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)

Brad Leue Photography

The view from The Remarkable Rocks on a winter's day, Kangaroo Island

Yellow-tailed black cockatoo – Wandilo Native Forest Reserve: The cockatoo is one of my favorite families of Australian birds. Whilst sometimes tricky to photograph, a flock of cockatoos creates somewhat of a 'party vibe' throughout the treetops. Their calls and chatter between one another are something quite extraordinary to witness. Unfortunately, due to deforestation and removal of natural habitats, some species of Australian cockatoo are now critically endangered.

Contents

features

regulars

Front cover:

Three male kangaroos play fight at sunset. Deep Creek Conservation Park, South Australia. Photo: Brad A Leue

Back cover:

This type of kangaroo is only found on Kangaroo Island. It is a subspecies of the western grey but has developed a darker, fluffier and thicker coat due to the surrounding ocean weather. Photo: Brad A Leue

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 2014

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

Dr David Murray - President

In my first communication from the President's desk, I propose to take a trip down memory lane to illustrate an extremely important environmental principle, and that is, one should never give up. Time and again, I have said this to colleagues on the point of surrender. Time and again, the day has been rescued.

I want to focus on the year 1992, in my aquatic phase. Back in 1990, Professor Tony Larkum at Sydney University invited me to come and investigate the seed proteins of an important seagrass, *Zostera capricorni*. In addition to that, I prepared a response to the Environmental Impact Statement put up by the proponents of the third runway at Sydney Airport.

Compared to the seeds of legumes that I had characterised for the previous 15 years, I found that the seeds of *Zostera capricorni* had extremely low protein content – about three percent by weight. At first I thought this was simply an economic adjustment to the environment in which *Zostera* seeds germinate, i.e. one rich in nitrogen. On second thoughts, learning that the internal concentration of carbon dioxide in seagrasses was about 1,000 parts per million (ppm), I decided that the capacity to assimilate nitrogen had been suppressed by the elevated carbon dioxide concentration. So I published these observations on *Zostera capricorni*, and then predicted that this seagrass was a model for what would happen to terrestrial cereals under elevated atmospheric carbon dioxide. Not only will seed protein content be reduced, but high-quality proteins will be the first to be sacrificed. That was not good news, and it has yet to be taken seriously by politicians and decision makers.

This work led to an invited review in the prestigious *American Journal of Botany* (1995), in which I gave the advice to leave coal in the ground, and ultimately a book, *Carbon Dioxide and Plant Responses* (1997).

Also in 1992, I was the first Australian research scientist to publish criticisms of the Japanese 'scientific' whaling programme. Essentially what they were doing was endlessly showing that Minke whales ate krill by examining the stomach contents of killed whales. This was both cruel and unnecessary. I published my critique of a paper published in *Polar Biology* in *Angry Dolphins*, March/April 1992. I published other letters too, e.g. in the ORRCA newsletter, and I presented a paper at a scientific conference at the University of Sydney. I corresponded with the Federal Minister for the Environment, Mrs Ros Kelly, and the Opposition Spokesman, Senator Fred Chaney. You will have heard recently that an international court has upheld my criticism – 22 years later.

I started the ball rolling. I then spent two years in the wilderness between appointments, and emerged in a different field, horticulture at Hawkesbury, in 1995. My bottles of Grange have something to do with that. Unlike some people I have no difficulty in remembering my six bottles of 1971 Grange, and what became of them. In my misspent youth, when I lived in Melbourne, my younger brother Neil at La Trobe University and I formed a wine-tasting group that included the proprietor of Box Hill Cellars. He gave us privileged access to the 1971 Grange, and I purchased half a dozen. They were looked after very carefully, and none was touched until after my move to Wollongong in 1979.

Sometime in the early 1980s, when it was at least 10 years old, we consumed one. It was excellent, of course, as Grange is, and the empty bottle is still on display in our kitchen. But I very soon realised that we could not afford to drink the rest. So I put the remaining five bottles in for auction in 1992. They would have been an ideal gift for someone turning 21, and they sold for $250 each. Even with commission to the auctioneer, this was a handsome reward for patience, and the proceeds helped me to attend a conference in Hawaii. I was one of the reps of the Australian Systematic Botany Society, but their contribution was confined to $500. That trip yielded two illustrated articles on botanic gardens in Hawaii for *The Australian Garden Journal*, and so contributed to my appointment at Hawkesbury in 1995.

Australian sea-lion pups playing. Photo by Brad A Leue. More of Brad's photography can be seen on page 23, as well as all of the cover pages.

105th Annual General Meeting

The 105th Annual General Meeting of the Wildlife Preservation Society of Australia Limited was held on Wednesday 2 April in Sydney.

Suzanne Medway, President, of the Wildlife Preservation Society of Australia, tabled the President's Report for 2013 and highlighted the past year.

The Treasurer's Report for 2013 was tabled and adopted by the meeting.

Election of Directors

Patrick Medway, Dick Mason and Clive Williams were re-elected as directors.

The current Auditor, Peter James Varley, CA Registered Company Auditor, was confirmed as the Society's auditor for 2014.

Annual President's Luncheon

The President's Luncheon of the Wildlife Preservation Society of Australia was held after the Annual General Meeting in the historic Cello Restaurant at the Castlereagh Inn in Sydney.

President, Suzanne Medway, welcomed life members, members and guests committed to wildlife conservation across Australia.

Suzanne Medway congratulating Dr David Murray, the next President of the Wildlife Preservation Society of Australia

Dr David Murray, Noel Cislowski and Chris Chan

Hetty Cislowski, Colleen Keys, Suzanne Medway and Margaret McGurgan (seated)

Back row L to R: Peter Hardiman, Chris Chan, Ken Mason, Dr Richard Mason, Dr Clive Williams, Sash Denkovski, Noel Cislowski, Stephen Grabowski and Dr David Murray. **Front row L to R:** Deidre Bowes, Suzanne Medway, Margaret McGurgan, Pam Fields and Sandra Reynolds

Meet your new President

Dr David Murray

David is a graduate of the University of Sydney in plant science and microbiology, with B.Sc. (Hons) in 1964, and Ph.D. in 1969. His last academic appointment was at the University of Western Sydney (1995–1998), where he taught botany to horticulture students. He is the author or editor of ten books, the last being *Successful Organic Gardening* (Simon and Schuster, 2nd edition 2006). In that same year the Royal Horticultural Society London awarded him a bursary to study organic gardening techniques in the U.K.

David has a longstanding interest in conservation of the environment, preservation of wildlife, and the cultivation of plants. He was accepted as a life member of the Australian Conservation Foundation in 1980, and later represented them on the first Consumers' Health Forum of Australia (1986–1992), a federal body established to advise the Minister for Health.

David supported the Australian Plants Society by joining in the mid-1970s and becoming a Director of the Australian Flora Foundation in 1986. He has represented the APS on this council since 2007. He has also represented the NSW branch of APS as their representative to the Australian Cultivar Registration Authority since 2000. This body has an annual meeting at the Botanic Gardens in Canberra.

In 1992 David was elected to the Council of the Linnean Society of NSW, and was one of their delegates to the Nature Conservation Council (NCC) Annual Conference. He spoke to modify a motion on greenhouse gases, saying "We may as well get this right". These words have been quoted back to him from time to time. The upshot was that he was drafted to the NCC executive by Anne Reeves and Penny Figgis. David was then elected annually, serving 13 years altogether until 2005. In that time he was NCC Representative to the Noxious Weeds Advisory Committee (1993–2003); to the first Biodiversity Advisory Council (1996–1999); and to the Hazardous Chemicals Advisory Committee.

David also helped to draft the NCC Policy on Sustainable Agriculture, presenting it for adoption at the 1999 annual conference. Ultimately, David was President of the Linnean Society (2006, 2007) and has been Vice-President since.

David and his wife Gayle have belonged to the WPSA since 1988. David met Vincent Serventy at the NCC annual conferences, and Vincent asked him to become Scientific Adviser on plants in 1996. David was appointed a Director in 2005, Vice President in 2008, and President in 2014.

Soon after David joined the Council of WPSA he attended a conference organised by the Australian Association for Environmental Education. He joined this association at the conference and for several years now has served on their Awards Subcommittee. He performs a similar role for the Alumni Council of the University of Sydney, having joined that body in 1992 as a representative for the Faculty of Science. He has served on the executive twice, and belongs to the Graduate Awards and Medal Selection subcommittees.

Other conferences David has attended on behalf of WPSA include the Australian Network for Plant Conservation (see *Australian Wildlife* issues 3 and 4, 2008), the NSW Pest Animal Control Conference 2008, and the International Botanical Congress in Melbourne in 2011 (*Australian Wildlife* issue 1, 2012). He also attended the Melbourne reception during our centenary celebration in 2009.

David has often taken part in WPSA tree-planting days at Rockdale, stemming from an earlier interest in bush regeneration. In 1993 he obtained a National Trust qualification in bush regeneration with an A grade pass. He was then active in the Mangerton Reserve and other locations in Wollongong from 1993 to 1997.

Other societies that David belongs to include the Iris Society of Australia NSW Region (President 2005–2009 and Vice-President since), and the Friends of Wollongong Botanic Garden (President 2006–2013; Vice-President 2013 onwards; Leader of the Propagation Team 2006 to present). His other interests include plant breeding and the preservation of heirloom vegetables, and the effects of elevated atmospheric carbon dioxide on the quality of insect, bird, animal and human food in the future. He pursues these interests mainly through the Seed Savers' Network, which he has belonged to since 1988. He is a custodian of cultivar collections of peas and beans, and a keynote speaker at biennial conferences since 2008.

David's current mission is to revitalise the Society's wildlife conservation and research work, and to attract more young men and women to the Society to ensure the survival of native wildlife in an uncertain future.

Meet the Directors

Stephen Grabowski has been a member of WPSA since 2005. He was recently elected to the Board of Directors at the May 2014 meeting and was warmly greeted by his fellow directors as a valuable member and contributor to the board.

Stephen Grabowski

I have a strong belief in helping those who can't help themselves. Recently I was at Corrimal Beach with my children, where they found a native duck lying which had problems getting up and they started feeding it. My son came to me and asked me to have a look as the duck looked sick. When I investigated I found the duck had its feet tangled in fishing line. Taking a closer look I found the fishing line had two gang hooks attached. The fishing line was rigged up for catching mullet and not for catching duck, but I am guessing the duck had taken the bread from the hook (which was bait used for mullet fishing). Unfortunately I was unable to remove the hooks as they were severely imbedded into the duck under its wing and behind its leg, so we rang the RSPCA to find out the closest vet, and off we went.

I have always had a passion for outdoor life, but my career had taken me into the financial services industry. In 1992 I started working in the banks just as a fill-in job. As time went by (17 years) I worked in the State Bank, Colonial Bank and finished up with the Commonwealth Bank as a senior financial planner for the south-western Sydney region. Since then I have moved into the private sector and have worked with some very high profile boutique financial planning firms.

