AUSTRALIAN Wildlife

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Celebrating a new century of wildlife preservation in Australia

Journal of the Wildlife Preservation Society of Australia Limited
(Founded 1909)

HOODED ROBINS

The South Australian State Government has changed legislation to allow dogs and mountain bikes into Conservation Parks. A risk assessment is being done on a park by park basis but there is concern for rare and endangered wildlife in areas such as this. Para Wirra is close to suburbia so is under pressure. The hooded robin is hard to find in Para Wirra as it is and any degradation can only be seen as a threat. For more information see page 16.

Hooded robin Para Wirra Conservation Park, South Australia. They are rare in this region. Photo: Danny McCreadie

A young hooded robin at Brookfield Conservation Park, South Australia. Photo: Danny McCreadie

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Editor, Australian Wildlife

Sabine Borgis
Sub-Editor, Australian Wildlife

Front cover:
A numbat needs to be on constant alert for predators as they forage for termites in Dryandra Woodland.

Back cover top:
A young numbat takes its first tentative steps away for the burrow on its journey to independence.

Back cover bottom:
Numbats at dispersal age in the early morning before they set off to explore the woodland.

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 2017

Notice to our members

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 registered company limited by guarantee with ASIC and is responsible for complying with all its regulations.

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 an independent, voluntary, non-profit 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 programs, political lobbying, advocacy 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 tried to convince politicians of the necessity to include the preservation of Australia's precious wildlife and its vital conservation habitat in all their planning and environmental issues and discussions.

From the President's desk

Suzanne Medway AM - President

It was a great honour and a privilege for me to chair the 108th Annual General Meeting of the Society on Wednesday 1 March 2017.

Unfortunately, I have been unable to source the minutes of the very first Annual General Meeting in 1907, but our historical archives in the National Library of Australia record the following:

> "Following the canvassing of the idea of the new preservation body among a number of naturalists, nature lovers, and some interested public figures, a preliminary discussion meeting was held at the offices of the Royal Swedish Consulate on May 11, 1909. As an outcome of this, it was decided to call a public meeting for the formation of the Society. Held in the Royal Society's Hall, 5 Elizabeth Street, Sydney, on the night of May 19, 1909, it is worthy of mention as showing initial enthusiasm, that despite the fact that the weather was extremely unfavourable, about fifty people attended. Fifty members were enrolled that evening, and within a week, this number had been raised to over one hundred. The Wild Life Preservation Society of Australia was launched, with the Honourable F.E. Winchcombe, MLC, presiding, and a committee appointed to draw up a draft constitution for submission to members.
>
> "The first Council of the Wild Life Preservation Society was outstanding for its membership of prominent citizens, such as the inaugural President, Frederick Earle Winchcombe, MLC, head of the well-known firm of Winchcombe, Carson & Co.

The Society founded the David Stead Memorial Fund and raised the initial funds for the purchase of the land for Wirrimbirra while Thistle Harris was President. She then decided to wind up the Society and put all the resources into the newly formed David G. Stead Wild Life Research Foundation of Australia. The intervention of Dr. Dick Mason and Vincent Serventy stopped this from happening.

The following extract is from *Conserving Australia's Wildlife – The History of the Wildlife Preservation Society of Australia, Inc.* by Dr Joan Webb:

> "Circumstance decreed that the property now known as Wirrimbirra would be acquired in 1962 and with Stead family agreement this became David Stead's memorial; finances from the David George Stead Memorial Fund were diverted to this project. For Thistle, David Stead's memorial at Wirrimbirra became her main interest and, in fact, her obsession.
>
> She was President of the Society in 1975 when Vincent Serventy was overseas. In December 1975 an 'Important Notice' was issued as a Supplement to *Australian Wild Life*. It stated:
>
> 'At the meeting of your Council on 9th December 1975, the following resolution was passed unanimously by the twelve members present:
>
> "That, at the next Annual General Meeting (24 February, 1976), consideration be given to incorporation of the Wild Life Preservation Society of Australia with the David G. Stead Memorial Wildlife Research Foundation of Australia."
>
> "The recommendation for incorporation of the Society with the David G. Stead Memorial Foundation seems appropriate because of our close association with the Foundation since its inception 12 years ago. Also, because the Foundation honours David G. Stead, co-founder of the Wild Life Preservation Society in 1909."
>
> There followed some suggestions regarding the funds held by the Society:
>
> That the funds held by the Society be transferred to the Foundation on the understanding that 50% of the total funds be used for funding a Wildlife Project to be determined by the Foundation.
>
> OR
>
> That funds held by the Society be transferred to the Foundation as an endowment fund.
>
> OR
>
> That funds held by the Society be transferred to the Foundation to be used at their discretion for wildlife conservation.

Vincent Serventy returned home from his overseas trip in January 1976. He received a call from Society member Dick Mason to alert him to the fact that Thistle had plans to wind up the Society. Dick Mason was extremely unhappy about this - 'it was a grass roots society for people in the community interested in the preservation of wildlife, and even though it was not in its heyday, it was a Society with a proud history - it should not be abandoned.'

Dick Mason asked Vincent to attend the AGM in February at which Thistle was going to move the motion to wind up the Society. Dick also asked Vincent to accept the nomination to be President once more. Thistle, unaware that Vincent had returned from overseas, was at the AGM supported by her friends, Gwen and Aileen Hanley and Joan and Eileen Bradley. When Vincent walked into the hall, there was a sudden silence.

Vincent Serventy was duly nominated, elected President, took the chair and proceeded to open the discussion on the future of the Society by speaking against the proposal. The discussion became heated, and at its height, Eileen Bradley collapsed. Dr Dick Mason tried to revive her without success - she was dead. Vincent had no choice but to close the meeting and adjourn until March when the matter would be decided. Thistle and her friends did not attend the March meeting. She never attended a meeting of the Society again. Vincent was particularly angry that Thistle had proposed to allocate the funds to Wirrimbirra rather than to the branch of the WLPSA in Queensland. After this setback, Vincent Serventy worked hard to raise the profile of the Society."

Today the Society's AGM and board meetings are tame by comparison!

After Thistle Harris' death, her will bequeathed the Wirrimbirra property to the National Trust of Australia (NSW).

At the conclusion of our 108th Annual General Meeting, I moved a special vote of thanks to Dr Richard Mason for his commitment and dedication to the Society over many years. He served on the board continuously since the early 1970s until December 2016. I mentioned that if it weren't for Dick Mason, the Society would not exist today. The Wildlife Preservation Society of Australia and Wirrimbirra Sanctuary have a long and convoluted history.

The board of directors at its Strategic Planning Day in May 2016 decided that under its theme of "Planning for a Sustainable Future," the Society should establish a national office for long term viability. It was thought that Wirrimbirra would be an ideal venue. Because of our initial involvement with the establishment of the Wirrimbirra Sanctuary at Bargo, negotiations had commenced some years ago to lease Wirrimbirra from the National Trust of Australia (NSW).

The board has now written to the National Trust of Australia (NSW) offering to lease the Wirrimbirra Sanctuary at Bargo under a 99-year lease, specifically to develop environmental education and wildlife conservation programs. Negotiations continue.

Peter Hardiman

We regret to advise members of the passing of former director on the Board, Peter Nelson Hardiman (aged 88 years) on 7 February 2017 from a heart condition.

Peter was a long term member with an interest in feral animal control of feral cats, wild dogs, goats, camels and cane toads which impacted heavily on our native wildlife right across Australia.

He joined the Board of Directors on 25 February 2009 and prepared reports on feral animal predation for the Board's information and attention. He also regularly contributed articles to *Australian Wildlife*.

Peter served in the RAAF in Victoria and as a Patrol Officer in Papua New Guinea before joining the NSW Police Force in 1960. After a career in the police force with a focus on security, he was appointed Chief Security Officer for the NSW Department of Education in 1975. In this capacity, he was instrumental in having public schools protected from vandalism and damage by the installation of non-scalable security fencing with external security patrols across the metropolitan area of Sydney.

Vale Peter Nelson Hardiman.

Bob Irwin with Peter Hardiman at the presentation of awards at the 2013 Annual General Meeting of the Society.

108th Annual General Meeting

The 108th Annual General Meeting of the Wildlife Preservation Society of Australia Limited trading as the Australian Wildlife Society was held on Wednesday 1 March in Sydney. The membership of the Society was well represented, with 25 members attending in person.

Suzanne Medway, President, tabled the Annual Report for 2016 and highlighted the Society's achievements in wildlife conservation over the past year. The full report is featured in this magazine.

The Treasurer's Report for 2016 showing a strong financial balance was tabled and adopted by the meeting.

The current Auditor, Peter James Varley, CA Registered Company Auditor, was confirmed as the Society's auditor for 2017.

The election of the directors to sit on the board for the coming year took place, and the following were elected to join the other seven directors remaining on the board:

Christine Banks
Patrick Medway
Clive Williams

At the conclusion of the AGM, Dr Clive Williams, Chairman of the judging panel, announced the Society Awards for 2016. He indicated that although the number of nominations has declined since previous years the quality of nominations was very high. In the case of the Serventy Conservation Award, for the first time the judging panel could not separate two outstanding nominations and it was decided to make two awards in this category.

L to R: Noel Cislowski, Ken Mason, Suzanne Medway, Stephen Grabowski and Sash Denkovski

2016 Serventy Conservation Award

The two awardees are Rupert Russell of Mt Molloy, North Queensland and Graeme Sawyer of Darwin, Northern Territory.


L to R: Vanessa and Steve Wilson, Bruce Tyrell and Ken Mason

Rupert Russell

Rupert has made a remarkable contribution to wildlife conservation in North Queensland for over 40 years, ranging from the protests over the road building in the Daintree to his present involvement in the yellow-bellied glider project. He has been a constant campaigner for the preservation of habitat crucial to this animal and also to the endangered tropical bettong. Rupert has succeeded in having forest areas freed from logging and actually achieved the creation of a new national park – Hasties Swamp National Park (near Atherton). He is the author of several publications and is considered an expert on the wet tropics, leading to him being frequently consulted for his knowledge on this subject.

Upon learning of his successful nomination, Rupert replied:

> Thoughts on receiving the award: initial response is surprise, then pleasure. Next, come memories of Dr Serventy's lifelong opposition to the degradation of this land and the oceans. I feel shy to learn that I am added to the company of people recognised for their love of our land and its animals: Margaret Thorsborne, protector of pigeons, Hinchinbrook and Cardwell, Jenny

Rupert Russell

Maclean, protector and healer of bats, John Weigel, snake wrangler and devil protector, the outspoken Bob Irwin and many more worthies. And now, somehow, me. People who love and work for the bush and its native animals never think of retiring from the core of their reason for living, but the Serventy Conservation Award, symbolic of being included in grand company, offers the strength of mateship.

