid illustrations and engaging storytelling, this book teaches counting and sparks curiosity about the natural world. So, get ready to embark on a counting journey and discover the hidden world of beetles!

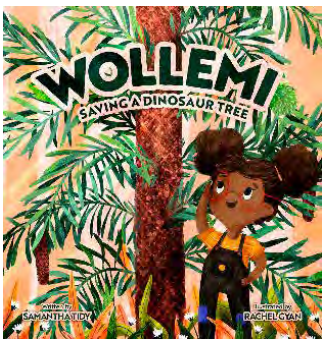
Publisher: Wild Dog | **RRP:** $24.99



Where Are All the Christmas Beetles? – *Suzanne Houghton*

Witness the captivating tale of Australia's beloved Christmas beetles and explore the possible reasons for their decrease in numbers. Once upon a time, these vibrant, sparkling creatures would grace our summers, signalling the arrival of the festive season. But now, they are nowhere to be found. Our eucalyptus trees stand empty, devoid of their dazzling presence, and the night sky lacks their enchanting dance around twinkling lights. Where have all the Christmas beetles gone?

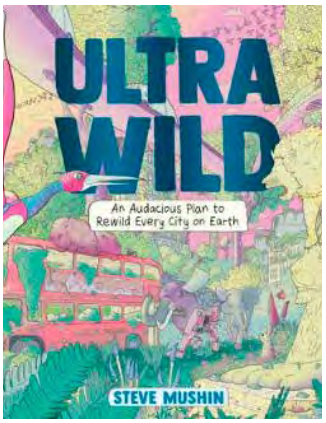
Publisher: CSIRO Publishing | **RRP:** $24.99



Wollemi: Saving a Dinosaur Tree – *Samantha Tidy and Rachel Gyan*

Embark on a journey through the mystical forest to discover an extraordinary treasure - the critically endangered Wollemi pine (*Wollemia nobilis*). This living relic, dating back two hundred million years, has withstood the harshest elements, from ice to fire, defying the test of time. But now, a new threat looms. Will a raging bushfire be the ultimate battle for this majestic living fossil? Join the race to protect this majestic living fossil and learn about the urgent actions needed to conserve this rare and breathtaking marvel.

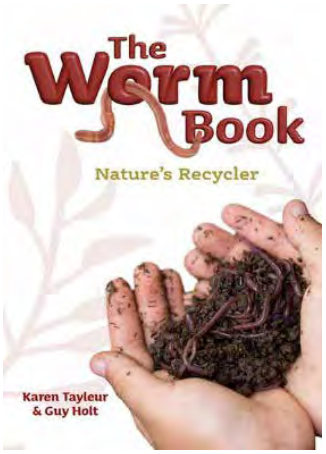
Publisher: CSIRO Publishing | **RRP:** $24.99



Ultrawild: An Audacious Plan for Rewilding Every City on Earth – *Steve Mushin*

Get ready to witness the extraordinary as you explore a world where science and humour collide to forge a brighter future for Mother Earth. You will find over one hundred outrageously funny inventions that entertain and offer a glimmer of hope in the face of climate change. Maverick inventor, Steve Mushin, takes centre stage as he tackles the challenge of rewilding cities, saving our planet, and exploring the immense potential for transformative change.

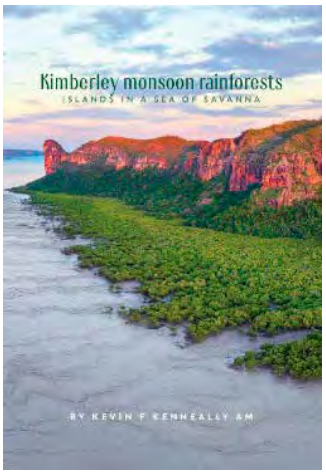
Publisher: Allen & Unwin | **RRP:** $34.99



The Worm Book: Nature's Recyclers – *Karen Tayleur and Guy Holt*

Worms tirelessly toil beneath the surface, working day and night to improve our soils and sustain the delicate balance of our planet. These remarkable creatures, known as segmented worms, roundworms, ribbon worms, and flatworms, play a crucial role in aerating and fertilising our soils, ensuring optimal conditions for plant growth. They efficiently break down organic waste, transform it into nutrient-rich compost, and serve as a vital food source for numerous animals. Learn more about these tremendous worms and their vital role in maintaining our environment.

Publisher: Wild Dog | **RRP:** $24.99

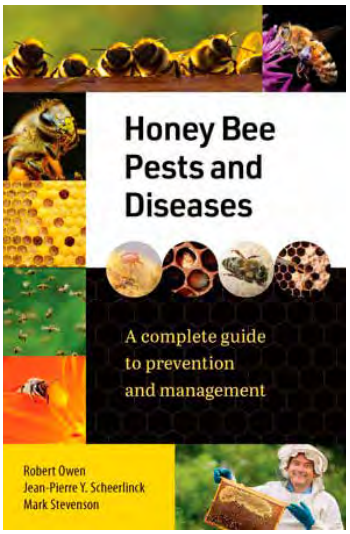


Kimberley Monsoon Rainforests: Islands in a Sea of Savanna – *Kevin F Kenneally AM*

The Kimberley rainforests are biodiverse ecosystems that are not well understood. They are home to unique species and hold cultural importance for Indigenous peoples. However, they face environmental threats like invasive plants, animals, wildfires, and climate change. Effective management and conservation at a large scale are necessary to ensure the long-term survival of these ecosystems. Understanding the species present, their locations and their survival needs is crucial. This book examines the current knowledge and gaps about Kimberley rainforests, emphasising their value for biodiversity and Indigenous cultural significance.