I am currently self-employed as a Director of Grabowski & Associates Pty Ltd, trading as Grabowski Financial Planning.

Married to Heather with three children Olivia, William and Monique, we live in Narellan Vale, which is in south-western Sydney.

My community involvement includes:

Immediate Past President – Narellan Chamber of Commerce (2013– current)
Assisting the President and the executive team.

President – Narellan Chamber of Commerce (2011–2013)
Steering a dedicated team in working with our members to achieve a high-quality Chamber that reflects the views of our members, this in turn benefits the whole community.

Vice-President, South West Sydney Regional Advisory Committee – NSW Business Chamber (2013–current)
Bringing Chamber member issues of their region to the attention of the NSW Business Chamber, to assist with their policy and advocacy.

Treasurer of Narellan Jets Master Footy Club (2013–current)
Honorary position which assists our footy club in achieving a renowned and great club for our members and the community.

Board member for the Local Traffic Committee (2011–2013)
We meet once monthly and provide assistance with direction and decision on local road and traffic infrastructure.

Attending local Safety Committee meetings (2011–2013)
We meet four times a year, listening to resident and business safety concerns in the region and work with local authorities to help manage these safety concerns.

Director for Christmas in Narellan (CIN) (2011–2013)
Overseeing the operations and decision on setting up and running a Christmas event in Narellan.

Combined Chamber yearly event – Business Event of the Year: setting up and overseeing (2010–current)

Supporting various fundraising events for local charity organisations;

helping out in the local school fetes (St Clare's Narellan Primary School);

Manager/coach for local footy team at Narellan Jets and also for the sporting activities at St Clare's Narellan Primary School.

Representative on Western Sydney Airport Alliance forum.

I am currently a Justice of Peace JP (No. 163327); hold an Advanced Diploma of Financial Services, a Graduate Certificate in Applied Finance and Marketing and Advertising Diplomas; and am currently studying for my Masters in Applied Finance – Financial Planning.

I believe every day is a good day. When I am not at work I enjoy spending time in the garden, going to the beach with my family to surf, playing football with the locals, fishing, taking the children for bush walks or enjoying the company of my friends around a BBQ.

There are only two things in life that are guaranteed – what you do with the rest of it is up to you. Live and live well.

BUMBLEBEES
an adorable plague

Emma Hodgson

European bumblebees, not native to Australia, are proliferating on the Australian island of Tasmania. Environmental authorities are concerned, but many people do not seem aware of the problem. After all, bumblebees are adorable. They're a staple of European and American culture; they feature prominently in the tales of those places – always in a benevolent or beneficial role. People who have travelled to other continents may well have enjoyed the sight of them bumbling (never was a word so appropriate) around flower-laden fields, drinking nectar and drenching themselves in pollen. They are deeply endearing in their native habitats. Fat, fluffy yellow-and-black insects, they potter around on flowers with a lulling 'bizz-wizz' sound and make that sweetest and most delicious of substances – honey. What's not to like? Well, insofar as the Australian ecosystem is concerned, quite a lot.

Exotic invaders

Bumblebees are not native to Australia. As anyone familiar with the devastation wrought by the 'much maligned' cane toad and other introduced species will be aware, creatures from a different ecosystem have the potential to wreak havoc upon the land. The need to control such species which are, as Pestat point out, affecting "Australia's economy, environment, and family life" is already significant. Furthermore, bumblebees interact with the food chain right at its primary level – they pollinate the plants which fuel the entire ecosystem. But how, many ask, could such an innocuous pollinator possibly do harm to the ecology of Australia? Surely more pollinators could only aid Australia's plant-life, and are unlikely to have any wide-ranging impact upon the wider ecosystem? These are understandable queries, but make the crucial mistake (one made by Europeans for centuries, which a recent decline in bee numbers is only just beginning to rectify) of underestimating the supposedly 'humble' bee.

The pollination problem

Let us take pollination for a start. Bumblebees are native to Europe and North America. This means that they have evolved to pollinate European and North American plants – or, as we call them here, 'invasive weeds'. Non-native plants from Europe were brought over in droves by early colonists in a move which would prove disastrous for the virgin ecosystem of Australia. These plants, with no Australian competitors, spread rapidly across the continent. They smothered native flora and are still proliferating to uncontrollable, epidemic proportions. Bumblebees have evolved for thousands of years specifically to pollinate and thus aid the spread of such plants. Foxgloves and bumblebees are much loved staples of English gardens and have evolved in harmony with each other for centuries – the flower of the foxglove even has a throat patterned with dark spots like a bumblebee-sized footprint trail leading the insect to the sweet nectar within.

British authorities enthusiastically promote the foxglove as a plant likely to aid the case of the bumblebee (and vice versa). "Bumblebees love a foxglove", the BBC tells English gardeners when advocating the plant's positives. As anyone with an interest in environmental science knows, however, foxgloves in England have checks and balances which evolved with them over the centuries. "Foxgloves are great seeders", seed-merchants Thompson Morgan state, enthusiastically, well aware that foxgloves in Britain will never become a nuisance. In Australia, however, no native checks and balances exist. These 'great seeders' are using their 'great seeding' ability to run rampant across Australia in a manner which threatens native plant species and all wildlife which relies upon them.

A competitive buzz

Then there is the issue of competition. Just as European plants like the foxglove have evolved to work in conjunction with the bumblebee, so Australian plants have evolved to work with Australian bee species. However, the European bumblebee is an adaptable beast, with what the Department of the Environment calls "a high level of ecological versatility". It is a robust, adaptable bee well capable of competing with native bee species and outdoing them with ease in the pollinating stakes. European bumblebees, unlike native bees, store food in their nests which allows them to survive periods of hardship. They can also fly at lower temperatures than their Australian cousins, travel much further from their nests, and are social – meaning that they can share information pertaining to food sources with their hive mates (unlike Australian bees, which are solitary). In short, the European bumblebee is hardier, better, faster and stronger than Australian bees – and it has exotic tastes. European bumblebees are more than willing to sample the nectar and carry the pollen of Australian flowers as well as more familiar blooms, which puts them in direct competition with native species for food. This could cause the mass extinction of native bees – a very distressing prospect. Studies in Tasmania have found that the bumblebees are having a serious impact upon other pollinators – including nectar-drinking birds and mammals. "This species is impacting upon plant–pollinator relationships which have previously been free from the effects of exotic bees", one study

stated, before going on to warn that these effects were liable to become much more severe. Furthermore, bumblebees present a distinct pollination threat to those plants which bumblebees cannot or will not pollinate themselves. Were competition for food to cause the decline of native pollinators, such plants would struggle to survive. Given that many antipodean animals and birds are highly specialised in their eating habits, this could very well have enormous impacts across the ecological spectrum.

A problem of our own devising

Depressingly, bumblebees did not arrive in Tasmania until at least 1992 – long after Australian authorities were aware of the threat presented by non-native species and had put in regulations to curtail their importation. Dr Andrew Hingston is of the opinion that the presence of bumblebees in Tasmania is the result of a deliberate, illicit introduction which got out of hand. He speaks of two feral bees found at roughly the same time, with no indication at all of how they managed to travel the thousands of oceanic miles between Tasmania and their native habitats. "It does suggest that they were deliberately brought in", he says. This would not be the first example of wilful ecological vandalism. Anyone with a will to learn about – as Valore Books put it – "the impact that humans are having on the environment" can open a textbook and find numerous such examples. Tellingly, the discovery of bumblebees in Tasmania roughly coincides with the discovery that commercial tomato growers the world over could greatly benefit from European bees pollinating their plants. Tomato plants pollinated by European bees are generally of better quality and require a lot less labour than those pollinated (as Australian commercial tomato operations are) by hand. This put Australian tomato growers at a distinct disadvantage in the global market, when European and American tomato operations were using bees as pollinators with complete impunity. This is pure speculation – but the presence of European bumblebees in Tasmania shortly after this discovery may not be coincidence.

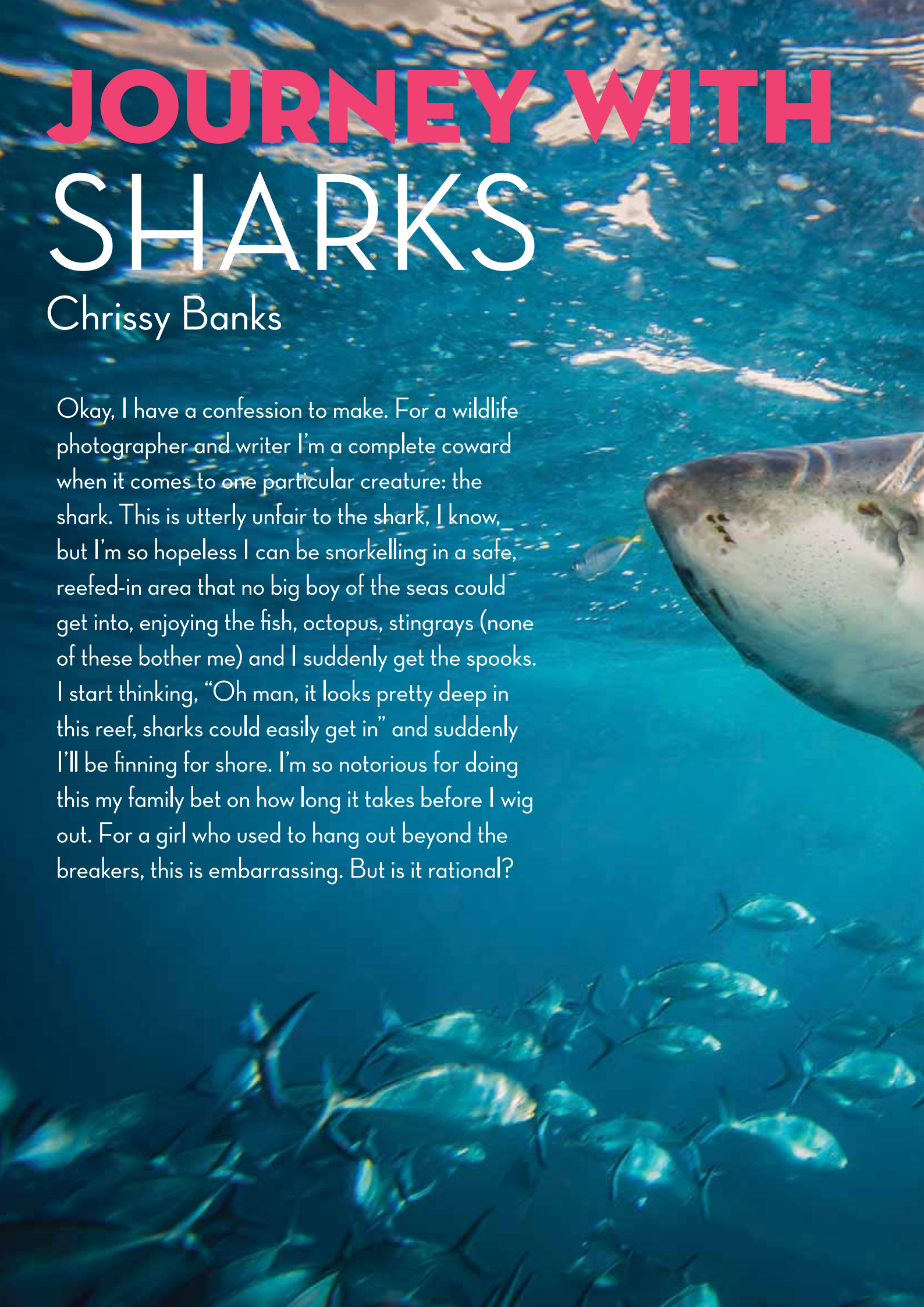
Early days

Looking to point the finger of blame, however, is not particularly productive. The problem is here, and it needs a solution. Thus far the bees are confined to the island of Tasmania – but Tasmania is really not very far from mainland Australia, and it would only take a single queen carried on the clothing of a Tasmanian day-tripper to spread the bees across the continent. Vigilance is needed, and action must be taken if one of these big, cute insects manages to bumble its way over the short stretch of sea to Australia.