Main conservation efforts

Always a naturalist, but my life was changed by an ABC Radio National Science Show circa 1980 describing opposition to logging in Terania Creek by people like Hugh and Nan Nicholson. This led me to question Forestry in North Queensland rainforests which resulted in my political and physical opposition to logging in native forests. These efforts proved to be a step along the way to gaining World Heritage listing for much of North Queensland's rainforests, mainly through the calm, tireless, highest calibre work of Dr Aila Keto. Opposition to logging led me into the Tall Eucalypt Forests of Windsor Tableland where one night I caught a northern bettong. The beautiful little animal was transferred to National Parks, serving to prove the occurrence of these rare bettongs at Windsor. This led to gazettal of a very large Scientific Area for the benefit of the bettong and a good population of yellow-bellied gliders, accomplished with the help of Sam Dansie, a well-respected forester. Discovering yellow-bellied gliders in a patch of country near Herberton where logging was imminent brought about a small Scientific Area and began my study of these best-of-all gliding possums. Arrested once at Windsor for stopping logging trucks, twice at the Daintree blockades and arrested but not charged for distracting duck shooters in Victoria are satisfying memories but sadly, duck shooting hasn't yet stopped.

Graeme Sawyer

The Serventy Conservation Award was presented to Graeme by Suzanne Medway and Clive Williams. Graeme was actively involved in the establishment of the Australian Association for Environment Education (Northern Territory) in 1987 and has maintained an active involvement in it ever since. He is Vice-President of the Australian Association for Environmental Education (nationally), and President of the Northern Territory branch. Graeme was responsible for developing innovative programs such as a multimedia information system about wildlife and habitats, which became part of a display at Questacon, Canberra for six years. He is the co-founder of Frogwatch and has been heavily involved in community awareness and education campaigns about biodiversity, and about frogs, cane toads, and reptiles. He has also been instrumental in the formation of Toadbusters and of Reptilewatch. He has been the community representative on the National Cane Toad Taskforce. Graeme's work has led to several West Australian Government initiatives to stop the western movement of cane toads. Graeme was Lord Mayor of Darwin from 2008-2012.

Acceptance speech by Graeme Sawyer

It is a wonderful surprise and a fantastic honour to be awarded the Serventy Conservation Award for 2016. I have always had a great love of wildlife and the natural wonders of Australia so to win an award named after great conservationists, the Serventys, is especially rewarding for me. It is also very humbling, but energising experience. Much of the verve that fosters the community engagement and activity underlying this award comes from a number of people in my community. Especially people

like Ian Morris OAM who has been a mentor and partner in many of my endeavours and scientists like Dr Mike Lentic and Dr Sean Doody who are so willing to talk about issues, refine concepts and to share ideas. They are examples of the increasing numbers of scientists who understand that community has a vital role to play in moving the conservation effort forward.

Education has always been a passion of mine and especially in relation to the natural systems in Australia. From indigenous projects in Arnhemland to school and community education work it is wonderfully rewarding to see young people respond to our natural world. Even more interesting is the way a mix of the natural world and certain technology-based educational approaches have led to the most powerful learning outcomes I ever saw in my years as an educational adviser.

People like Aldo Leopold, indigenous peoples, and many others, understood the power of the human/nature connection. Researchers today are slowly revealing the innate strength of this bond. As educators and mentors, we need to understand that bond and nurture it. One item that resonates with me is Sir David Attenborough's statement that he has never met a child that is not fascinated by nature. It is worth thinking for a moment how we can stop people losing this fascination and grow it into their adulthood and the sustainable lifestyles and business practices we need.

It is clear to me that we have some really big challenges in front of us as a society if we are going to protect biodiversity and achieve sustainability. Education must be front and centre in our strategy. Not simply formal education but community education as well. We need to build an informed, thinking community, not people with the mindless belief characterised by religious dogma or unregulated capitalism, but attitudes that lead to change and adaptation.

The community response to the FrogWatch project in the top-end and the Community Cane Toad Initiative has given me great hope that even though governments have collectively dropped the ball on biodiversity, there is still enormous energy and interest in the community. We need to use this to unwind the biodiversity decline that is becoming so dire and the government ineptitude that constrains funding and opportunity for people to engage.

It can truly be said of Graeme, once a teacher but always an educator.

Graeme Sawyer

2016 Community Conservation Award

The award for 2016 was made to Frog Safe, Inc. of Edmonton, North Queensland. This organisation has operated a frog hospital for 18 years, treating over 3,000 frogs in that time and has developed a deep understanding of frog health. Frog populations around the world are in decline and our awardee is doing

L to R: Clive Williams, Graeme Sawyer and Suzanne Medway

L to R: Tony Clunies-Ross, Treasurer; Deborah Pergolotti, Founding President; Jeremy Neve, long-time volunteer; Megan Wall, intern and Angie Randall, Secretary

its best to help understand and prevent this decline. It has developed an informative website, which is consulted far and wide and has been archived by the Government as part of its PANDORA project. Frog Safe's expertise is such that it is not only consulted by persons in its locality but by persons, including vets, in all parts of Australia and even from overseas. It has succeeded in making the world its community.

Deborah Pergolotti sent the following message to be read at the meeting:

> "Thank you for the lovely recognition of our efforts. We do what we do because the frogs need it and because we all, as spiritual beings, need to help fix our ailing and suffering planet by whatever skills we have to offer. We don't care if anyone ever says "thank you" for taking in a frog in distress or ridicules us for spending money on individuals in a taxon considered 'a lower animal' in the food chain.
>
> What is causing frog decline should be of paramount concern to everyone. The world would not be in such a state of cataclysm if we all paid attention to the loud and very clear message we are getting from the frogs that turn up on our doorstep.
>
> Even after our 18 years of rescuing and rehabilitating frogs, frog rehab is still fairly new on the 'radar' and not enough people are involved. But frogs are telling us in the most graphic way that we are slowly poisoning them to death – parts per million at a time. When our Founding President starting doing this activity, everyone assumed that local frog declines were the result of the highly publicised chytrid fungus. But our work of actually receiving and examining distressed frogs from a wide geographic area (Townsville to Cape York) has proven that chytrid fungus is NOT responsible for the severe local decline in frogs (and cane toads!). Ultimately, chemicals – in particular, the neonicotinoids – will be proven responsible for frog losses. Our message to the Australian government is that if it cares at all for the protection of biodiversity, it needs to ban those chemicals found to attack our native species.
>
> Thanks again for putting our humble efforts in the spotlight!

Roz Holmes and Graeme Sawyer

The Australian Wildlife Society Community Rehabilitation Award

This award was introduced in 2016 by President, Suzanne Medway to highlight the incredible work done by wildlife rescuers and rehabilitators and their contribution to wildlife preservation in Australia.

Our Society knows that many organisations and thousands of volunteers are already working tirelessly to save our threatened species as well as the humble and more common Australian species and the precious wildlife habitat in which they live. We are all aware of the wonderful work being carried out by volunteers across the country in saving our sick and injured wildlife. They spend many hours and days caring for a single animal that has been injured by a car, savaged by a feral animal or hurt in bush fires. We want to recognise and help these individuals or conservation groups continue with their good work on behalf of the whole community. The inaugural Australian Wildlife Society Community Rehabilitation Award was made to Roz Holmes of Cedar Creek Wombat Rescue and Wildlife Refuge.

Roz, who was born and bred into wildlife and is also a trained vet nurse, takes on animals with illnesses or injuries that may have otherwise been euthanised. Roz and her husband Kevin began this journey in earnest when they became aware of how many local wombats were affected and dying from sarcoptic mange. Roz began studying ways in which wombats with sarcoptic mange could be treated and hopefully saved from a slow horrible death. It started with a few calls from locals letting them know when a wombat was seen that appeared to have mange. They would treat as many as they could and attempt to educate the public. It has grown into a Herculean effort where they travel many kilometres and treat wombats of all ages, sizes, and stages of disease as well as treating wombats that have been injured in other ways. Animals that until recently would have died if left untreated are given a chance to recover and continue to help maintain the population.

Cedar Creek Wombat Rescue and Wildlife Refuge is dedicated to rescuing not just orphaned joey wombats but also sub-adults and adults that are in need of medical care whether it be from accident, injury or mange. Along with wombats, they care for many species of native animals with the focus being on animals that are in need of more than routine care to get them to the point of release.

In the past, few people would attempt to rehabilitate any wombat that was much bigger than about 10kg, finding them too difficult to handle. Many sub-adult, as well as adult wombats, have been successfully treated by Cedar Creek Wombat Rescue for a variety of illness such as vehicular trauma, dog attack or mange and released back into their home range.

On accepting her award from Suzanne Medway, Roz gave a short thank you speech:

> I've been treating wombats for over 35 years. The wombats that come into care are mainly suffering from mange, injuries from a car accident or attack by dogs. The wombats come to me for treatment and rehabilitation from all over New South Wales. Cedar Creek Wombat Rescue is the only wombat hospital of its kind. Its foundation is thanks to Sophie Brenton who raised funds and organised it all for me (without her I'd be lost). Special thanks to Robin Crisman for her help in obtaining equipment to fit the hospital out and to my husband Kev who has to put up with my long hours spent saving wombats – and for building of pens, I always seem to need more. Thank you.

Suzanne Medway presenting the award to Roz Holmes

Annual Luncheon

The Annual Luncheon was held after the Annual General Meeting in Cellos Restaurant at the Castlereagh Inn in Sydney.


L to R: Steve Johnson, Margaret McGurgan, Deidre Bowes and Colleen Keys at the AGM Luncheon

COULD MAN'S BEST FRIEND

JOHN LAWSON and ROB MCLEAN

The Southwest corner of Western Australia is the last stronghold of the numbat, one of Australia's most endearing and endangered marsupials. Numbats originally ranged over much of the southern half of the continent. Their population has now dropped to less than 1,000 animals left in the wild (there are fewer numbats than giant pandas in the world). With the arrival of European settlement and extensive land clearing plus the introduction of the European red fox, numbats disappeared over much of their range as the fox expanded into its habitat. By the early 1980s surveys had shown that the numbat could only be found in two small areas in Western Australia: Dryandra Woodland and Perup Nature Reserve. This beautiful little animal was actually on the brink of extinction.

Numbats feed exclusively on termites and are diurnal (active during the day), unlike most Australian mammals. They can be seen during the day as they search for the 20,000 termites they need to sustain themselves. It's a special thing when you watch as it frantically digs the termite galleries that crisscross the bushland floor, jumping logs, sniffing the ground, then breaking in and extending its

HELP SAVE THE NUMBAT

20cm tongue through the tunnels to catch these tasty insects (well that's what they think). It is the closest living relative to the Thylacine, the only member of the family Myrmecobiidae. It has more teeth than any other Australian terrestrial mammal (50 to 52), but it doesn't chew its food, it only uses them to modify nesting material. There are so many things that are unique about this little creature, and yet the troubles it faces are unknown to many Australians.