Publisher: UWA Publishing | **RRP:** $45.00

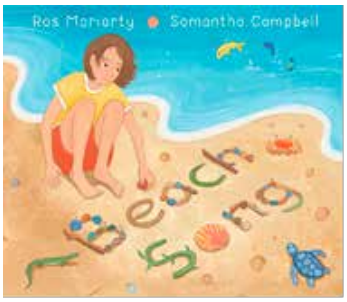
Book Reviews



Honey Bee Pests and Diseases – *Robert Owen, Jean-Pierre Scheerlinck, Mark Stevenson*

The authors of *Honey Bee Pests and Diseases*, who have extensive experience as beekeepers and researchers, aim to provide beekeepers with up-to-date information on identifying and treating diseases. By incorporating beekeeping techniques from different countries, this book offers a comprehensive resource for effective disease management.

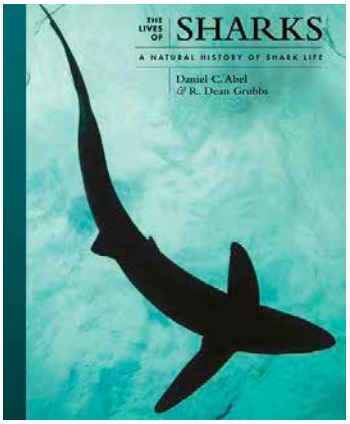
Publisher: Exile Publishing
RRP: $69.99



Beach Song – *Ros Moriarty and Samantha Campbell*

Dive into a captivating beach adventure celebrating a child's love for the ocean! Written by a bestselling author and co-founder of the life-changing Moriarty Foundation, this mesmerising tale will transport you to a world of surprise, wonder, and endless excitement. Experience the thrill of leaping through waves like a playful dolphin, gliding through the water like a graceful fish, and soaring along the sandy shores with the seagulls. This lyrical masterpiece beautifully captures the joy of exploring the coast, urging children to embrace the magic of the natural world that surrounds them.

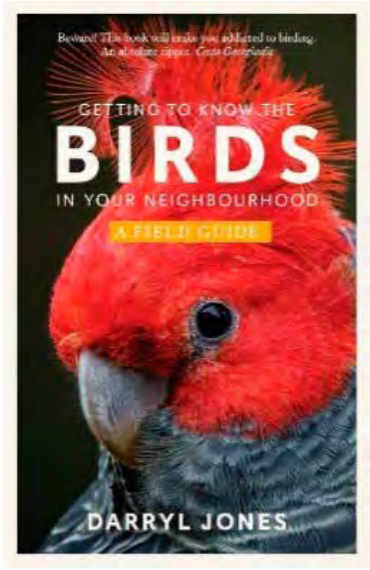
Publisher: Allen and Unwin | **RRP:** $24.99



The Lives of Sharks: A Natural History of Shark Life – *Daniel Abel and Dean Grubbs*

The Lives of Sharks is a fascinating and beautifully illustrated guide that explores shark physiology, anatomy, behaviour, ecology, and evolution, as well as conservation and the impact of human activity on shark populations. These misunderstood animals are characterful, exhibit surprisingly complex behaviours, and lead secretive lives full of interest in every type of marine habitat. From the Vulnerable silky shark (*Carcharhinus falciformis*), whose dermal denticles are smooth to the touch, to the longnose sawshark (*Pristiophorus cirratus)*, a mesopredator of small fishes and invertebrates, and Sydney's Port Jackson shark (*Heterodontus portusjacksoni*), a nocturnal shark with a piglike face, to the basking shark (*Cetorhinus maximus*), a gentle giant of the ocean that feeds on plankton, you will be utterly amazed by these marine animals, and no doubt develop a new sense of appreciation for them.

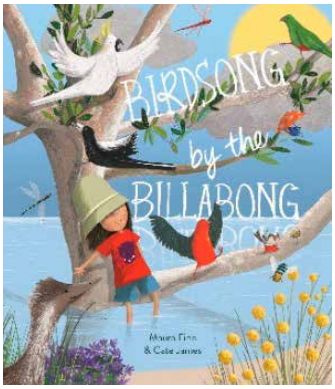
Publisher: NewSouth Books | **RRP:** $59.99



Getting to Know the Birds in Your Neighbourhood – *Darryl Jones*

Getting to Know the Birds in Your Neighbourhood is the ultimate beginner's field guide to urban birds in Australia. This comprehensive guide not only helps with bird identification but also provides insights into their habits and behaviours. It is a user-friendly resource packed with information, tips, and suggestions to enjoy, protect, and attract more birds to your area. By delving deeper into the lives of your local feathered residents, you will gain a better understanding of their needs and how to coexist with them harmoniously.