Editor's note: Pestat was established by the Pest Animal Control Cooperative Research Centre (PAC CRC) in 1999 and is now a member of the Invasive Animals Cooperative Research Centre. Pestat provides management services for Australian bioscience, and delivers effective and humane technologies that help address Australia's pest animal problems.

JOURNEY WITH SHARKS

Chrissy Banks



Okay, I have a confession to make. For a wildlife photographer and writer I'm a complete coward when it comes to one particular creature: the shark. This is utterly unfair to the shark, I know, but I'm so hopeless I can be snorkelling in a safe, reefed-in area that no big boy of the seas could get into, enjoying the fish, octopus, stingrays (none of these bother me) and I suddenly get the spooks. I start thinking, "Oh man, it looks pretty deep in this reef, sharks could easily get in" and suddenly I'll be finning for shore. I'm so notorious for doing this my family bet on how long it takes before I wig out. For a girl who used to hang out beyond the breakers, this is embarrassing. But is it rational?

Great white shark - Neptune Islands, South Australia.
Photograph by Brad A Leue (www.bradleuephotograph.com.au)

Port Jackson shark (*Heterodontus portusjacksoni*) North Head, Sydney Harbour. Photo by John Turnbull (www.marineexplorer.org).

I'm not sure I can answer that yet, but I've never had a frightening encounter with a shark, lost a loved one (my heart and sympathies go out to those who have), or seen any of the endless horror movies about sharks Hollywood obsessively pumps out – I don't want to see these. I can freak myself out, thanks very much. Shark-a-phobia is a real problem for me. Academically, I understand that most attacks on humans are a case of mistaken identity; that sharks are growing increasingly desperate for food because we've overfished the seas, but knowing this doesn't help me escape the heebie-jeebies when I'm in the water. And I'd bet my bottom dollar I'm not alone in this. Half of you get a little nervous swimming in the deep blue too, right?

Trouble is, fear can be a bad thing – caution and commonsense are essential – but fear distorts truth about things and robs us of enriching experiences. So I've put myself on a 'de-fearing' journey and am taking you with me in hopes that in learning more about these creatures first hand we'll all be a little less twitchy. And I'm starting with...

...the gummy shark. Oh okay, laugh if you want, but at this point if you popped me in a cage off the back of a boat to view a great white you'd hear me snorkel-scream from your lounge room. Better to start small and build up, I say. And I was joking, I won't start with the gummy shark, I'll be braver. May I present to you a duo: the Port Jackson and bamboo sharks - and yes, they have teeth.

Port Jackson shark (*Heterodontus portusjacksoni*) North Head, Sydney Harbour. Photo by John Turnbull .(www.marineexplorer.org).

But first a couple of interesting sharky facts: Sharks are part of a group of fish known as cartilaginous – meaning their skeletal structure is made up of cartilage not bone, they have specialised teeth that replace over a life time and tiny tooth-like scales covering their skin. While most sharks are strictly marine creatures, a few species can tolerate freshwater. There are around 400 species of shark known worldwide (a growing figure), 170 of which cruise Australian waters, 80 of which are accepted as endemic. Earth's sharks range in size from the tiny 21.2-centimetre dwarf lantern shark to the whale shark that grows as large as 18 metres.

Port Jacksons and the brown-banded bamboo are two fascinating little sharks found off our coastlines. I recently encountered both of these on two separate occasions. Sitting poolside at Stingray Bay at the Aquarium of Western Australia (AQWA), it was a rare occasion that no one else was around. Quietly watching stingray and Port Jackson sharks glide by we were joined by a staff member, and he had a bucket. The moment he sat with us, what had been a pool of languid sea creatures, became a hive of activity. Suddenly, we were hemmed in by eager rays and sharks keen for a share of what was in the pail. Among them was a silky-grey shark that literally glittered in the sun. "This beautiful old girl is a Port Jackson", I was told as she gently hoovered a chunk of fish from the feeder's hand. I'd never seen one this colour before. While my son coaxed a turn at feeding a shark I watched the old girl swim away. She was exquisite.

Port Jacksons (*Heterodontus portusjacksoni* – from the genus of bullhead sharks, of which there are nine species, in the order Heterodontiformes) can be a regular sight for snorkelers and divers around the southern Australian coastline from the central coast of Western Australia around South Australia and up to southern Queensland. They are also found in Tasmanian waters. While there has been one reported sighting in New Zealand, and some talk that they originated from South Africa, it is largely recognised that this is a species endemic to Australia. Named after Port Jackson in Sydney Harbour, this is arguably our most recognisable mini-shark.

Typically beige in colour, they sport dark-brown strap marks that come over the eyes and stretch along the body to the pelvic fin on either side looking

The whale shark (*Rhincodon typus*) is a slow-moving filter feeding shark and the largest known extant fish species.

much like a dog harness. They have the blunt, broad head and heavy ridged brow of all bullhead sharks, with a body that tapers gradually to a slender tail with an elongated caudal fin. They have pectoral and anal fins and two dorsal fins that sit evenly spaced along the back. A spine sits at the foremost point of both fins. While there is no hard evidence to prove these spines are venomous, they are listed as traumatogenic (meaning: will induce wound or injury) and are under further research. In light of this, the spines are most likely used against predators. I recently watched footage of an angel shark swallowing and then coughing back up a small horn shark (also of the bullhead family) whose spines were fully exposed. While the angel shark swam off clearly distressed, the horn shark uncurled and calmly went back to foraging for dinner. Port Jacksons will react in exactly the same manner: try to eat me and I'll stab your soft palate. These are tough little sharks.

For humans though, Port Jacksons are very little threat unless mishandled. This is a shark that does have teeth, make no mistake, in fact its scientific family name Heterondontidae can be broken into two Greek words, *heteros* meaning different and *dont* meaning tooth. A Port Jackson's teeth are thin and sharp at the front (not serrated) and used for snagging soft prey such as small fish. While blunt, molar like teeth at the back make short work of crustaceans and molluscs. It should be noted that no one in living history has ever been mauled by one of these sharks. In 2011 there was a recorded incident of a man having been 'bitten' by a Port Jackson, however the skin was not broken, and the 'victim' swam to shore with the shark stubbornly attached to his leg. This is a very unusual situation and happened during breeding season. As with any wildlife, it is of utmost importance to give respect and distance during mating season. Quite possibly, this one felt threatened and acted accordingly. Or he was trying to mate. A male will bite down on a female's pectoral fin to secure himself, before twisting around and under her body when she's receptive. Whatever the case, this particular Port Jackson bit onto more than he could chew.

Juvenile Port Jackson shark, Camp Cove, Sydney Harbour. Port Jackson sharks have a very distinct ridged brow common to bullhead sharks. The harness markings of the Port Jackson shark make them easily identifiable. They can sit stationary for hours by using their first gill to pump water through the other four allowing them to breathe without motion. Photo by John Turnbull (www.marineexplorer.org).

Chrissy Banks

Port Jacksons have small sharp teeth at the front of the mouth ideal for snagging tiny fish and molar-like teeth at the back for crushing crustaceans and molluscs via powerful anvil-like jaws.

Breeding season is from later winter to mid-spring. This is the time Port Jacksons congregate in large numbers under ledges and in shallow caves, often quite close to shore. Males come into sexual maturity between eight to ten years old, while females take 11-14 years. An oviparous shark (egg layer), the female lays eggs on and off in pairs for up to two weeks. As many as 16 eggs can be laid by one mother during the breeding season. They are dark brown in colour, about 12 centimetres in length and are initially very soft. After egg-laying the female takes one egg at a time in her mouth and wedges it into crevices for safe-keeping. There the egg hardens. Despite this care, a staggering 89 percent of babies die before being born. Some are preyed upon, while others are washed out of their safe zone and eaten. The survivors, after 10-11 months' incubation, break free of the egg. Pups look like a mini-version of their parents and fend for themselves immediately. There is some suggestion they have a life span of up to 30 years.

Commonly, males grow to 75 centimetres while females reach 80-95 centimetres. Preferred habitat is rocky reefs where, during daylight hours, they can rest in little caves or under outcroppings safe from the surge of the tide. A very special ability allows them to stay sedentary like this for hours on end. Port Jacksons use their first gill to pump water through the other four, allowing them to breathe without motion. Come evening, they stir from their slumber to hunt along the ocean floor using an exceptional sense of smell to locate and dine on prey: small fish, crustaceans, molluscs, sea urchins and octopus. The mouth is small and positioned underneath the head enabling them to suck food, sand and water from the sea floor. Sand is blown out of their gills while food is retained for consumption. Unwanted morsels are coughed back out of the stomach, while wanted food passes to a very short intestine that looks a little like a spiral valve, which churns the food around and around until fully digested. From this, any waste is passed out.

Bamboo sharks use their pectoral fins to pull themselves over reef and move backward. Note: They cannot swim backward. Parasites can be a problem around the gills for the bamboo shark, such as larvae of an isopod, Gnathia sp., and the copepod Eudactylina spera. A tapeworm in the intestine can also be a problem. Photo by Chrissy Banks.

While they generally don't live deeper than 100 metres, some have been recorded at a depth of 275 metres. Let's put that into perspective. That's equivalent to five and a half olympic swimming pools stacked end on end; a depth that would give any human a decent headache, decompression sickness, blackouts...

This is not an endangered species, ranking least concern on the Conservation Status and its predators are largely unknown. While crested bullhead sharks are known to prey on embryos, the most likely threat to adults are other sharks.

The brown-banded bamboo shark is of more concern. Listed as Near Threatened (NT), it is found in the shallow waters of the tropical Indo-Pacific Ocean. However, only on the

east coast of Australia are they officially protected in our marine parks – one good reason to keep them pristine.