Numbats are solitary animals and have a lifespan of up to six years in the wild. Females have home ranges of around 25 to 50 hectares; males can wander over much larger areas with a home range that overlaps that of several females. Numbats generally only come together during the breeding season, which is in early January. A female only comes into oestrus for a 48-hour period. If she doesn't mate during this time, she may repeat this cycle in early February. If she does not find a male, then she must wait till the next season to produce young. After a 14-day gestation period, up to four young about the size of a rice

Above: Numbats enjoying the morning sun. Photo: John Lawson

The numbat, also called the banded anteater, is a small endangered marsupial animal native to parts of Australia. They are under threat from habitat loss and introduced predators like foxes and feral cats. We need your help to protect the future of this unique marsupial. Photo: John Lawson

bubble are born. They then make their way up and attach themselves to one of four nipples which the female has in an underdeveloped pouch on her belly. Here, the young hold on until they are too large for the mother to carry around. She then deposits them in late July/early August in the burrow she has prepared with nesting material. The female leaves the burrow to feed daily, returning late afternoon to suckle her babies throughout the night. As the young grow they become bolder, and start to emerge from their burrow in late August. At first, they stay close to the safety of their home, but progressively move further and start to explore the world around them, learning to feed for themselves. In November they leave the family burrow to set up territories of their own. Young females breed in their first season, but young males will not become sexually mature until their second year. Their mother has invested ten months in raising her brood and must now start to prepare herself for the next breeding cycle. It's a busy life for a female numbat.

In the early 1980s when their numbers were critical, an intensive effort to bring numbats back from the brink of extinction was put in place by the Department of Conservation and Land Management of Western Australia (CALM – now Department of Parks & Wildlife - DPaW). A few numbats were taken to CALM's Woodvale complex, and here they were bred for the first time in captivity. A captive breeding program was set up at Perth Zoo in the early 1990s. Habitat loss and the European fox were identified to be the main threats to numbats in the wild, and an effort was made to develop control methods for these problems.

In the early 1990s, Operation Foxglove was born, and a fox baiting regime was set up. In 1996 this became the Western Shield Program that still runs to this day in many areas of Western Australia. After the initial success of

A numbat gathering nesting material. Photo: John Lawson

this program and improved control of the main predator, numbats made a comeback. By 1992 it was estimated that the numbers in Dryandra Woodland alone were between 500 and 800 individuals.

Reintroductions to former ranges began in 1985 with early success. Animals caught from the wild and later some individuals from Perth Zoo's breeding program were introduced to Boyagin, Tutanning and Dragon Rocks nature reserves and Batalling State Forest: populations are still present at all of those sites today. However, later reintroductions, to Cocanarup Timber Reserve, Stirling Range National Park, Mt Dale and Karroun Hill were not so successful, and those colonies are listed as either no longer present or status unknown. Numbats were also introduced to three fenced areas run by the Australian Wildlife Conservancy: Yookamurra, Scotia, and recently Mt Gibson sanctuaries. These feral free areas now account for around 30 percent of the total numbat population.

Around 2006 a worrying picture started to develop. Numbat numbers were crashing once more. By 2015 the population in Dryandra had dropped to an estimated 50 animals. The bad times were back. With fox control in place, a new predator, the feral cat, had taken advantage and increased in numbers to become the main threat to numbats in the wild. Feral cats are much harder to control. They generally don't take baits and are notoriously hard to trap. Feral cats are implicated in the extinction of 27 Australian mammal species and are listed as the main threat to another 124 threatened species of mammals, frogs, birds, and reptiles. A 2013 study in Dryandra Woodland showed that feral cats are responsible for approximately 50 percent of numbat predation and foxes 17 percent, that's a staggering two-thirds of all numbat predation attributed to these two invasive predators.

This is where a small but dedicated group called the Numbat Task Force hopes to help, by raising funds for a Numbat Protection Dog. This project will be implemented and coordinated by Principal Research Scientist Dr Tony Friend of DPaW and the Numbat Recovery Team across all remaining numbat habitats in Western Australia and is supported by the Threatened Species Commissioner, Gregory Andrews. The group hopes to raise around $300,000 to run the project for at least two years. These funds would be used to employ a handler and two dogs to be used to locate the exact position of invasive predators so they can be removed humanely. If predation by feral cats and foxes can be reduced, it will significantly benefit numbat populations and give them a boost across their range. Removing feral cats and foxes will also have a positive effect on other threatened species that inhabit the same areas, such as woylies, chuditch, red-tailed phascogales, and malleefowl.

The Numbat Task Force hopes to raise these funds through Government and Conservation group grants and is now gearing up for a crowdfunding campaign to kick the project off. We hope for wide support for this innovative project.

The authors John Lawson and Rob McLean are two ordinary blokes with a passion for wildlife and a special soft spot for Western Australia's fauna emblem, the numbat.

The authors gratefully acknowledge that much of the information in this article has been provided through reference to Dr Tony Friend's extensive numbat research.

Numbats have a long sticky tongue that allows them pick up termites. Photo: John Lawson

Hooded robin

Suzanne Medway

The hooded robin (*Melanodryas cucullata*) is a small passerine (perching) bird native to Australia

The hooded robin gets its name from the male of the species, whose neat black-and-white plumage includes a dark 'hood' which covers the bird's head, extending down onto the upper breast and back. The female, by contrast, is drab, having largely brownish-grey plumage. The hooded robin is around 16 cm in length.

Being a shy and unobtrusive species, hooded robins are often rather quiet during the day, especially in the afternoon, but are one of the first birds to call in the morning, when they vigorously add their far-carrying song to the dawn chorus.

The hooded robin is a medium-large robin with a rather short slender bill and a moderately long tail which is square-tipped. They are usually seen in pairs or small groups and are rather shy and quiet. Their flight is short, swift and undulating (curving up and down) with the white in the wings and tail being obvious.

Hooded robins are found all over mainland Australia, except Cape York and the eastern Gulf of Carpentaria and inland around the Simpson Desert, on the Nullarbor Plain and south of the Kimberley Ranges. They are more commonly found in south-eastern Australia from Adelaide to Brisbane.

Hooded robins are found in lightly timbered woodland, mainly dominated by acacia and/or eucalypts.

The hooded robin sits on exposed perches, such as dead branches and stumps, and pounces on arthropods (mainly insects). It forages on or near the ground.

The hooded robin breeds in monogamous pairs. They construct a cup-shaped nest of leaves and bark, bound with spiders' web, placed in a crevice, hollow or hole in a tree or stump. The female incubates the eggs.

Breeding season is July to November with one or two broods raised. The nest is a neat cup made of soft dry grass and bark. Spider webs, feathers, and fur are used for binding/filling, generally in a tree crevice, hollow or fork. The clutch generally consists of two pale olive-green or bluish-green eggs with darker spots and blotches measuring 21 mm x 16 mm.

Clearing of woodlands in south-eastern Australia has caused a decline in populations of the hooded robin. Young birds are taken by foxes.

Hooded robins are not listed as threatened; however, their conservation status varies from state to state within Australia. For example, they are listed as Threatened in Victoria.

The false allure of robotic facsimiles of pollinating animals

A critique of 'materially engineered artificial pollinators' and the championing of preserving real pollinating organisms

Kit Prendergast, Forrest Scholar and PhD researcher on Australia's native bee assemblages

A recent paper titled "Materially Engineered Artificial Pollinators" has had the media in a frenzy of excitement. Across my Facebook Newsfeed and on popular 'science' websites have been posts and articles clamouring about the exciting development of 'robo-bees': tiny robotic drones coated with specially-engineered sticky hairs, which apparently can perform pollination. As touted by *WiredScience* "Robo-bees covered in sticky horsehair could one day help pollinate crops," with the byline "Tiny drones powered by artificial intelligence could help us keep up with global crop demands, Japanese chemists suggest"... I very much doubt so. As an ecologist, conservation scientist, and bee researcher, I don't share the hype. Instead, I have cause to be very critical of the claims that these robotic bees can save humankind from the impending "pollination crisis." Moreover, the notion promulgated by such websites gives me grave cause for concern for they imply that if robotic bees can do the job, then why spend the time and effort on trying to disentangle the various factors threatening real living pollinators. Why put money and effort into the long, arduous, mundane, and, by various stakeholders, undesirable practices into restoring habitat, limiting pesticide use, and preventing further land-clearing? For some, a 'techno-fix' is a lot more 'cool' than ecological restoration.

The artificial pollinators were created by attaching a patch of ionic liquid gel-coated animal hairs, which the researchers demonstrated to be capable of adsorbing and depositing pollen, to the back of an unmanned aerial vehicle (AUV), and as a demonstration of their pollinating prowess, were directed to visit lilies. The accompanying article titled "Sticky Solution Provides Grip for the First Robotic Pollinator" starts with the statement: "Bees, move over. A lily has been pollinated by a remote-controlled flying robot"... I think not!

Above: A *Megachile* bee foraging on *Salvia*. Note the pollen located on the underside of her abdomen, where her scopae are located. This makes megachilid bees very effective pollinators in that they readily collect and deposit pollen when flying from flower to flower. Photo: Kit Prendergast

A drone created to function as an artificial pollinator.

It is clear that the artificial pollinator's creators are not ecologists, let alone pollinator ecologists. Pollination is not so simple. Many plants exhibit a huge diversity of structures that have evolved such that only specific pollinators that have the right match in morphology or behaviour can pollinate them.

In the co-evolution between plants and pollinators, plants have evolved traits (scent, colour, shape, rewards, floral guides) and pollinators have evolved behaviours, which increase the chance that a bee visitor will pick up pollen, which will adhere to its body as it travels to another flower of the same species, and deposit it on the stigma (the receptive part of a female flower). Whereas bees perform this task through innate behaviours and learning, even programmed drones are unlikely to be able to 'forage' in such a way that the right amount and quality of pollen is collected and subsequently deposited on the stigma. Moreover, flowers do not release viable pollen indefinitely, nor are stigmas receptive indefinitely: whilst bees use sensory cues to determine this, how on earth can a robo-bee 'know' when the anthers (male reproductive structures) of a given flower are releasing pollen, and tell when the stigma is receptive so that fertilisation can occur?

Some flora have long corollas that can only be legitimately accessed by pollinators with matching glossa (tongue) lengths. The 'textbook' example is the orchid *Angraecum sesquipedale* which has a very long nectary (up to 30cm long); Charles Darwin who developed the theory of evolution by natural selection predicted that this orchid would have co-evolved with a moth with a tongue long enough to pollinate it; 20 years after Darwin's death this moth was finally discovered and named *Xanthopan morganii*

A pollen-covered *Megachile* bee foraging on the inflorescence of a bottlebrush, *Callistemon viminalis.* Photo: Kit Prendergast

pradedicta and finally, in 1992, 130 years after Darwin's prediction, the moth was confirmed to visit and transfer pollen between the orchids.

Various flowers have a complex 'tripping' mechanism (including the economically important crop lucerne); only bees that handle the flowers in a particular way can properly gain access to the pollen and effectively perform pollination services. Some complicated programming would be needed to get the robo-bees to perform this behaviour that comes innately to some bees.

Then there are the many flora that requires sonification or 'buzz pollination'; this includes both native flora (e.g. *Hibbertia*) as well as horticulturally important species like tomatoes, peppers, pumpkin, cucumber, and squash. Such flowers requiring sonification have what are known as poricidal anthers that will only release pollen when vibrated at a specific frequency. This form of pollination evolved independently in multiple plant lineages and is achieved by a range of bees (over fifty genera distributed across all seven bee families, but is not performed by the dominant domesticated bee pollinator, the honeybee *Apis mellifera*). Poricidal anthers requiring sonification for pollen release are believed to have evolved to control the rate of pollen release and thereby limit pollen loss and promote pollen dispersion, as well as exclude illegitimate pollen thieves.