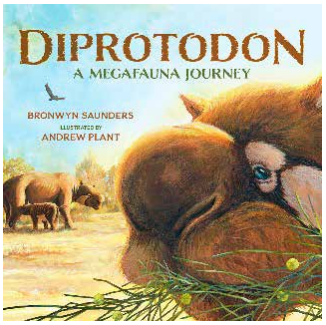
Publisher: NewSouth Books | **RRP:** $34.99



Birdsong by the Billabong *Maura Finn and Cate James*

Discover Australia's enchanting landscape and wildlife in this captivating picture book. From the melodious song of an Australian magpie (*Gymnorhina tibicen*) to the vibrant lemon myrtle (*Backhousia citriodora*) near a serene billabong, immerse yourself in the beauty of nature. What else might you find on a trip to the Billabong? Uncover the beauty within; every page is a gateway to a wonderful discovery.

Publisher: Affirm Press | **RRP:** $24.99



Diprotodon: A Megafauna Journey – *Bronwyn Saunders and Andrew Plant*

Embark on an epic adventure through the frozen world of the Ice Age! Join Diprotodon (*Diprotodon optatum*), the colossal marsupial, as he navigates a prehistoric landscape teeming with magnificent megafauna. *Diprotodon: A Megafauna Journey* is an enchanting picture book that brings this ancient era to life with stunning illustrations. Get ready to be captivated and transported back in time as you follow Diprotodon's giant footsteps.

Publisher: CSIRO Publishing | **RRP:** $24.99

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Account Name: Wildlife Preservation Society of Australia trading as the Australian Wildlife Society

Membership Hotline: Mob: 0424 287 297

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AWS Portal: Access the Members' Resource Centre – your destination for resources and materials on various wildlife-related topics.

Social Media: Contribute to our social media platforms: Instagram, Twitter, Facebook, LinkedIn, YouTube, and Website.

Right to Vote: You have the right to vote on important matters at Society general meetings (financial members only).

Other Benefits: Awards, Scholarships, Grants, and the opportunity to network with like-minded people.

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If you would like to find out how to leave a bequest to the Society or how your bequest can make an impact, please download our bequest information pack.

Benefits of Membership

1 Receive the quarterly issue of ***Australian Wildlife*** via email or post to keep up-to-date with the collective work promoted nationally.

Receive the **monthly e-newsletter.** Keep up-to-date with news from our members and the work of the Society. 2

Australian Wildlife Society
Conserving Australia's Wildlife since 1909

3 Access the **Members' Resource Centre -** your destination for resources and materials on various wildlife-related topics.

Contribute to our **social media platforms:** Instagram, Twitter, Facebook, Linkedin, YouTube, and our Website. 4

5 You have the **right to vote** on important matters at Society general meetings (financial members only).

Receive other benefits such as **Awards, Scholarships, Grants,** and the opportunity to **network** with like-minded people. 6

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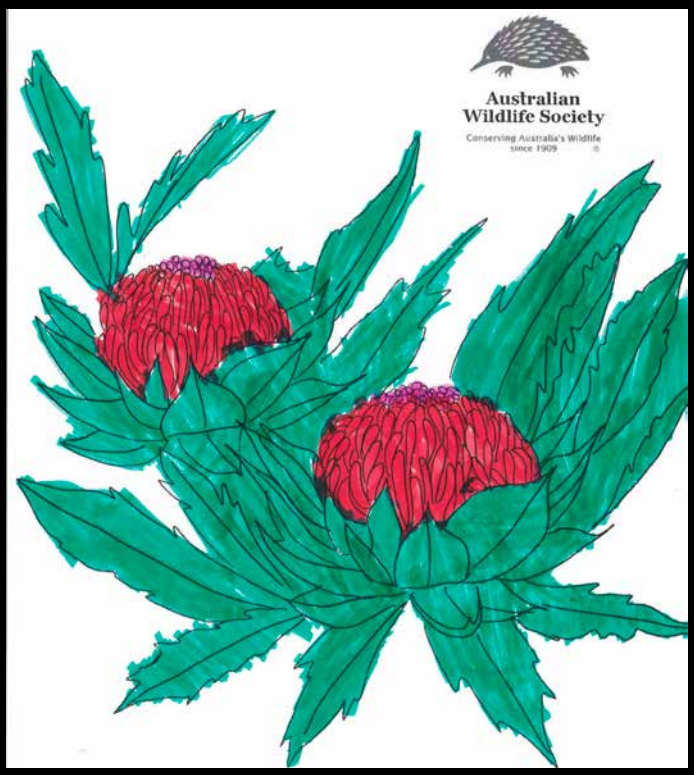
acnc.gov.au/charityregister

2023
Colouring-in Competition



Five-year-old Cady
from Victoria

Seven-year-old Abigail
from Tasmania

Four-year-old Hayley
from Western Australia

Eleven-year-old Grace
from Tasmania