Also known as the long-tail carpet shark, and often mislabelled as wobbegong (a legitimate subspecies), the brown-banded bamboo shark is of the family Hemiscylliidae, order Orectolobiformes. A fairly diminutive shark, it rarely reaches sizes exceeding 121 centimetres and gains sexual maturity not according to years, but inches. Males 'come of age' between 68-76 centimetres, and females at 63 centimetres. The bamboo shark is oviparous and females deposit eggs in pairs anywhere in the benthic zone (the sea floor from shoreline to the edge of the continental shelf). Eggs appear as small, oblong cases about 11×15 centimetres. The pup feeds exclusively off the yolk during incubation, a period recorded as four months in captivity, though uncertain in the wild. Pups are between 13 and 17 centimetres by the time they swim freely and are independent.

Young are born with stunning dark-brown bands that fade with maturity. Adults are beige (some with a hint of early banding) allowing them easy camouflage among rocks and in shallow caves during the day. Elongated and cylindrical in shape, this shark has a softly rounded nose (or long snout) that tapers to a tail that is more than its body length and has a long caudal fin that is subterminal, or notched. There are two dorsal fins set low down the back (not spined). The eyes and supraorbital ridges on bamboo sharks are quite indistinct, and set just behind each eye is a spiracle, a specialised gill that filters oxygen from the water directly to the eyes and brain of the fish allowing it to remain sedentary. This also allows it to breathe and eat simultaneously. A distinctive feature of the bamboo shark is the barbels (singular whiskers located either side of the mouth) that are highly sensitive and used to locate food on the ocean floor. The mouth is situated underneath the head in an ideal position to slurp up prey. Bamboo sharks have small, sharp teeth that are no harm to humans, but ideal for snagging food such as crabs, small fish, shrimps and worms.

Amazingly, this shark can survive stranded in shallow tidal pools, completely exposed to the air for an entire tidal cycle. In antithesis, with the ability to tolerate hypoxic conditions (low oxygen) they have been recorded as deep as 85 metres – not too shabby for a little shark.

During day hours Port Jacksons will often congregate in groups and remain virtually motionless until dusk, at which time they become active. The defensive spines of the Port Jackson can be clearly seen and are classed as traumatrogenic. Photo by Chrissy Banks.

Predators are generally larger fish and marine mammals but, as always, humans are the worst. Outside of Australian waters they are hunted for the cooking pot (generally just for their fins and tails), but here too they are pilfered off the reef for the aquarium trade. While legitimate aquarium businesses adhere to captive breeding licences, there are those who insist on pirating the reef rather than going through official channels to obtain one. And whether you believe it's okay to keep this species in a tank or leave it in the wild altogether, I appreciate places such as AQWA that provide visual education to the public while keeping the animal in a happy and safe habitat. In fact, it's due to one such place that I was able to interact with the brown-banded bamboo shark.

The Naturalist Marine Discovery Centre in Perth obtained two eggs via a reputable aquarium breeder so the pups could help educate the public about the species. They were two weeks old when I secured a time to visit. They truly were the sweetest things I've seen in ages, and I know it sounds all mooshy and girly, but they really were. No bigger than my hand, I could barely take my eyes off them. In that controlled situation I was allowed to touch them, and while one took off like a shot to hide amid rocks and kelp, the other showed unabashed curiosity. He nudged my hand and had my heart in an instant. If ever you were going to love a shark, this would be the one. I'd fin with him any day!

And so we've begun our relationship with sharks: brown-banded bamboo and Port Jackson sharks. Totally awesome. Next up for me will be a little reef-walking, followed by a snorkel among grey nurses, bronze whalers and reef sharks. I can't promise I'll be brave, but I'll let you all know how I go. Fingers crossed I don't let fly with that infamous snorkel scream. My kids, no doubt, will bet I do.

Note:
Thanks to AQWA and Naturalist Marine Discovery Centre for the opportunity to interact and photograph these sharks.

Silvery-grey female Port Jackson shark at AQWA. A Port Jackson shark can turn its stomach inside out to rid it of unwanted contents. Female Port Jacksons wedge their eggs into crevices to give their pups the best chance for survival. Photo by Chrissy Banks.

Finding balance

Tiffany Sharp

A country girl at heart, growing up on a farm and spending most of my time in bushland, I found I had a natural affinity with animals. After a unique experience in the wild bush of South Africa, tracking lions and experiencing the bounty of wildlife in their natural habitat, I decided to utilise the camera to capture the natural beauty and character of wildlife in Australia and overseas. I want to share how special our wildlife is to our environment and our home and how important it is to protect our animals and natural habitat.

I have lived in most major cities and rural areas of Australia. Currently I reside in Adelaide pursuing a long term goal of a Masters in Public Health, balancing this with family and travel. The beaches in Adelaide, sea and wildlife are some of the best I have seen in Australia. We indeed live in the lucky country!

I hope to bring a unique focus that is an 'up close and personal' visual artistry, coupled with capturing the 'humanity' of animals in nature. I want to see beauty in the patterns of flora and fauna, and identify character traits of the animals that are not so dissimilar to our own.

My key objective is to enhance a sense of connection with the wild to inspire a wider audience to protect and explore its beauty.

Editor's note:

Tiffany is a highly qualified clinical nutritionist and medical herbalist, providing evidence-based natural medicine. She is experienced in working alongside mental health and allied health professionals and in advocacy in the non-profit sector. The majority of her work centres around veterans and veterans' families. With advocacy work that highlights some of the worst of humanity, Tiffany found it important to find balance with time out in nature, exploring and documenting with a visual medium the beauty around her.

Above: Potoroos are one of the most unique Australian mammals. In Perth they are quite often the size of domestic cats and bigger. These smaller fellows deserve more acknowledgment in Australia as beautiful, shy natives. Many people confuse them with possums, mice or rats.

I stumbled across this happy duo and was delighted to watch mum and joey going about their day. The joey was most curious and its beautiful eyes followed me as I tried to sneak up closer on my knees and elbows.

Zebra finches having a meal; their hunger outweighed their fear of a human approaching.

I love the character and seeming personality in the faces of wildlife. These two playful yellow-tails were hyper-alert but still curious in a semi-relaxed manner in my presence.

Rarely do we take the time to really see the beauty of our wildlife up close and personal. From their feathers to tiniest detail in their skin, you can identify wondrous patterns that have purpose in function and protection of the species.

Most native animals are masters of disguise. Years of evolution have offered a unique camouflage making them almost one with the flora and nearly impossible to see. Upon approach, if you listen closely, you can hear different animals sending out alarm calls to alert members of their community that a predator may be approaching. Training yourself to listen to the wider world around you helps you identify the type of wildlife near you. I learned this technique whilst in Africa, where many calls and sounds of the animals around us would alert us to an apex predator being nearby.

The Australian brush-turkey, (*Alectura lathami*), also frequently called the scrub turkey or bush turkey, is a common, widespread species of mound-building bird from the family Megapodiidae found in eastern Australia from Far North Queensland to Illawarra in New South Wales.

The ultimate master of disguise, the tawny frog mouth is almost impossible to see up against its favourite tree's foliage. The sound it makes is unique and, if not familiar a little unnerving.

A busy mum really enjoying her bush tucker, the appropriate drool a sign of enjoyment and hunger. After all, she is eating for two. The mum wasn't sure about my presence and wouldn't let me get too near; luckily the large lens was able to get close enough for unique detail in this shot.

The very splendid fairy-wren

Steven Saphore

Luxurious? No. Sound of pen scrawling on paper. Marvellous? No, no, no. Sound of paper being scrunched into a ball and thrown. Splendid? Hmmm, maybe... Superb? Ahhh!

Splendid, superb, wagtails, warblers; the wearer of many labels... Ngarrindjeri people call them Waatij Pulyeri, or 'little one of the bush'.

A native songbird of Australia, today we meander the Minnippi Parklands of Brisbane and get up close and personal with a peculiar feathered flyer known to the rest of the world as a fairy-wren.

Not to be mistaken for true wrens found in Europe, fairy-wrens are small in stature, but big in pigment (well, the males at least – you'll see). Fortunately a common sight in the urban environment, you may have already spotted a few of these tiny birds around your own gardens, parks and walking tracks.

Exhibiting such a high degree of sexual dimorphism, the nondescript appearance of a female superb fairy-wren will often trick even professional ornithologists into seeing a different species altogether. Frequently mistaken for honeyeaters, mynas and other drably plumaged avian species, we won't be so easily deceived... Perched on a reed stalk as the Brisbane sun sets in the distance, this young mother scans for her mate. Where could he be?

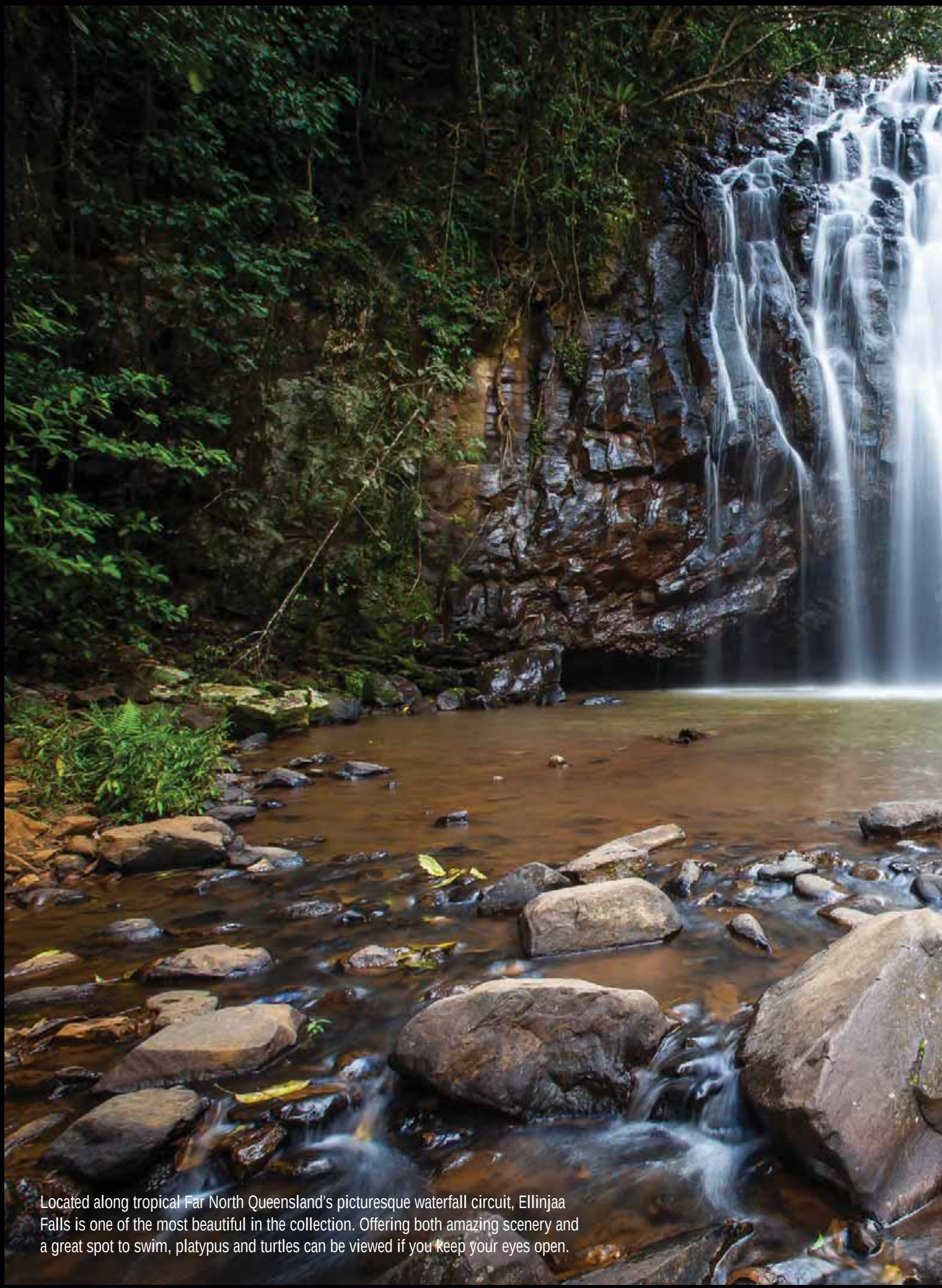
Here he is! Also known as a blue wren, the electric blue feathering and bubbling trills will leave no room for mistaken identity here. Although superb fairy-wrens pair for life, they are considered 'the most unfaithful bird in the world'. Perched upon a reed close to his mate, this male is on the hunt for insects to feed their newly hatched offspring – or maybe another bird to become 'acquainted' with. One benefit to come of this polyamorous lifestyle is that the paramours will often help with raising the brood of promiscuous pairs.