And then there are various 'sexually deceptive' orchids that, by mimicking the scent, shape, and colour of a female bee or wasp, dupe the males of the corresponding species into attempting to mate with the flower and in the act, end up ensuring the 'mating' of the flower!

Plants also exhibit different mating strategies: some require pollen from other plant individuals that are genetically different; the extreme is self-incompatible plants, where pollen from the same genetic individual will fail to germinate on the stigma, yet other forms of inbreeding depression occur when pollen from plants that are too genetically similar to the female flower fertilise the ova, and can result in fruit abortion, poor fruit development, poor seeding germination, and poor seedling performance. Plants that benefit from 'outcrossed' pollen require pollinators forage between plants in different populations, achieved by large-bodied long-distance foragers like birds. On the other hand, pollen that is too genetically dissimilar can be detrimental and can disrupt local adaptation. Can drones be programmed to 'forage' in ways to maximise these? For most flora, we don't even know their 'ideal' outcrossing scenario, but fortunately, a range of species visiting them and exhibiting variation in foraging behaviour ensures at least some pollen is deposited that maximises fruit and seed set.

Lasioglossum (Parasphecodes) hilactum (family Halictidae) foraging for pollen on the native plant *Hardenbergia violacea*. This plant, as in other species in the family Fabaceae (pea plants), has papilionaceous flowers which require bees to apply pressure in order for pollen to be released. Note the large pollen loads on the bee's hindlegs, especially the femur where the primary scopae (pollen-collecting hairs) are located for this genus. Photo: Kit Prendergast

Likewise, although not all floral visitors are effective (and some are even 'thieves' that steal pollen or obtain nectar without performing pollination), a diverse community of floral visitors usually ensures effective pollination. We are only beginning to unravel the complexities of pollination, and certainly, do not know enough to design robo-bees that can provide full pollination services to the myriad flora.

Bees and other pollinating animals do not exist 'for' humans. While their pollination services, of course, are

A European honeybee (*Apis mellifera*) foraging on a marigold. Note the pollen packaged in corbicula, also known as 'pollen baskets': a cavity surrounded by a fringe of hairs on the tibia of the hindlegs in honeybees as well as some other bee species in the family Apidae. Photo: Kit Prendergast

critical to ensuring pollination (75 percent of crop species benefit from animal-mediated pollination, and up to 94 percent of all flowering plants rely to some extent on animal-mediated pollination), bees themselves have intrinsic value; their loss represents a loss of natural heritage. Bees and other pollinating animals are part of the intrinsic co-evolutionary web of ecological relationships and provide us with insights into the fascinating aspects of evolution, and of mutualistic – and even antagonistic – relationships that play out in the grand epic of life. A little army of metal drones buzzing around the skies is a poor substitute for the diverse, beautiful, intricate, glossy to fuzzy, cute to bizarre bees that, through their daily quests to provide resources for their offspring, enable the fertilisation of plants to the benefit of entire ecological communities, of which we are just one member.

A closer look at the video supplied by the authors and shared widely by the PR press and news outlets already point to flaws in the robo-bees. In fact, in the process of what essentially amounts to the drone dive-bombing the lily, the drone bee actually can be seen to bruise the flower! Damage to floral structures like petals can impair the attraction of flowers to 'real pollinators', and if the stigma is damaged, can leave it prone to infection by pathogenic bacteria and fungi, or even prevent pollen germination. These clumsy prototypes seem to be no substitute for real bees.

The flowers used – the lily (*Lilium japonicum*) – to demonstrate the robo-bees pollination ability also makes me question the ability of these robo-bees to provide pollination to the majority of flora: lilies are far larger than the majority of flowers and have receptive surfaces and pollen that are far more exposed than most. Even for such an 'easy' pollination target, the video of the robo-bee makes me cringe at the clumsy attempt to mimic pollination.

Three foragers of the eusocial honey-producing native 'stingless bee' species *Tetragonula carbonaria* (family Apidae) foraging on thistle at a bamboo property in the Northern Rivers Region, New South Wales, owned by Mark Donald. Photo: Kit Prendergast

Any claim that robo-bees can replace or compensate for bee and other pollinator declines expresses a woeful ignorance of pollination biology, as well as a disregard for the value of bees irrespective of their pollination services.

Not only is the idea dangerous regarding the fate of bees, but it is also ridiculous and underscores the lack of understanding of engineers when it comes to the real, messy world of nature outside of the technological institutions they work in. Should dollars be spent on gizmos and gadgets to replace pollinators, or spent on restoring habitat to protect the pollination services that living bees and other floral visitors provide for free, with the added beauty of these 'service providers' being living organisms of which we are connected to both ecologically, and evolutionarily?

Sure, the robo-bees do have some pros; for, as living organisms, bees are vulnerable to disturbances, they do suffer from habitat destruction, and are threatened by the inappropriate use of herbicides and pesticides. A major worry I and anyone who cares for the environment should have is the risk that, allured by the promises of this new technology, it leaves farmers to feel secure to apply pesticides and herbicides without restraint: a robotic bee can't die from pesticide exposure, but the remaining bees and myriad invertebrate biota can!

In theory, an army of drones, each designed to maximise pollination for a specific plant might be possible... but in practice? The time and money spent on manufacturing the hardware involved in the creation each robo-bee, programming it, and making it function would end up being prohibitive, and these technological feats are more a show demonstrating engineering feats, rather than being realistically deployable in the real world. An estimate by bee researcher David Goulson calculated that to build the 3.2 trillion units required to even partially replace those of a single species – the honeybee *Apis mellifera* – during a foraging season, complete with power and control devices, under the (absurdly optimistic) cost of one penny each, this would cost 32 billion pounds per year. At present, each drone costs about US$100!

This futuristic scenario of tiny flying robots pollinating our food supply is no match, in efficiency or cost, for real bees. Unlike this new invention, bees have been on this planet, and, through their activities to obtain pollen and/or nectar, coincidentally pollinating flora, and promoting biodiversity for about 120 million years: a very long time for natural selection to tune them to be very good at it. And this is largely performed for free.

A little *Leioproctus* bee (family Colletidae) foraging on the small flowers of the native plant *Conostylis candicans*. Note the pollen on the femur of the hindleg where the primary scopa are located for this species. Photo: Kit Prendergast

And once set out in the field, the fate of these cyborg insects is unknown: some would become lost, it is inevitable some would malfunction, others become damaged by wind, rain, heat and other environmental vicissitudes, and I'm sure many a bird, robber fly, spider or praying mantis would try and make a quick meal of these flying creatures that lack the sensory perceptions and instinct of real bees to avoid predation. Not only does this represent a loss of investment in these robo-bees, but this also underscores that living bees cannot be replaced by robotic facsimiles. Not only are real bees capable of escaping predation, but those that do not play an important part in providing food for other organisms – bits of metal hardly can be benign on the stomach of those animals that mistakenly ingest the robotic bees, and robo-bees certainly provide no nutritional value!

A *Lipotriches flavoviridis* bee (family Halictidae) on *Corymbia ficifolia*. Photo: Kit Prendergast

If we assume (generously) a lifespan of one year, what would happen to all the defunct robo-bees? Would we be littering the land with more trash in the form of deceased robotic pollinator machines? And what about the environmental costs of manufacturing these bees? What rare metals would need to be mined, how much carbon pollution would be involved in their manufacture?

Real bees have no environmental cost and provided their foraging and nesting resources are met; they readily replenish themselves and power themselves.

So, rather than being a savour designed by tech-savvy 'scientists' as hailed by the media, robotic bees may indirectly result in adverse consequences for the fate of nature's originals. Acknowledged by one of the designers as "just a proof-of-concept," they likely will stay as such, but of course, the press needs to sell a story, and hyperbolic claims are nothing new.

This technological machismo should be interpreted as a cute bit of engineering, perhaps a point of intellectual interest, but certainly not an alternative to the 'wicked' problems of biodiversity decline. We need to use science, not technology, to protect and conserve living, breathing bees and the pollination services they perform for free to the benefit of humans and non-humans alike.

Spins on projects like these might seem innocuous, but they can have dangerous consequences by endorsing an attitude that we can tolerate dwindling bee populations since we have technological back-ups. More repulsive, and most damaging, is that they promote the idea that we should only care to protect biota if they have utilitarian uses, and that their existence is justified by what goods and services they can perform to humanity. And if such services can be replaced or better serviced by technology, then there is no reason to conserve biota just for the pure reason that they have evolved and exist on this planet.

Rather than look to a quick techno-fix, we should solve the problems humans have created that threaten food supplies and food security. The solution is there in nature: we just need to protect the wonderful diversity of bee assemblages. Their decline is symptomatic of larger environmental issues (inappropriate pesticide use, habitat destruction largely for livestock agriculture, and increasingly, climate change, also largely driven by livestock agriculture as well as excessive fossil fuel use). Unlike deploying robotic bees, directly addressing bee declines and restoring pollinator populations will go towards addressing and reversing the problems facing the natural world on which we depend on and are a part of at large.

Website - http://www.wired.co.uk/article/robotic-bee-pollinates-flowers

Video produced by Kit Prendergast of a Blue-banded bee (*Amegilla*) pollinating the Australian native flora *Hibbertia scandens*:

https://www.facebook.com/Kit.Prendergast/videos/g.1041684025880609/1015492888608427 3/?type=2&theater

A resin bee *Megachile aurifrons* foraging on bottlebrush *Callistemon viminalis*. Bees in the family Megachilidae are very effective pollinators owing to having scopae (pollen-carrying hairs) on the underside of their abdomens.

Some Reflections on ECOSYSTEMS

Clive Williams

THE MURRAY RIVER

A recent leisurely cruise down the Murray River in South Australia brought me face to face with the ecology of the region. We all talk about ecology and stress how important it is to take ecological factors into consideration when issues affecting the environment are involved, but it takes a real living experience seeing these factors at work to raise one's awareness. At the time of my journey, the Murray was in flood, caused by the heavy rains in New South Wales and Queensland several weeks beforehand. It was the sight of the river red gums as well as black box standing in water which made me consider the ecosystem of the river. The river red gums are the most widespread of all Australian eucalypts and grow along the courses of most inland rivers. They can live to several hundred years of age, BUT, they need regular floods to survive.

Regular flooding enables water to penetrate deep into the soil to provide a reservoir for dry times. It was a pleasure to observe this aspect of the river ecology at work. We all remember the severe drought of a few years ago when the Murray barely reached the sea and Adelaide was in dire straits for a water supply. There were reports of many red gums dying, and I witnessed evidence of that. However, all is not lost. On some trees the upper limbs were indeed dead, but lower down the trunk nearer the roots, new shoots were growing, showing how resilient these trees can be. The trees ranged in age from mere saplings to ancient specimens. It is intriguing how nature, on close inspection, continues to surprise. Many of the old and large red gums carried hollows useful as nesting sites for birds or animals. I certainly knew about that. In some areas of the Murray the tall limestone cliffs for which the river is noted dominate the scene. I certainly knew about them. But what I did not know is that these cliffs are full of crevices and hollows, and the local corellas and cockatoos make use of them for nesting sites. Their powerful beaks enable them to enlarge the hollows to suit their needs, as I was able to witness. It was a great example of wildlife making use of what is available about which I was totally unaware.

The river in flood is itself a source of wonder. The water was discoloured – what the locals call blackwater. This is caused by the waters carrying elevated levels of dissolved organic carbon and the release of these carbon compounds, which include tannin, causes the black appearance. This is similar to the effects experienced in Tasmanian west coast rivers. The increase in carbon levels affects the ecosystem both positively and negatively. There is no danger to humans, but the resultant reduction in oxygen levels can cause severe stress or even death to aquatic animals. Fish deaths were already occurring. To balance this, however, once the river is flushed it provides ideal breeding conditions for fish, and the higher level of carbon leads to an increase in zooplankton and other invertebrates, a major food source for fish. On balance, there are more benefits than losses.

Above: The limestone cliffs are dramatic.

Blackwood was harvested at Dismal Swamp for almost half a century, from the 1930s until 1975.

DISMAL SWAMP

The Murray River ecosystem is huge, but there are other ecosystems which are very small and specific. One of these is Dismal Swamp in North West Tasmania. Dismal Swamp is a unique ecosystem located in the Tarkine Wilderness area of the State, easily accessible by road about half an hour south of Smithton. It is a sinkhole 40 metres deep and covering 640 hectares, Australia's largest, caused by water dissolving the dolomite rock over thousands of years. It is claimed to be the only blackwood sinkhole in the world. We all know blackwood as a beautiful cabinet timber. In fact, it is often called Tasmanian Blackwood. However, it also grows on the mainland, but it is particularly suited to the high rainfall climate of Tasmania's west coast. In the early days, it was the most available timber and was used for fence posts and even for corrugated roads. Blackwood is a member of the acacia family, just as another lovely cabinet timber, silky oak, is a member of the Grevillea family.

It is not certain how Dismal Swamp got its name, but it is believed to have arisen from the experience of the Government Surveyor of the time who was sent by Governor Arthur to map the area. He complained that it was a dismal place as his team were constantly wet and had to resort to sleeping on fallen trees. A nearby swamp must have pleased him better as he named it Welcome Swamp.
In 2004 Forestry Tasmania opened Dismal Swamp as a tourist destination. They built a visitor centre at the top, featuring Tasmanian timbers and a viewing platform. At the bottom of the sinkhole, they built a series of boardwalks in a maze-like fashion and commissioned Tasmanian sculptors to produce sculptures inspired by the location. A walk along the boardwalk will bring one face to face with signs directing one's attention to some feature of the environment. To access the boardwalk the visitor can walk down a graded pathway, or, if feeling adventurous, ride down an 110 metre covered slide, much as one would do at a fun parlour. For the less mobile, there is a small motorised buggy. Forestry Tasmania closed its operation in 2010, but it has been taken over by a private operator.

The blackwood tree flowers and drops seeds each year and these seeds can lie dormant for up to one hundred years. We are all used to native plants depending on a significant event such as fire or flood to aid in the germination of their seeds, but in Dismal Swamp, germination relies on something entirely different. Dismal Swamp is home to a small burrowing crayfish which is constantly disturbing the soil allowing the seeds to be covered and to germinate. Trees on the rim of the sinkhole are of a different variety to those below. Other trees to be found in the sinkhole include other lovely cabinet timbers such as myrtle and sassafras, while pademelons, possums, blue wrens, green parrots, grey goshawks, and snakes find a home there. It is a home that is probably unchanged since ancient times.

Red gums under flood.

The experience of the vast expanse of the Murray River system and the tiny Dismal Swamp is a reminder that wherever we are we are part of an ecosystem. These ecosystems are frequently complex, sometimes fragile and disturbing one part can affect the whole system, often with disastrous consequences. Sadly humankind is slow to learn this lesson. So as you move about this lovely country of ours, I invite you to keep your eyes and senses open and alert and ask yourself the question "What sort of an ecosystem am I in and what's special about it?"

Corellas and cockatoos nest in these crevices.

OPTIMISING FUTURE TROPICAL

EXAMINING THE ECONOMIC BENEFITS AND ENVIRONMENTAL COSTS OF ROADS IN

MASON CAMPBELL (MOHAMMED ALAMGIR AND WILLIAM LAURANCE)

MY COMMUTE

On average, I drive 90 kilometres per day to-and-from my place of work. I begin my commute on the highland plains of the once rainforest-shrouded Atherton Tablelands. My journey then traverses a rural agricultural matrix, passing remnant patches of tropical savannahs, monsoonal vine thickets and evergreen rainforests, until I arrive at my place of work, James Cook University, near the city of Cairns, one of Australia's few truly tropical cities, located in the far north of Queensland. Cairns can be found on the humid-tropical lowland plain, and it is these lowlands that Mohammed's shorter journey to work crosses as he passes the ever-expanding urban sprawl and the still relatively extensive fields of towering sugarcane gently swaying in the coastal breeze.

My daily route to work bisects the deep-green, world heritage listed rainforests whose vegetative abundance conceals the ruggedness that is the Macalister Range. This imposing mountain range provides a glorious backdrop to our university and constitutes part of Australia's renowned Great Dividing Range whose precipitous ridges once formed an impenetrable barrier preventing the early European settlers who inhabited the mesic eastern coastal plains from accessing the arid interior of the continent. The road I take was originally devised as a means of gaining access to the mineral-rich mining towns of the interior to feed their insatiable need for daily goods while transporting their metallurgical spoils to the navigable ports of the eastern seaboard, such as Cairns. Equivalent with many roads penetrating the once vast wilderness regions of the Worlds tropics, the opening of this route resulted in the extensive development of the interior through diverse economic endeavors including substantial agricultural intensification. This development led to an economic empowerment of the local populace, a major reason given for tropical road construction to this very date, but

ROADS
THE ASIA-PACIFIC

occurred at the expense of extensive tropical forest loss and significant environmental degradation.

Today as I wind my way through the multitudinous switchbacks allowing my passage of the steep terrain I am contemplating the economic benefits and accompanying environmental havoc wreaked by the presence of tropical roads such as the one upon which I presently journey. In my reverie, I would like to imagine that many of my more enlightened fellow travelers accompanying me along this route may be at least contemplating the environmental impact of our combined vehicular emissions, though whether this is the case or not I do not know. But one thing I can be relatively confident of is that few if any of them, would be wondering whether this road should even exist at all.

ROAD LOCATION; COSTS AND BENEFITS

Have you ever stopped to wonder about the road you're currently driving on and why it exists in its present location? Or indeed, whether this placement would maximise economic outcomes while minimising environmental harm? If not, don't feel chastened, I'm sure you are amongst the vast majority of road users world-wide. Now if you are wondering why such pragmatic if not melancholic quandaries inhabit my and Mohammed's grey matter it is because we constitute part of a dedicated research team, led by Bill Laurance and based at James Cook University Cairns. The team has undertaken the behemoth endeavour of examining the environmental cost and economic benefits of potential future roads throughout the developing tropical nations of Indonesia, Malaysia, and Papua New Guinea. Collectively, these three countries house some of the world's most imperiled ecosystems and are major hotspots for biodiversity and endemicity.

COSTS

Unfortunately, the very existence of many species in these countries is threatened by the unprecedented investment in transport infrastructure expected to flood the world's tropics over the next few decades. In fact, it is projected that by 2050 there will be an additional 25 million kilometres of paved roads on earth which is enough to encircle the planet 600 times. And around nine-tenths of these roads will be built in tropical developing regions.

As tropical forests around the world are vanishing at a rate of 50 football fields a minute and wilderness areas have shrunk by a tenth globally in just the past two decades (with the biologically rich rainforests destroyed the fastest), this planned additional road development is an environmentalist's worst nightmare. In fact, eminent ecologists such as the Brazilian Professor Eneas Salati (who has spent his life studying the Amazon) have been known to suggest "the best thing you could do for the Amazon is to blow up all the roads."

Now if you think his views are somewhat extreme consider this: in the Brazilian Amazon alone 95 percent of all forest destruction occurs within five kilometres of roads, and for every kilometre of legal road, there are at least three kilometres of illegal roads! Not only do these roads penetrate once pristine environmental regions causing localised damage through their initial construction but they unleash a cascading chain of ongoing environmental degradation. This degradation occurs through processes such as increasing fire penetration, increased illegal hunting, illegal forest clearing by land speculators and increased illegal mining to name but as few.

Now before you disregard another impact assailing the ever-threatened Amazon, note that many of these effects are Pan-tropical and impact all of the major remaining wilderness areas in the tropics including Australia. For instance, in the Congo Basin, the toll on wildlife of increased illegal hunting through access provided by road construction has been devastating. In the last decade, for instance, around two-thirds of all forest elephants have been slaughtered for their valuable ivory tusks.

BENEFITS

But as any economist will tell you **we need roads**. They are an indispensable part of modern societies providing a cost-effective way to promote economic growth, encourage regional trade and provide access to natural resources and land suitable for agriculture. They are also used to shore-up a countries retention of disputed geographic regions. Partially to fulfill this insatiable need for roads, in 2014 at their global summit, the Heads of State of the G20 nations committed to investing US$60-70 trillion in new infrastructure worldwide, by the year 2030. If this were to occur as planned, this would not only be the single largest financial transaction in human history; it would more than double the present value of infrastructure globally. Now while the proportion of this which will be supplied to tropical countries is currently unknown, any investment in developing tropical countries is

Above: Many fauna species throughout the tropics are threatened by direct collision with vehicles (Image courtesy Brazilian Ecology Road Center).

Most of the remaining rainforest within the Australian tropics is to be found on the steepest mountain slopes with the flatter regions long since cleared for agriculture and urban development.

laudable as many of them house some of the poorest citizens in the world. Moreover, the citizens of the world desperately needs **tropical roads** in particular because the tropics currently house approximately 40 percent of the world's population, and 55 percent of its children under five, but by 2050 it is expected that more than half the world's population and a phenomenal 67 percent of its young children (under five) will reside there! However, if this infrastructure investment is to reach its maximal benefit, it must occur upon a solid base of careful planning. Poorly planned road building could not only impose massive environmental degradation but deliver negligible economic benefits. So the crux of the issue becomes determining how we balance the two competing realities, on one hand, road construction for social development and poverty mitigation, and on the other road exclusion for the conservation of the crowning glory of natural diversity which is housed in the few remaining tropical wilderness areas?

That's where we come in... Bill's team is leading a major international research effort to devise a strategic and proactive scheme for identifying

The rainforests of the Daintree are some of the last tropical lowland forests in Australia that have avoided the impacts of an extensive road network.

and prioritising current road building projects across Indonesia, Malaysia, and Papua New Guinea. In concert with other colleagues from the respective governments and collaborating organisations (in particular NGOs), we aim to devise a national road map for each country which would identify areas in which roads or road improvements are likely to have substantial economic benefits at the lowest environmental cost. We have the major aim of facilitating effective and conscious road positioning by providing objective facts and decision support to our governmental collaborators. Thus the reason for my current reverie.