The red-backed fairy-wren is a more elusive bird than its colourful counterparts. For months, a flash of crimson was all I knew of this species. Getting closer meant I would have to trudge through knee-deep layers of reeds and dead vegetation in heathland along Bulimba Creek with no more than gumboots and a camera to protect me. This was a decisively harrowing experience to say the least, especially in a place like Brisbane around September: snakes come out of hibernation after the winter months, a large number of which happen to be brown snakes, the second most venomous land snake in the world – and they love this type of terrain. As such, every step I took would trigger a flurry of rustling in the listlessness around me... Nerve-racking indeed.

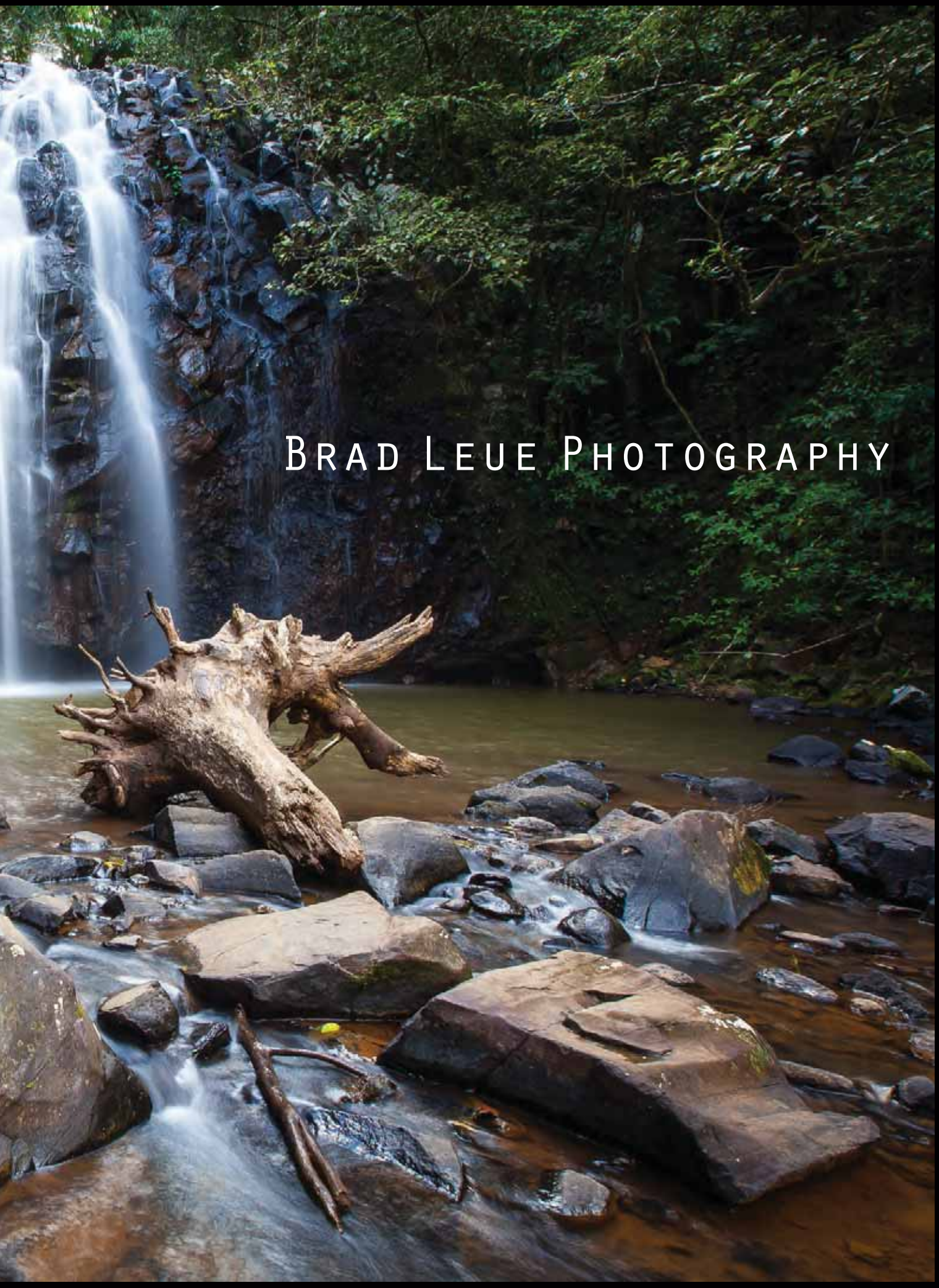
With a tendency to remain stationary for no more than approximately two seconds, getting a picture of this bird was like trying to photograph a eucalyptus petal blowing in the wind. Scanning the layers of whichever bushy alcove I found myself, my eyes gradually became attuned to any subtle contrast of colour amidst the green vegetation.

In all my stalking, only once was I quick enough to obtain a decent capture of *Malurus melanocephalus* and it happened to entail one of the most intriguing displays of courtship in the animal kingdom. This red-backed fairy-wren would pluck petals, seeds and various titbits of flora matching the vivid red hue of its trim and present them to females. If she liked what she saw, they could likely be mates for life. Although unsuccessful in wooing a sheila under my gaze, there is a very high chance his artistic mating ritual has resulted in a brood of baby fairy-wrens taking to the skies at this very moment.

A profound display of creative flattery or merely a primal reproductive instinct? Either way, it's yet another smattering of paint on the vividly coloured palette of Australia's backyard birds.



Located along tropical Far North Queensland's picturesque waterfall circuit, Ellinjaa Falls is one of the most beautiful in the collection. Offering both amazing scenery and a great spot to swim, platypus and turtles can be viewed if you keep your eyes open.


Brad Leue Photography

Lightning on Seaford Beach, South Australia

Wedge-tailed eagle – Arkaroola, South Australian outback

Brad A Leue:

As a wildlife and nature photographer, I am constantly trying to experience and capture as much of the natural land and its inhabitants as possible. I feel alive when I can get away from the craziness of society and submerge myself in a more natural, and ancient surrounding. As subjects, wildlife and the outdoors provides an endless challenge. Nature produces its own mood, and I am endlessly trying to capture that in my photography. We are very lucky to have such a large range of wildlife and beautiful, natural surroundings here in Australia, and it is something that every one of us should cherish and fight for.

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Brad Leue Photography

Ravinee Des Casoars, Kangaroo Island

Known throughout Australia and the world for its iconic 'laughing' call, the kookaburra is the soundtrack of the Australian bush. The name kookaburra comes from the Wiradjuri traditional landowners' word 'guuguubarra', which describes the bird's call.

The history of the dingo in Australia is still somewhat unknown. The first archaeological records are shown in rock paintings in Western Australia's Pilbara region, dating back 3,500 years ago. The dingo has definitely earned its position as an iconic Australian animal, but the respect within our culture is somewhat outdated. With the dingo fence spread across almost half of Australia we are restricting the animal's role as the country's top predator. Embracing the dingo could be our answer to the country's fox and rabbit issues.

Australian sea-lion pups - Seal Bay, Kangaroo Island: Seal Bay supports the third largest colony of Australian sea-lions and is home to around 1,000 seals. Seal Bay is a great location to observe seals in their natural environment both on land and in the shallow waters. After these fascinating creatures were nearly hunted to extinction in the 19th century we are very lucky to have such a strong colony to appreciate. Australian sea-lions from Seal Bay have been recorded diving to depths of 275 metres and males have been spotted as far as 100 kilometres south of the Island. While spending time with these beautiful seal pups I was amazed how curious and playful they are in nature. They were just as interested in me as I was in them.

Usually incorrectly labeled as the crow, the Australian raven can be identified by its prominent throat hackles, which are visibly longer and shaggier than other species in the family.

The noisy scrub-bird

back from the dead

Dr Vincent Serventy (1916-2007)

The phone rang early one morning. It was a reporter from the local paper *The West Australian*. "A chap at Albany, the local headmaster, claims he has re-discovered the noisy scrub-bird. Is it important?"

I knew the 'chap'. Harley Webster was a friend. More importantly, he was a competent ornithologist and keen bird photographer although he once sadly 'improved' some nest pictures by adorning them with flower petals!

I exclaimed, "It's the most exciting natural history find of this century!"

I had spent many years searching for the bird with Stan White and my brother. We had scoured the country at Drakesbrook in the southwest forests where John Gilbert, the hardworking assistant of the great English bird man John Gould, had first collected the species. He had said it was not easy to see and shoot, also remarking on its "sweet and extraordinary loud notes". Later he complained that "its notes are exceedingly loud and shrill so as to produce a ringing sensation in the ears". Gould named it *clamosus* in tribute to this song producing such a clamour. Popular usage gave it the name of noisy scrub-bird, while the Aborigines called it 'Jee-mul-uk'. This last name was from a King George's Sound tribal clan, the region where Harley had found his bird.

In 1842 the species was found to be living in the bush just south of Perth, south along the coastal forests then eastwards to Cape Riche, and north to Mount Barker. Collectors went in search of it with some success, until the last was shot in 1889. After that all was silence.