CONCLUSION – HOMEWARD BOUND

So as Mohammed drives across the heavily urbanised and agricultural lowlands of Cairns and I head for the forest-cloaked mountain range and on towards my upland abode, I am still considering the many proposed roads in the tropical countries we plan to examine, whose aims correlate with the one built so long ago upon which I currently travel. But unlike those proposed for our study locations across the Asia Pacific, we no longer have a say in the position of the one I'm on. Nor the costs of its current upkeep and potential for expansion which both remain heated political topics today, so many decades since its incursion. Indeed, if the early pioneers who identified the current position of this road were endowed with today's technological capacity and array of economic and environmental assessment tools (and the willingness to use them), would it exist at all? However, as the saying goes, we missed that boat. Fortunately, this is not the case for the many proposed roads we are examining. And if we can assist our governmental collaborators in strategically directing the tsunami of road building proposed for these tropical regions, there is a strong likelihood that their future roads could maximise economic development for their young populace while striking priority conservation outcomes for centuries to come. But if this tsunami arrives undirected upon the tropical shores of the Asia-Pacific all that may one day remain will be the historical "what if" musings of a fellow tropical traveler on their daily commute a century from now.

The clear mountain streams of upland catchments are often threatened by the impacts of road construction, facing sedimentation and altered drainage patterns.

Mitigation measures such as these rope bridges across the Palmerston Highway in tropical far north Queensland, can assist in ameliorating the impacts of tropical roads on arboreal fauna species.

SECRETS AT SUNRISE

MEET ONE OF AUSTRALIA'S RAREST BIRDS AND THE PEOPLE WHO ARE TRYING TO SAVE IT

FRIENDS OF THE WESTERN GROUND PARROT

It is still dark on this early February morning. The dash clock of the 4WD bumping along a track in remote Nuytsland Nature Reserve some 300km east of the Esperance in Western Australia is showing 4:05am. A few minutes later the vehicle comes to a halt. Armed with head torches, compass and clipboards the vehicle's occupants clamber out and take up their positions in the pre-dawn heathland. Initially there is only the sound of the wind, but as the light slowly appears on the eastern horizon, the first bird calls are being heard and the team is beginning to listen with great concentration. By daybreak the dawn chorus is in full swing and they soon pick up the calls of a variety of honeyeaters, but this is not what these early risers are listening for. They have come to this rugged place near the Great Australian Bight to search for one of the world's rarest parrots.

You have probably never heard of the Western ground parrot, a little-known species from Western Australia, whose numbers have declined so dramatically that it is now listed as Critically Endangered. It is estimated that less than 150 birds remain in the wild. These secretive parrots, also known as Kyloring by the local Noongar people, were once found in coastal heathland all the way from Geraldton to Israelite Bay in Western Australia. However, land clearing, wildfires and predation by foxes and feral cats have all but wiped out this unusual member of the parrot family. Today they are only known from Cape Arid National Park and the adjacent Nuytsland Nature Reserve on the remote south coast of Western Australia.

Western ground parrots live in heathlands and forage amongst dense vegetation, taking to flight only when flushed or flying between roosts and feeding areas. The only time the birds announce their presence is during a brief period before sunrise and another after sunset. Their call, which has been likened to the whistle of a boiling kettle, is generally not heard during the day, making the birds extremely difficult to locate.

As their name implies, they spend most of their time on the ground, making them very vulnerable to predation and just like the equally rare ground-dwelling night parrot and New Zealand's Kakapo, they are now on the

Above: Western ground parrot in the wild. Photo: Brent Barrett / Department of Parks and Wildlife

brink of extinction. Being so rare and not easily seen, it was not until 2004 when the first, albeit fuzzy, image of a bird in the wild was captured and it took another year of concentrated effort to obtain the photo below.

By this time Western ground parrots had disappeared from Waychinicup National Park east of Albany and a few years later the population that had been surviving in Fitzgerald River National Park was also found to be in steep decline. The last time the parrots were heard calling in this biodiversity hotspot was in 2012.

With wildfires a constant threat for what was now the only wild population left in the world, the South Coast Threatened Birds Recovery Team made the decision to capture a small number of wild birds to begin to establish an insurance population. If it was possible to maintain this species in a captive environment, something that had never been done before, there was hope that the birds could eventually be bred in captivity. A team from the Department of Parks and Wildlife succeeded in catching a handful of Western ground parrots in 2009 and 2010, and subsequently proved that it was possible to keep this species in captivity. After spending several years in custom-built aviaries on the south coast, the birds were transferred to Perth Zoo in 2014 with the aim to eventually establish a captive breeding project.

Although there had been concerted efforts to halt the decline of the species since the start of the century, it became obvious that fox-baiting alone was clearly not enough to keep the birds safe from introduced predators. Another predator, the feral cat, appeared to be increasing in numbers as fox numbers were going down in response to baiting. Scientists from the Department of Parks and Wildlife began to carry out cat-baiting trials, aiming to protect the remaining wild birds from these predators which have been implicated in the extinction of a large number of Australian animals. After successful trials Eradicat® bait, which is based on 1080 poison, was officially registered last year and will be a useful tool to manage the threat posed by feral cats.

Attempts to protect the birds from wildfires, a huge task given the size and remoteness of Cape Arid National Park, however, proved less successful. In October 2015 a series of lightning strikes started several fires in the national park burning an estimated 20 percent of the known occupied habitat of the critically endangered parrot before they were put out. This posed challenges for the Parks and Wildlife project team who were about to undertake the capture of additional birds for Perth Zoo's captive breeding trial. After nine days of intense surveying supported by volunteers from our organisation, it was decided enough birds had escaped the fires and the team began to attempt to bring a few parrots into captivity.

Volunteers Tegan Douglas and Jim Creighton in Cape Arid National Park.
Photo: S Comer / Department of Parks and Wildlife

Western ground parrot. Photo: Alan Danks

Documentary about the race to save one of the world's rarest parrots.

On 15 November the field team, which by then had successfully captured two birds, had their work interrupted by severe thunderstorms moving across the region. The spectacular lightning display during the night didn't bode well and the following morning they were alerted that lightning had started several fires in the national park, forcing them to leave immediately. The ensuing catastrophic bushfires killed four people near Esperance and burnt more than 300,000 hectares of land. In the aftermath of the fires it became evident that an estimated 90 percent of the Western ground parrot's known occupied habitat in Cape Arid National Park lay in ashes making it hard to remain optimistic about the survival of the species.

However, a reconnaissance trip to Cape Arid National Park a month later established that two small pockets of habitat had escaped the fires. Nearby Nuytsland Nature Reserve had also remained unburnt giving hope that not all birds had perished in the flames. In February 2016 a team of scientist and volunteers travelled in a convoy of 4WD vehicles to this remote corner of Western Australia to undertake a search for the elusive parrots and one morning just after sunrise they heard the call of a Western ground parrot flying from its roost site. It was now official – some of the birds had survived the fires.

The future of the Western ground parrot may seem dire, but it is important not to lose sight of the fact that other bird species have been brought back from the brink of extinction. Wildfires will be an ever present threat, but there are now tools to help keep feral predators at bay. A group of conservation specialists from Australia and New Zealand met in Perth last year and discussed measures needed to aid the recovery of one of the country's rarest birds. The recommendations made by the scientists are now urgently in need of funding so they can be implemented.

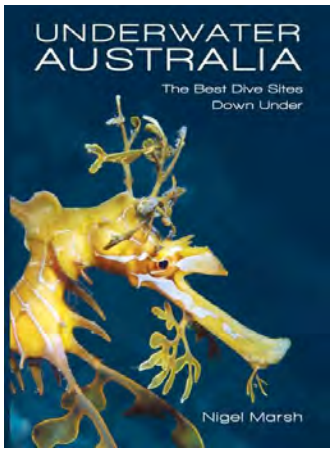
The birds at Perth Zoo are yet to produce young in captivity. After a successful courtship one of the pairs nested, but tragically the hen was unable to pass the egg and all attempts by the Zoo's veterinary staff to save her failed. After this significant setback the team at the Zoo paired the successful male with the only female bird left in captivity and were delighted see them mate after a few weeks. However, no offspring resulted in the end. Despite the challenges of having only a handful of birds to work with, dedicated Zoo staff succeeded in getting this difficult to breed species to mate and produce a vital egg within two years. Will the next breeding season see the first Western ground parrot chicks born in captivity? We don't know, but if successful it is another step back from the brink for this unique Western Australian bird.

The documentary *Secrets of Sunrise* which will be available soon, follows the efforts of the team of wildlife experts who, together with a group of volunteers, are determined to save this bird from extinction. The official trailer is available on Vimeo: https://vimeo.com/164201123

Friends of the Western Ground Parrot, founded in 2003, are based in Albany, Western Australia. They raise awareness about this little-known parrot and lobby government for funding. The organisation which is run entirely by volunteers supports the recovery project through fund-raising and helping with surveys. They work closely with the Western Australia Department of Parks and Wildlife and Perth Zoo.

If you want to find out more about the Western ground parrot or make a tax-deductible donation to the Western Ground Parrot Rescue Fund, go to their website: www.western-ground-parrot.org.au

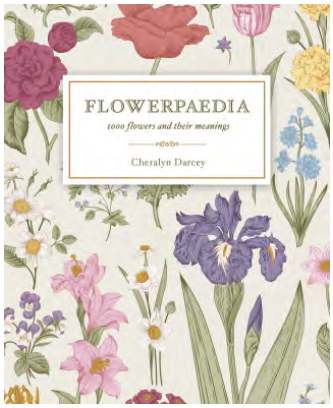
Book Reviews



***Underwater Australia - The Best Dive Sites Down Under* by Nigel Marsh**

Australia is blessed with one of the most diverse marine ecosystems in the world. From its tropical north to its cool temperate waters, Australia is truly a diver's paradise. Divers can use this book to explore every section of this great southern land, state-by-state and region-by-region. Filled with wonderful pictures, this is a must have guide book for anyone wanted to submerge in the land Down Under.

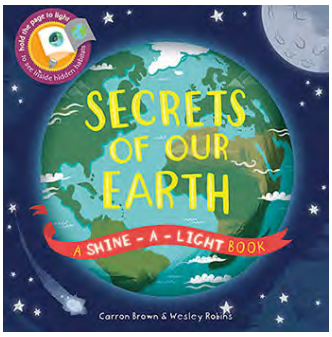
Publisher: New Holland Publishers Australia
RRP: $35



***Flowerpaedia - 1000 Flower and their Meanings* by Cheralyn Darcey**

Flowerpaedia is an A-Z reference guide of over 1,000 flowers researched and compiled by botanical explorer Cheralyn Darcey. This comprehensive dictionary includes each flower's correct botanical name for easy and exact identification.