Twenty-two specimens were safe, although dead, in museums but where were the live birds? Some scientists thought the species was 'biologically senile' in line with many other Australian species, considered 'second class' animals, unable to withstand the competition of modern European species. I did not believe that living on an island made any plant or animal 'second class'. The Saxons were not second class compared to the Normans! I knew many Australian plants and animals had become pests when introduced into 'first class' countries. I also knew that the Aborigines had brought their new tool, fire, into a land which before their arrival had experienced only the rare lightning-caused burns.

I also realised from my anthropological studies that the Aborigines in the southwest set fires early in the summer, letting them run until the rains of autumn doused them. This meant there was little complete destruction of the forests, and the dense 'rainforest' where the scrub-birds thrived were unscathed by a slow burn. The first farmers, fearing for their wheat crops, had bribed the people with food and clothing to stop their traditional burning, but now we are learning to use the Aboriginal method of 'mosaic' burning.

So my guess was the birds were reasonably spread, although never common. Probably this was due to climatic change, the country drying out with rainforests becoming less. Our European ideas of protection caused intense wildfires to wipe out remaining pockets of the dense thickets. As each region was burned, birds could spread from untouched areas to re-colonise. With the advance of settlement, added to by new enemies such as foxes and cats, the birds became rare. Still I hoped search by naturalists might uncover one last pocket that with modern conservation could be bred from to re-colonise other suitable areas.

I thought some of the islands of the Recherche may make ideal homes for this species. The first problem was to find that remaining stronghold. Harley had now done this. He told me how walking back from a fishing trip at Two Peoples Bay, he had heard the powerful song, new to him. So he began his search with final success and was able to tape record and photograph the elusive noisy scrub-bird!

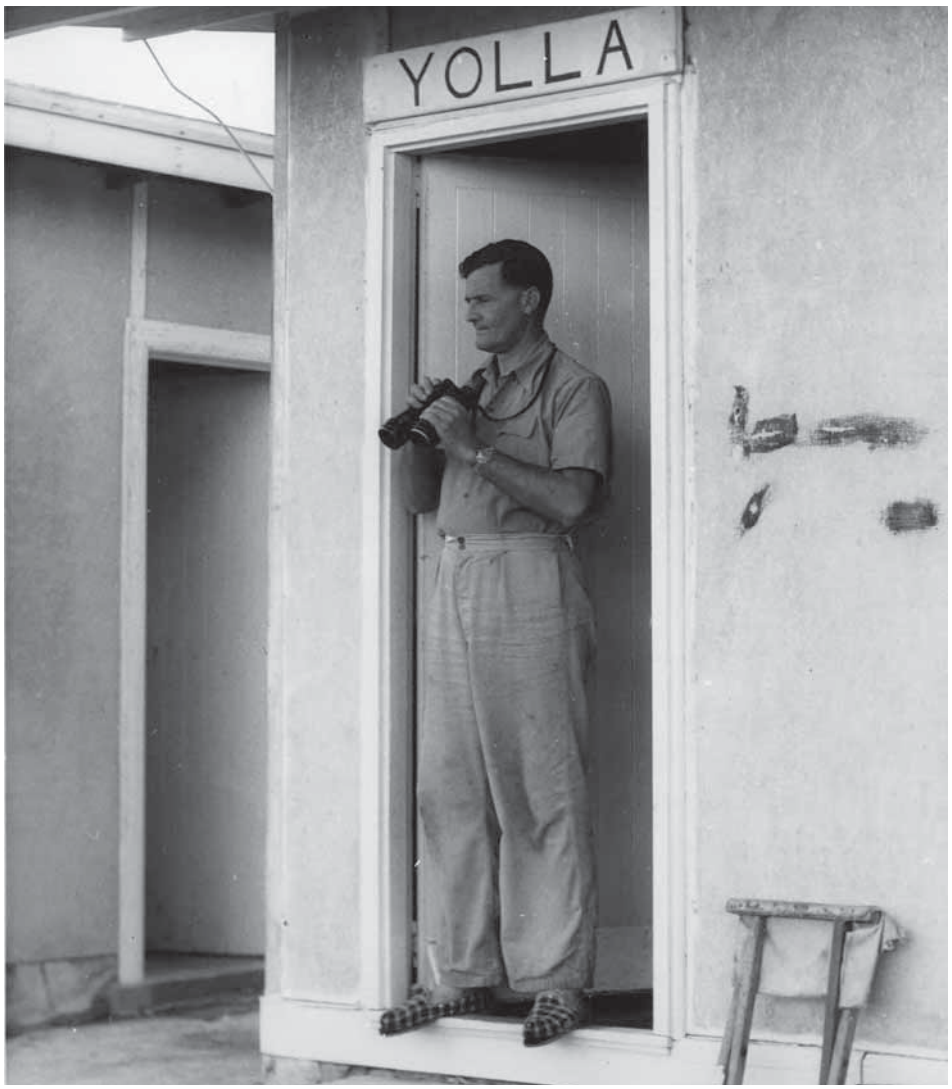
Harley told me he had guessed he had caught "a tiger by the tail". I knew collectors would soon shoot the birds for specimens so I hastened to warn the museum director his name "would be mud" if he shot the species into possible extinction. I learned later that he had abruptly cancelled instructions to his collector. The wildlife departments soon gave official protection from any casual hunter.

I went off to England where I gave a lecture tour. The highlight was the voice of this sweet voiced singer of the Australian bush. Tens of thousands of people heard that song where I was able to play the tape and screen the film I had taken at Harley's famous discovery place. I also put forward my theory of why it nearly disappeared and how it could be saved.

In my London audience was a television producer, Colin Willock from Anglia television. He was also the organiser of a series of books on endangered world wildlife. Colin suggested I write a book on the noisy scrub-bird. I replied, "Why a book about one bird, there's a whole continent in danger down there".

Above: Noisy scrub-bird calling. This photo was taken by its modern discoverer, Harley Webster.

Dom Serventy (centre) showing a noisy scrub-bird to Harley Webster while a ranger watches on



Dom Serventy, taken in April 1958

"Write a book about that", said Colin. So my book *A Continent in Australia* was published, the first one on conservation in Australia in a hundred years, except that Professor Jock Marshall was editing a book on the same topic titled *The Great Extermination*. Both won praise and we can claim we began a new wave of interest in the environment.

Popular interest in the long lost bird increased when it was found that a holiday town was planned for its only survival place. Scientific interest increased when research indicated that scrub-birds, both the noisy of the west and the rufous of eastern rainforests, are related to the lyrebirds.

The grand old man of writing and natural history, Alec Chisholm, flew over to hear the birds, pronouncing them "symbols of something eternal". Even more telling, the Duke of Edinburgh became involved. Although disliking the common name, noisy scrub-bird, he mentioned it in an address to the Western Australian State Parliament. Before returning to London he turned to the Minister who was seeing him off in style, "You'll let me know when your Government cancels the plans for a holiday town at Two Peoples Bay."

This place had been named by the French navigator Louis de Freycinet, who had met an American sealing brig in the bay in 1803. The Frenchman decided such a meeting of one new nation and one old deserved remembrance. He marked on his map 'Baie de Deux' so all the promontory of Mount Gardner, the two islands and Black Rock, became part of the new reserve with a strictly protected area where Harley had heard the first bird singing. "A voice like a nightingale", said writer Florence James when I took her to hear it.

With royal endorsement the conservative government capitulated, proclaiming the whole bay a nature reserve and this story of 1962 was retold during a Parliamentary address to the Duke in 1973 in Perth.

"... the discovery was already scheduled as the site of a new town to be called Casuarina (the scientific name for the she oaks)... In 1962 Prince Philip visiting Perth for the Commonwealth Games heard about this case. He personally expressed to Mr W S Bovell, the Minister for Lands, the hope that the bird would be protected. For the next three years he publicly announced this interest..."

The address concluded with the words, "So you have here to address you today, a man who has personally saved a species from extinction". My brother Dom wrote, "... had it not been for the action of the Prince... the government would certainly have gone ahead with the scheme..."

Many years later, also in Perth, I was talking to the Duke, after he had spoken again about the noisy scrub-bird to Parliament, and I gave him more news of the success of our conservation work.

A lot of hard work had to be done before the species was safe. First we had to ensure birds could be trapped alive in a mist net. The opportunity came when Victorian naturalist Graham Pizzey, making a documentary for the ABC, suggested trapping a live bird on film. Dom organised the official permission so in 1964 a party of naturalists travelled to the Bay to carry out the operation. I was there with my camera to shoot the action for my own dream of a nature documentary. A bird was located by its song. The net in place, and a party of beaters controlled by field telephone, the quarry was driven at the net. I saw what looked like a mouse scurry into the trap. It proved a rare species, a bristle-bird, but not our target.

An hour later we were again at the net, this time with success. A burly young naturalist, Bob Stranger, seeing the bird running along the foot of the net clasped, probably for the first time in human history, a live bird in his hands. His triumphant cry of "*Atrichornis*" still lingers in my memory. Later I too was to hold the bird, which was docile compared to the bristle bird which struggled the whole time.

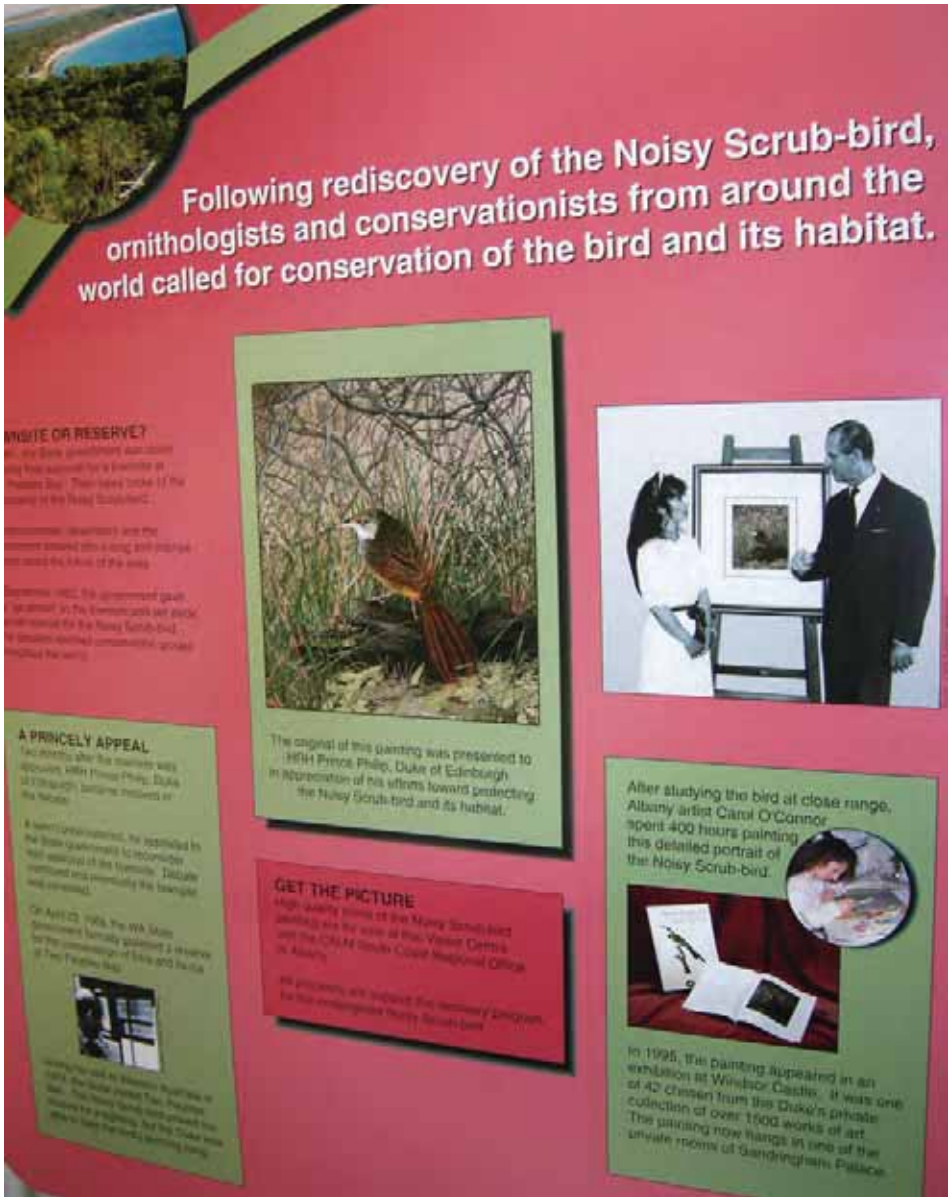
It was tagged with CSIRO band 050-03501 then released. It hopped into the tangle of shrubbery with great leaps, all captured on my film, to be shown later in the lecture tour of Great Britain. Birds were caught to be bred in captivity at the CSIRO Mount Helena laboratory, where I was able to see my old friend at close quarters. Then came the more important task of ensuring the birds were not all in one basket at Two Peoples Bay. Experts in translocating birds from New Zealand gave advice and the first releases were at Mount Manypeaks.

It was estimated the population in their stronghold of the Bay was about 500 birds so some were captured to be transported in padded boxes and, in the words of Alan Danks, "on our backs". He was the management officer at the

Reserve at Two Peoples Bay where they still thrived, protected from wildfires. Many other release points at national parks and nature reserves in the southwest have now taken place so the long drawn out conservation victory is complete.

This began with naturalists, Harley Webster the first, followed by CALM and the CSIRO, and government experts both State and Federal. Dom was a driving force. It is this combination of government workers and volunteers which is the basis of conservation victories.

Editor's note: Dr Vincent Serventy AM was President of the Wildlife Preservation Society of Australia from 1966 to 2001. This article was written by Vin for the Society's publication *Conservation Victories and Battles Yet to Win*, published by the Society in 2004.



Let's raise a racket to protect the noisy scrub-bird!

Kit (Amy) Prendergast, nature writer, zoologist and conservation biologist

Back in 2004 *Australian Wildlife* magazine featured the article 'The noisy scrub-bird – back from the dead' by Vincent Serventy detailing the amazing comeback of a species once thought extinct. This is largely thanks to half a century of dedicated research and conservation efforts, including some notable translocation (also known as recolonization) successes. Dr Serventy ended on a positive note, concluding "the long drawn out conservation victory is complete". Sadly, fast-forward to 2014 and the noisy scrub-bird's future is not quite so rosy. Whilst in 2000 there were estimated to be 1,500 breeding birds in total, by the next census in 2005 the number was drastically reduced to only 695 birds. Peaking in 2001, a series of wildfires in the Albany Management Zone – the stronghold of the population, caused declines. Just one year after Serventy's article, disaster struck in the form of a major catastrophic wildfire at Mount Manypeaks, the site where previously noisy scrub-birds had been most abundant, wiping out about two-thirds of the entire noisy scrub-bird population.

As both its common name and scientific epithet of its Latin binomial scientific name, *Atrichornis clamosus,* indicate, this species is renowned for its clamorous calls produced by the males which can be heard for distances up to 1.5 kilometres away! Easy to detect… but difficult to observe: in contrast to its conspicuous voice, it is notoriously challenging to get a sighting of a noisy scrub-bird. A tiny passerine (with females weighing in at only 31–36 grams, and males slightly larger at 48–55 grams) camouflaged in brownish hues, this elusive species evades sight, flitting through the dense undergrowth it inhabits, rarely emerging from cover. Researchers rely on the loud calls to census this bird, which are emitted only by males since females are virtually silent, making population size figures (based on an estimated sex ratio of 2.5:1 females:males) somewhat unreliable. The males are highly territorial and once established, may hold their territory for life. Their idiosyncratic territorial call begins as a pleasant song, then crescendos, accelerating into an ear-splitting finale. Males and females differ not only in their proclivity to be vociferous but also in appearance: males are larger than females, and males have a dark-grey/black triangle on their plain white throat which is absent in the females who have a cream-coloured throat. In terms of breeding, males direct all their activity to defending and declaring their territories, leaving nest-building and all parental duties up to the female. Egg-laying peaks in late June. Only a single egg is laid. This very low reproductive rate also renders this species very vulnerable, and severely limits its potential to recover in the aftermath of a catastrophe such as a large wildfire, or sustain its numbers when facing ongoing threats. The female incubates her egg for 36–38 days: a surprisingly long time compared with most other passerine birds of a similar size. The chick will fledge three to four weeks after hatching, but may remain with mum for up to half a year after they leave the nest.

With a preference for dense habitat of sedge clumps and shrubs to provide suitable material for nesting and a well-developed leaf litter layer for foraging on its diet of invertebrates (primarily ants, beetles and spiders), this species is highly susceptible to the effects of fire. It tends to occur only in long-unburnt areas (and is only abundant in habitat that has not been burnt for at least 20 years), and as the post-fire population surveys have indicated, suffers declines following fires. It appears this species takes over 10 years to recover following fire. Its vulnerability to fire is likely also linked to the fact that, unusually, this species is essentially flightless. In fact, it is incapable of sustaining flight for more than a few metres. This makes protecting and creating continuous corridors of natural vegetation important for allowing natural colonization of new habitats and tracking suitable habitat under climate change, since birds are unlikely to cross open expanses, which make them vulnerable to attacks by predators. Adults are sedentary, with dispersal being limited to young birds, mainly two-year-old males that have moulted into their adult plumage.

The noisy scrub-bird has high conservation value for it is evolutionarily unique, listed as number twenty-one of the most evolutionarily distinct and endangered species in the world by EDGE (Evolutionarily Distinct and Globally Endangered). With a highly restricted distribution, this species is endemic (found nowhere else) to south-west Western Australia, found only between Albany and Cheynes Beach, as well as a translocated population occurring on Bald Island. The mainland subpopulation consists of about six local populations, the most important located at Mount Gardner which supports about thirty percent of the total population.

The noisy scrub-bird is one of only two species in the family Atrichornithidae (the other being the rufous scrub-bird, *Atrichornis rufescens,* found in eastern Australia) considered an ancient lineage. Interestingly, DNA studies have found Atrichornithidae are most closely related to lyrebirds, differentiating from lyrebirds about thirty–thirty-five million years ago.

Conservation and management of the noisy scrub-bird is currently under the responsibility of the South Coast Threatened Bird Recovery Team as one of four species in a multi-species recovery program. Main conservation actions involve continuing the translocation attempts for this species so as to increase the number of populations and therefore reduce the risk all noisy scrub-birds will be eradicated by a local disaster; monitoring; active fire management at all known locations; and habitat management in all occupied areas, as well as surveying for other unknown populations. Fortunately most birds occur within protected areas, but making sure connecting vegetation is not cleared on unprotected land will be imperative. Maintaining habitat corridors is not only important for dispersal and colonisation of new habitat, but also to prevent inbreeding depression. Like many species brought close to extinction, the fact that numbers plummeted to only about fifty birds when the species was rediscovered in 1961 means it went through a genetic bottleneck, confirmed by recent DNA studies revealing genetic variability – important to prevent inbreeding depression and maintain evolutionary potential – is very limited in this species.

Whilst not everyone can directly partake in the above activities necessary to conserve this species, all of us can do our bit in reducing the magnitude of climate change, which poses a grave threat to this species (and countless others), by implementing simple yet effective actions like minimising energy use and adopting a vegetarian lifestyle.

With predictions of increasing fire frequency and intensity under climate change, it is vital that efforts be made to prevent fires occurring in current and suitable habitat and fire protection strategies be implemented. Fortunately, despite the large decline following the 2005 fires, noisy scrub-bird numbers have shown some recovery, increasing from 343 males after the fire to 494 when surveyed in 2011. With sound fire management, let's hope that we really can be confident that the noisy scrub-bird has been certainly brought 'back from the dead' and prevent this species from returning 'to the dead'.

Reduction of roadkill

Suzanne Medway, editor *Australian Wildlife*

Australian native animals use both the road and verge environment as transport corridors and as an easy food resource area. Unfortunately the indiscriminate, contemporary predator of this environment, the motor car or truck, can place vulnerable species or populations on the verge of extinction. Many native Australian species are already stressed from habitat loss, predation and disease. For those species, the added pressures of roadkill can lead to wildlife populations existing 'on the verge'.

The directors of our Society decided that reduction of roadkill would become an ongoing major project in 2003 to call attention and explore solutions to the danger to Australian native wildlife on our roads.

The project started with our directors attending a workshop organised by Austroads; then we awarded grants for research on roadkill and sponsored Sydney Metropolitan Wildlife Services at the 2003 Animal Expo, which enabled them to recruit new carers, raise money and lift awareness of their organisation, as well as write, research and lobby government, insurance agencies and the media about the danger to Australian fauna on our roads.

Our Society, by its very nature, is primarily a lobby group and our directors also spend their time as volunteers facilitating and supporting other organisations concerned with the protection of wildlife. As volunteers we care passionately about the preservation of Australian wildlife, but our expertise as directors is in the organisational and support area, not as wildlife rescuers, carers and rehabilitators.

Our next step in our reduction of roadkill project was to hold a Reduction of Roadkill Seminar in conjunction with the Linnean Society. At the beginning of the seminar we featured a slide show presentation of pictures of roadkill and injured wildlife. These pictures were supplied by wildlife rescuers and carers, plus the recipient of one of our research grants showed in graphic detail the horror of roadkill.

In the opening address Peter Buckley, President of Sydney Metropolitan Wildlife Services, spoke of "The rescue of wildlife injured on our roads". At one point he told of the experiences of rescuers getting up out of a warm bed at 2 a.m. to go out in the rain on a dark country road with a flashlight to look for an injured animal and to bring it back home for treatment and care. This is just the start of the commitment to return an injured animal back to health and return it to its natural habitat. He also spoke of a rescuer in the Northern Territory who was tragically killed on the side of the road while searching for an injured animal.