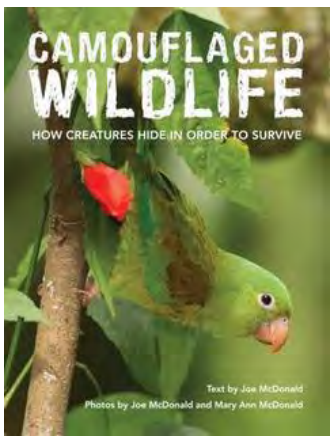
Publisher: Rockpool Publishing | RRP: $24.99



***Secrets of our Earth* by Carron Brown & Wesley Robins**

This beautifully illustrated book will introduce children to the joys of nature, and show them what wonderful secrets are revealed if you just look a little closer. Embark upon a memorable journey of discovery with this combination of natural landscapes, animal habitats, and geological wonders. The unique design of the book allows children to discover a 'hidden' image by holding the page up to a bright light. For children aged three and up, this is the perfect introduction to the hidden mysteries of our Earth.

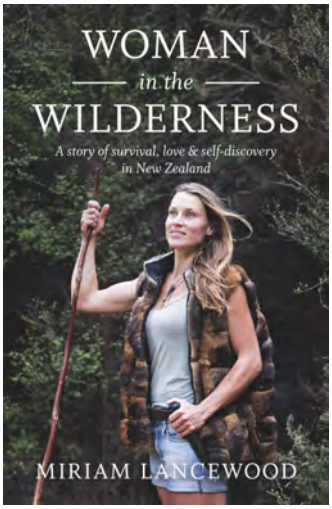
Publisher: Murdoch Books
RRP: $19.99



***Camouflaged Wildlife - How Creatures Hide in Order to Survive* by Joe McDonald**

This beautifully illustrated book on camouflaged animals includes some of nature's greatest designs and is one of the most remarkable compilations of pictures on the subject ever published. These images have to be seen to be believed in terms of the subjects' remarkable imitations of their natural backgrounds, which often aid them in their roles as hunting predator or prey attempting to avoid capture. Decades of work by the award-winning photographers Joe and Mary Ann McDonald are distilled down into this remarkable and eye-catching book.

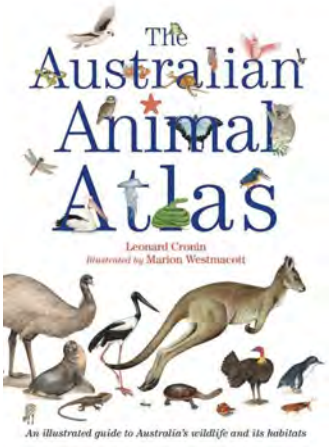
Publisher: New Holland Publishers Australia
RRP: $35



***Woman in the Wilderness - A Story of Survival, Love & Self-Discovery in New Zealand* by Miriam Lancewood**

This inspirational story of adventure and bravery tells how one woman learned to dig deep and push the boundaries in order to discover what really matters in life. Miriam is a young Dutch woman living a primitive, nomadic life in the heart of the mountains with her New Zealand husband. She lives simply in a tent or hut, and survives by hunting wild animals and foraging edible plants, relying on only minimal supplies. This is a gripping and engaging read and is perfect for anyone exploring the idea of living a more authentic, real life.

Publisher: Allen & Unwin
RRP: $32.99



***The Australian Animal Atlas* by Leonard Cronin, Illustrated by Marion Westmacott**

An entertaining and educational illustrated guide to Australia's amazing wildlife and its habitats.

Come on a journey into the world of Australia's wildlife, exploring all the different habitats, from parched deserts to lush rainforests. This environmental atlas of Australian animals by an expert team is full of fascinating facts and superb illustrations.

Publisher: Allen & Unwin
RRP: $29.99

AUSTRALIAN WILDLIFE SOCIETY
PO BOX 42 BRIGHTON LE SANDS NSW 2216 | (ACN 134 808 790)

PRESIDENT'S ANNUAL REPORT FOR 2016

A year in review

The past year for the Society has been one of consolidation and growth. At the Annual General Meeting in March 2016, I was honoured to be elected back onto the Board and then at the following board meeting, elected as President. We were delighted to welcome two new members to the Board – Wayne Greenwood and Trevor Evans.

A highlight of the year was our Society winning the prestigious NSW Nature Conservation Council Member Group Award for 2016. The NCC award is given annually to a Member Group of NCC judged to be the most outstanding environment group that has demonstrated commitment and success in the conservation of the environment in New South Wales, particularly through empowering and organising individuals and groups to protect the environment.

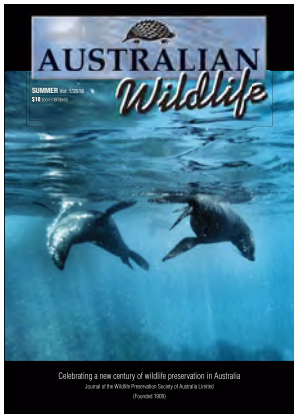
Presentation of the prestigious NSW Nature Conservation Council Member Group Award for 2016.

L to R: Clive Williams, Suzanne Medway, Professor Don White (President of NSW Nature Conservation Council) and Ken Mason

Dr. Richard (Dick) Mason, the longest serving member of the Board, decided to retire and the December meeting was his last. Dick, one of our Life Members, joined the Society during the 1970s. He has been a regular and diligent member of the Board and we presented him with two books as a farewell present. We will miss his contribution and passion.

Australian Wildlife magazine

Our coloured *Australian Wildlife* magazine is the flagship of the Society and has proved to be extremely popular amongst all of our members. We invite members to distribute copies to family and friends and to invite them to become members. A special thank you to our Sub-Editor, Sabine Borgis, for her valuable contribution to the editing of the magazine.



Summer Cover

Autumn Cover

Winter Cover

Spring Cover

Our fortnightly email wildlife newsletter has also proven to be very popular with our members and we encourage them to forward the newsletter on to their family, friends and associates to help spread the wildlife conservation word. A big thank you to Linda Dennis, Editor of the newsletter, for her valuable work in keeping us regularly informed on wildlife matters.

We were delighted to welcome a new volunteer to co-ordinate our social media presence – Kate Chaplin.

Kate has been making regular postings on Facebook and Twitter. Please be sure to look up our pages – Australia Wildlife Society and Australian Fauna and Flora Photography – on Facebook. Members and friends are welcome to post on either site.

Website

Towards the end of the year we appointed a new webmaster to manage and update our website to make it more user friendly. Changes to the structure and layout will be an ongoing process. It is also planned to design and implement a 'Members Only' section. We also hope to make the application process for new members simpler. Members are encouraged to view the website and send any feedback via email to: info@wpsa.org.au

Strategic Planning Day

A Strategic Planning Day was held in May to review past performances and to plan for the future of the Society. A one-year and a five-year Strategic Plan were developed and adopted by the Board for implementation over the next 12 months. Highlights include plans to establish a National Office for the long-term sustainability of the Society and to engage a Project or Office Manager to promote the Society and its aims and objectives in Australian universities. Succession planning and a dynamic new website are already underway for the future of the Society.

Wildlife rescue calls

We continue to receive numerous and wide-ranging distress calls for help from members of the public about sick, injured and stranded wildlife.

Our Mission

Part of our Mission Statement reads:

"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 programs, political lobbying, advocacy and hands on conservation work."

To fulfill this goal we introduced the University Student Grants Scheme in 2005 and since its inception have awarded over 120 grants to very worthy recipients. Last year we increased the grant to $1,500 and plan in the future to steadily increase the dollar amount of the grants.

2016 – University Student Grants Scheme

The Australian Wildlife Society's University Research Grants are scholarships offered to honours or postgraduate students at Australian universities. Each year, ten grants of $1,500 are awarded. Grants are available for research projects of direct relevance to the conservation of Australian wildlife – plant or animal. The winners for 2016 were:

Hannah Bannister, The University of Adelaide
Project title: Identifying successful reintroduction techniques for brushtail possums (*Trichosurus vulpecula*) in a semi-arid environment.

Lauren Roman, Institute for Marine and Antarctic Studies (IMAS), University of Tasmania
Project title: "We've had a gutful of this rubbish": Population-level effects of plastic ingestion in Australasian seabirds

Newly elected directors. L to R: Sash Denkovski, Noel Cislowski, Wayne Greenwood, Suzanne Medway, Trevor Evans, Ken Mason and Stephen Grabowski.

Emily Roy-Dufresne, The University of Adelaide
Project title: Mapping the distribution of the European rabbits (*Oryctologus cuniculus*) in Australia using occurrence data from targeted and non-targeted field studies

Monique Smith, The University of Adelaide
Project title: Interactions between native and introduced grass species in the context of restoration of grassy habitats

Patrick Taggart, The University of Adelaide
Project title: Investigating correlates of *Toxoplasma gondii* infection to explain its higher seroprevalence on Kangaroo Island

Jack Tatler, The University of Adelaide
Project title: Spying on Dingoes in the desert - New insights into the behaviour energetic and resource selection of free-ranging dingoes - *Canis lupus dingo*

Luke Tilley, The University of Adelaide
Project title: Potential impacts of Western Quolls (*Dasyurus geoffroii*) on in situ species at Arid Recovery

Anicee Lombal, School of Biological Sciences, University of Tasmania
Project title: Re-establishment plan of Providence petrels (*Pterodroma solandri*) on Norfolk Island

Donald McKnight, James Cook University, Townsville
Project title: Do bacterial immune defenses drive the recovery of threatened frog populations?

Gary Palmer, Griffith University
Project title: Seed predators in rainforests: What are they eating, and how are they influenced by forest fragmentation?

Wildlife Science Ecology Research Scholarship

The 2016 Australian Wildlife Society Wildlife Ecology Research Scholarship was awarded to UTS School of the Environment PhD student **Naomi Walters.** Naomi's PhD project in the Kimberley, Western Australia, aims to prevent the extinction of northern quoll populations at Mornington Wildlife Sanctuary (owned by the Australian Wildlife Conservancy) and the neighbouring crown land. During the last few decades as cane toads have spread across Northern Australia, northern quolls (*Dasyurus hallacatus*) have been significantly impacted. As the invasion continues to spread, the introduced pest poses an imminent threat to the endangered northern quoll. While there is no silver bullet to halt the spread of, or to eradicate, the toxic toads, research has been working towards ways to prevent quoll extinctions by training quolls to avoid eating cane toads before the toad spreads any further.

Northern quoll (*Dasyurus hallacatus*) and Naomi Walters

Wildlife Conservation Awards

The winner of the **Serventy Conservation Award** was **John Weigel.** John has been an active wildlife campaigner for over 35 years. In the 1990s he devised and implemented a highly successful mobile education program for primary and high schools in all states. Over a million Australian school children were educated through this program. He has made 25 visits to the Kimberley Ranges making discoveries of previously unknown species. Two, a frog and a king brown snake, have been named after him. John's most recent venture was, with his wife, to invest $1,000,000 in Devil Ark, a program at Barrington Tops, NSW, to provide a safe haven for devils. He continues as Managing Director of the not-for-profit Devil Ark Conservation Fund. John is truly a man who has devoted his life to conservation and we welcome him to the list of those recognised by the Serventy Conservation Award.

John Weigel

The winner of the **Community Wildlife Conservation Award** was **Friends of the Brush-tailed Rock Wallaby Inc.** This group is based in the Kangaroo Valley and has been active in trying to prevent the extinction of the BTRW since 1995. The group has formed a close alliance with the local community, local landholders, local schools and with the National Parks and Wildlife Service. By reducing the risk of predation the Friends have been successful in saving this animal from probable extinction in the area and trebling the number of animals at large. They are a great example of a successful community organisation at work.

2016 Conservation Group Grants

The Board of Directors carefully considers all requests for grants from other wildlife conservation groups and places a special emphasis on native wildlife research, conservation and the preservation of wildlife habitat. We lobby organisations and government bodies on their behalf and make donations to assist them in their special wildlife conservation projects.

Conservation grants were made to the following projects:

- Western Woodlands Koala Mapping Project
- Wedge-tailed eagle monitoring project in WA

Conferences and wildlife research seminars

The Society's directors attended and contributed to a number of important wildlife conservation conferences, seminars and meetings throughout the year. We actively initiated and sponsored many of these conferences and participated in others. AWS

is an active member of the Nature Conservation Council of New South Wales. Our Society's CEO is a representative on the NSW State Pest Animal Control Council and attends both city and country meetings at Orange. We attended the Australasian Wildlife Management Society Annual Conference in Auckland, New Zealand, in November 2016, where some six sponsored students made presentations on their research. The CEO attended the Sustainable Wildlife Conference in Brisbane in September 2016. The CEO and President attended the ANPC Conference at Mt Annan Botanic Gardens, Sydney. Regional Adviser Linda Dennis attended the Wildlife Rehabilitation Conference in Melbourne in August and presented a paper.

Radio and Cruise talks

The Society's CEO and honorary secretary, Patrick Medway, continued to promote the Society by giving lectures to various groups and schools. He was again a guest on ABC Radio's *Nightlife with Tony Delroy* to answer questions on wildlife conservation issues from across Australia and launched a major lecture series for Royal Caribbean Cruise Lines on native Australian fauna and flora.

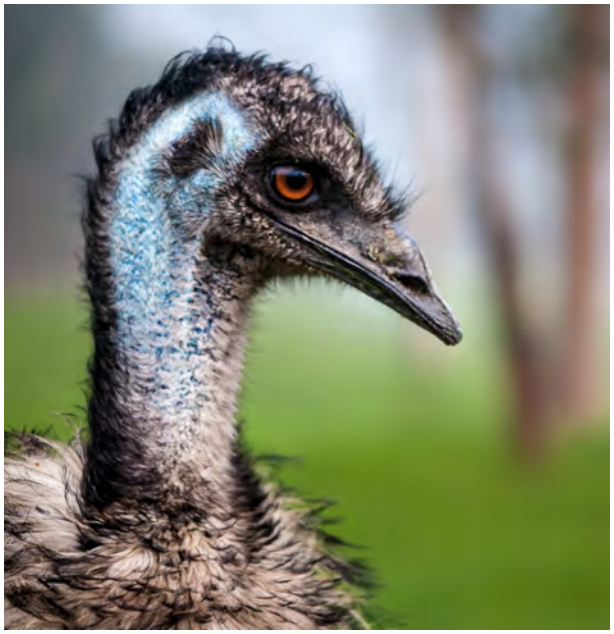
Honorary Life Membership Awarded

The Society was pleased to award Honorary Life Membership to Regional Adviser Linda Dennis for her long-standing commitment and dedication to wildlife conservation and the Society.

Donations, bequests and gifts

During the year we continued with our bequest program to encourage donors to support our wildlife conservation work across Australia through the website and through general publicity. We are very grateful to all our members for considering using the bequest program to help the Society with its long-term planning.

Please contact the National Office for more details on the Bequest Program and on how to join the Friends of the Society and make a regular monthly donation to support our national wildlife conservation programs.



Emu. Photo: Michael Ritchie

Scientia Circle Luncheon at UNSW. L to R: Professor Ian Jacobs (Vice Chancellor UNSW), Patrick Medway AM, and Dr David Gonski AC (Chancellor and Chair UNSW Foundation)

UNSW Invitation

The CEO, Patrick W Medway AM, accepted an invitation from the Chancellor and Chair of the UNSW Foundation to join the Scientia Circle to represent the Society.

Fundraising

A major fundraising initiative was launched during 2016 to introduce a new university scholarship at the University of New South Wales. The Australian Wildlife Society Wildlife Ecology Research Scholarship will be launched during 2017 and will be open to postgraduate students from anywhere in Australia to undertake a research project at UNSW that is of direct relevance to the conservation of Australian native wildlife (flora or fauna). The scholarship totals $5,000 and will be awarded to one candidate, who will receive one payment of $2,500 each semester. The scholarship is provided to support operational costs associated with the successful candidate's research project, such as travel associated with the research project; fieldwork expenses; specialist software and purchase of small items of equipment.

Financial Report summary

The Society's directors and the Finance and Investment Committee continue to exercise tight and effective control over our finances, reviewing and adjusting the investment portfolio as required during the year. The investment funds of the Society have continued to grow.

Moving Forward

The Board of Directors approved two initiatives in 2016. Firstly, the Wildlife Rehabilitation Award to recognise outstanding wildlife carers who devote so much time and energy to the rehabilitation of sick and injured native wildlife. A new photographic competition is to be established to encourage a greater interest in the preservation of our rare and threatened native species. A prize of $1,000 will be awarded to the winning digital photograph, with a second prize of $500 from a public choice photograph. Details will be publicised via email, newsletter, magazine and website. Entries are invited from all interested members and non-members.

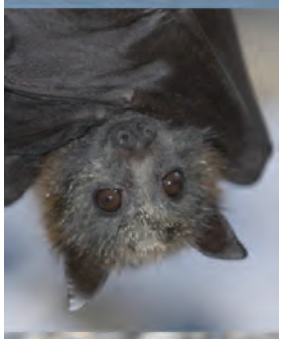
A special thank you to all our members

May I wish every member of the Society a happy, healthy and prosperous 2017 and thank you all most sincerely for your tremendous support and continued dedication and commitment in helping the Society to preserve and protect our native wildlife for future generations of young Australians.

Suzanne Medway AM | PRESIDENT | 31 December 2016

Be a part of the Australian Wildlife Society's conservation future






To commit to being a part of our future, please complete this form. You may cancel your donation subscription at any time by notifying the national office.

Australian Wildlife Society
PO Box 7336
MT ANNAN NSW 2567

Email: accounts@aws.org.au

You may also commit by visiting www.wpsa.org.au and registering online

All donations of $2 or more are tax deductible.

Australian Wildlife Society
Conserving Australia's Wildlife since 1909

Your Details

Name: Dr / Mr / Ms / Mrs / Miss

Address:

State: Postcode:

Phone: Home Work

Email:

☐ I want to join the Friends of WPSA and give by automatic deduction each month to help protect our unique native wildlife and its important habitat

I will give via: Credit Card (please complete authority form below)

Credit Card Payments

I am paying by: ☐ Visa ☐ MasterCard Card Security Code (CSC) __ __ __ __

Card No. __/__/__/__/ __/__/__/__/ __/__/__/__/ __/__/__/__/ Expiry date ___ /___

Name on card Signature

Regular Payment can be made by EFT

BSB: 062 000
Account No: 1043 2583
Account Name: Wildlife Preservation Society of Australia

I will give:

☐ $10 per month ☐ $15 per month ☐ $25 per month ☐ $50 per month

☐ My choice of $ per month _____

Signature Date

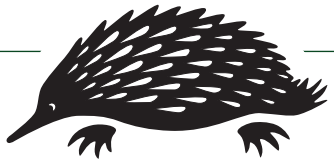
This authorisation is to remain in force until cancelled by the donor and in accordance with the terms described in the Agreement below.

Deduction will be made on 15th of each month.

CREDIT CARD AUTHORITY

1. The Donor will be advised 14 days in advance of any changes to the Credit Card Authority arrangements. 2. For all arrangements relating to the Credit Card Authority arrangements, the Donor will need to call AWS on (02) 9556 1537 or write to PO Box 42, Brighton Le Sands NSW 2216 or email info@wpsa.org.au. 3. Account details should be checked against a recent statement from your Financial Institution. 4. It is the donor's responsibility to ensure sufficient funds are available when the payments are due to be drawn. 5. If the due date for payment falls on a non-working day or public holiday, the payment will be processed on the next working day. 6. For returned unpaid transactions, the following procedure will apply: AWS will advise the Donor of the unpaid transaction and request alternative arrangements to be made for payment if possible. 7. All Donor records and account details will be kept private and confidential to be disclosed only at the request of the donor or Financial Institution in connection with a claim made to an alleged incorrect or wrongful debit. 8. This authorisation is to remain in force until cancelled by the Donor.

Membership Form



WILDLIFE PRESERVATION SOCIETY OF AUSTRALIA LIMITED

PO Box 42 Brighton Le Sands NSW 2216

Membership

Become a member of the Wildlife Preservation Society Limited
Simply fill out this form.

Name:.....

Address:.....

City/Suburb:..... Postcode: .....

Telephone:..... Fax: .....

Email: .....

Membership category (please tick)

- ☐ Individual: $55
- ☐ Family: $70
- ☐ Concession (pensioner/student/child): $50
- ☐ E-mag (emailed as PDF, no hardcopy will be sent): $30
- ☐ Associate (library, school, conservation groups): $85
- ☐ Corporate: $125
- ☐ Life: $2,000

(Includes postage within Australia. Add $40 for overseas postage)

Three year membership (please tick)

- ☐ Individual: $150
- ☐ Family: $190
- ☐ Concession (pensioner/student/child): $135
- ☐ E-mag (emailed as PDF, no hardcopy will be sent): $81
- ☐ Associate (library, school, conservation groups): $230
- ☐ Corporate: $340

(Includes postage within Australia. Add $60 for overseas postage)

Payment details (please tick)

☐ Direct Debit ☐ Cheque ☐ Money Order ☐ Mastercard ☐ Visa

Card Security Code (CSC) __ __ __ __

Card Number:

Name on Card: .....Expiry:.....

Signature:.....

Amount $.....

Donation $.....

Total $.....

Mail to the: **Wildlife Preservation Society Limited**
PO Box 7336, MT ANNAN NSW 2567.
Email: accounts@aws.org.au Website: www.wpsa.org.au

Direct debit: **BSB:** 062 000
Account No: 1043 2583
Account Name: Wildlife Preservation Society of Australia

Note: All cheques to be made out to the Wildlife Preservation Society of Australia

Consider - A Bequest

Another way which you can support the work of the Wildlife Preservation Society of Australia (Australian Wildlife Society) is to remember us in your will.

If you would like to make a bequest, add the following codicil to your Will:

> I bequeath the sum of $..... to the Wildlife Preservation Society of Australia for its general purposes and declare that the receipt of the Treasurer for the time being of the Society shall be complete discharge to my Executors in respect of any sum paid to the Wildlife Preservation Society of Australia Limited.

"The challenge to the present adult generation is to reduce the increasing pressures on the Earth and its resources - and to provide youth with an education that will prepare them emotionally and intellectually for the task ahead.