During the seminar a carer who had travelled all the way from Brisbane spoke of the constant battle with authorities and the public over the

tragedy of roadkill and injury of koalas on Queensland roads. There is still a lot of frustration amongst carers who must wonder if this enormous problem can ever be reduced, let alone solved.

The papers presented by Dr Daniel Ramp, Natascha Arens, Vanessa Wilson and Peter Buckley are featured in this magazine.

Unfortunately, since 2003 roadkill of Australian native animals continues to rise.

Our Society continues to monitor, lobby and support the reduction of roadkill and to this end is very proud to be sponsors of the inaugural ANET Conference, hosted by the Australian Research Centre for Urban Ecology and the Royal Botanic Gardens. The conference will include talks, field trips and the opportunity to network with industry, government and research professionals from Australasia and across the globe. It will be an excellent chance to learn about the latest work in reduction of roadkill and share your experiences.

ANET is a not-for-profit organisation that aims to promote best practice in road ecology and the design of environmentally sensitive linear infrastructure. They provide a centralised location for the latest evidence on the design, construction and evaluation of environmentally sensitive roads and linear infrastructure. Improving the flow of high-quality information among stakeholders (e.g. planners, engineers, regulators, researchers, community groups, etc.) will have positive outcomes for the public.

Environmentally sensitive roads will reduce the number of wildlife–vehicle collisions, increasing motorist safety and reducing costs for insurance claims and vehicle repair.

Environmentally sensitive roads will better conserve biodiversity by effectively minimising the negative environmental impacts (e.g. reducing the rate of roadkill, allowing wildlife to move throughout the landscape).

By ensuring the most efficient and effective methods are considered and implemented early in the planning process, and ensuring unsuccessful measures are not repeated, environmentally sensitive roads will be cost-effective.

Examples of the tragedy of roadkill

Compassion for individuals within road ecology - an opportunity for community action

Daniel Ramp, Centre for Compassionate Conservation, University of Technology, Sydney

Every day, countless animals are killed on roads. The effect of those lost animals are keenly felt by their kin and have major implications for the survival of their species and for biodiversity in general. While clever science seeks to mitigate impacts by trying to design roads and vehicles to reduce the likelihood of collisions with animals, much of society is either oblivious or feels helpless to be part of the solution. Here I argue that by assisting communities to find compassion for individuals, opportunities for active adaptation through increased awareness and responsibility become available to solve part of the road ecology problem.

It is well documented that roads have a major effect on wildlife. All around the world they disrupt the population ecology of wild animals, threaten local species persistence, drive some of those species extinct, and result in often irreversible ecosystem dysfunction. The effects can be vastly complex and multifaceted, combining changes to abiotic conditions (soils, light, wind, moisture), the favouring and disfavouring of particular species, and the restructuring of landscapes (fragmentation, genetic isolation, habitat availability) with direct and indirect impacts on wild animal populations. The simple evidence of witnessing dead animals on roadside verges, however, highlights the simplicity of how roads affect animals – being struck by a moving vehicle is a tragic, painful, and cruel end to a life.

Vast numbers of domestic, livestock, and wild animals are killed on roads every day. Combined with the loss of habitat, effects of fragmentation, abiotic changes and pollution to name a few, this is a lot for animals to cope with. For many species it is the tipping point from which survival is no longer possible, the final straw in a human-dominated world. Even for species adapted to urban and peri-urban landscapes, successful in finding food and shelter resources and avoiding predation and persecution, death on roads is an incontrovertible and inevitable truth for all but the canniest of species. It is only going to get worse. Human populations are expanding rapidly and as globalisation increases, transportation networks are increasingly becoming optimised to handle personal traffic and movement of goods. This change has been rapid. Roads and transport are a way of life for humans and they are not going away any time soon.

Commensurate with the rapid proliferation of transportation networks has been the acknowledgement that the consequences for wild animals are dire. For the last few decades, the science of trying to quantify the consequences and proffer solutions (i.e. road ecology) has been, and continues to be, a well-studied area of research, with many scientific researchers from diverse backgrounds becoming engaged in documenting what the effects are and working out solutions to offset them. One major focus has targeted the biology and ecology of wild animals to provide novel mitigation strategies. Numerous technological solutions have been proposed over the years that claim to scare animals away from roads at the time a vehicle might be present. Anything from devices that reflect oncoming vehicle light perpendicular to the road to acoustic devices attached to vehicles. Nothing to date suggests that these efforts have been worthwhile, despite some good, and also some frustratingly poor, science.

Research and implementation of signage, whether static or variable, takes the opposite view, warning drivers to modify their behaviour rather than asking other animals to modify theirs. Disappointingly, the effects of signage are often transient and on their own have little capacity to prevent animal deaths. As part of larger educational campaigns their potential may be heightened, and they remain a tool in the armoury of those designing solutions for addressing the conflict between roads and wildlife.

Modification of the roads themselves has perhaps taken the largest focus of road ecology research. This can take the form of facilitating safe passage from one side of the road to the other at restricted and special locations, or else preventing access to roads through appropriate fencing. Done retrospectively these options are extremely expensive and frequently bureaucratically prohibitive, and are only typically considered for major roads and highways. They can be very successful at allowing movement between patches of fragmented habitat and at reducing deaths at hotspots, thereby saving individual lives. Without a doubt, they are a must for all new roads and upgrades. However, because of the expense of their installation and resultant sparseness, their utility in directly ensuring population persistence must always be transparently viewed.

For road authorities, whether federal, state or local, the issue is large and is not going away. With over 800,000 kilometres of roads in Australia, mitigation efforts cannot feasibly be implemented over the entirety of such a vast transportation network. Solutions to this problem therefore need to be clever, locally delivered, rigorously tested, and scientifically credible. Looking to science to provide the mechanism for reducing the impact of roads on wild animals is, however, only part of the solution. The emphasis on science to independently solve human-wildlife conflicts so that the rest of society can be absolved of conscious effort is mistaken. Most people on the planet are road users, even if they don't ever drive a car – the very fact that the goods they use and eat are brought within their vicinity is down to roads. Yet desire to prevent animals being killed on roads is not universal. Many people are oblivious to the carnage, or else are unconcerned about nature's plight. Often, so many animals are killed that it can be overwhelming.

Coupled with this are some of the entrenched positions within road ecology. It has been suggested that the death of animals on roads are only relevant when deaths outnumber population growth rates. While this may be true when decision-making is centred around maintaining species persistence, it fails to acknowledge the harm suffered by the animals collided with on roads, their dependent young, and the resultant costs born by their kin and social groups. There is no discrimination between animals from

different species – an animal on an endangered species list is no different to an animal not considered threatened. Of the types of animals most frequently observed dead on roads, primarily there are the usual suspects; medium - to large-sized mammals, often mobile grazing herbivores but also carnivores, often species considered to be nuisances or pests, and those often considered to be abundant or widespread. These are obviously generalities, but the fact that many of the animals seen dead on roads are either not empathised with or else are unwanted, sways community perceptions of animal deaths on roads and influences motivation to become involved in solutions.

For most people, seeing a dead koala or quoll on the side of the road results in greater sympathy than a kangaroo or rabbit. Someone's pet dog or cat typically draws more concern and empathy than a snake or a wombat.

This affects how society engages with this conflict and how it decides to address it. Charismatic species often take precedence over species described as common or pests, drawing on community empathy and dominating the attraction of financial assistance. But a life is a life. These preconceptions and preferences do not help address the greater issue. While it is true that there is often a strong correlation between empathy and species in need, and that these species should not be ignored, the foundational principles of road ecology should be based on reducing harm to all animals, regardless of ascribed human values and judgements.

This is important for two reasons: because of what we now know about non-human consciousness and sentience; and because ignoring all animals is an impediment to engaging communities in taking ownership of road impacts and therefore creating real progress in preventing animal deaths. That almost all animals feel pain, feel emotions like grief, anxiety, joy and loneliness, and even have a sense of justice, cannot be avoided. We are not just talking about mammals and other vertebrates like fish – invertebrates like ants and crayfish are not exempt. On 7 July 2012 was witness to the Cambridge Declaration on Consciousness, which stated that due to neurological similarities, most other animals must be conscious and all that consciousness entails. There is no doubt that this is difficult to deal with. Our entire way of life is somewhat dependent upon either other animals having no feeling at all, or else their feeling is wholly subjugated by our own needs and therefore need not be considered.

Rather than being over-whelmed, or worse, aggressive in defence of existing practices, lucid and clever thinking suggests that by investing in empathy for all other animals as individuals that novel and innovative solutions may arise, and provide a new and vital opportunity for dealing with human-wildlife conflicts. Compassion for individuals is a universal ethic, aligned with altruism, which can be defined as a desire to alleviate suffering in others. Compassion is now globally recognised as a major leap forward for conservation and has opened up debate on the treatment of other animals, particularly wild animals, in existing conservation practices. Compassionate conservation has a principle of 'first do no harm' and strives to bring transparency, defensible science, and wide engagement to bear on decision-making in conservation. This is not to say that the needs of other animals supersede those of humans, but rather that their needs should no longer be ignored.

What does this mean for road ecology? For large rural roads it may assist by facilitating the adoption of driver awareness campaigns to change driving habits (which roads to use, when to use them, and what speeds to travel at). However, perhaps the greatest impact will be felt in urban and peri-urban landscapes. By engaging local communities in educational programmes centred on compassion for individuals, greater responsibility can be fostered in those that are closest to the animals being directly impacted upon. Local community action has the capacity to influence decision-making by local councils and state authorities, ensuring that planning processes are cognisant of the needs of wild animals. Of course, not all drivers on roads are local and are therefore typically naïve to local sentiments. Yet, by thinking positively about compassion for individuals it should be possible to establish long-lasting and far-reaching practices of coexistence that extend beyond local communication pathways.

This idea is already being actioned in the US with regard to coexistence strategies for living with carnivores like coyotes (*Canis latrans*). The California-based organisation Project Coyote advocates compassion towards coyotes and provides information and support for non-lethal approaches to coexisting with these wild animals. In 2012 they began working with the township of Superior in Colorado, adjacent to the Rocky Mountains, which is now pioneering one of the most successful community education programs for compassionate coexistence anywhere in the world. With Project Coyote support, the local council provides educational programs for residents and town staff, outlining times of day and year when coyotes are more prevalent, appropriate safety and hazing measures, and reasonable expectations living in coyote habitat.

Although the circumstances of this non-road ecology example are different, it has much to offer road ecology in pioneering the use of compassionate coexistence to tackle human-wildlife conflicts. However, many local communities are already engaging in strategies that could be defined as fitting within compassionate principles. For the last decade, the Wildlife Roadkill Prevention Association (previously the Northern Beaches Roadkill Prevention Committee) has worked tirelessly to encourage scientific data collection on road impacts on the northern beaches area of Sydney, has held public forums, engaged in school education programs, garnered support in local media and, importantly, successfully lobbied local and state government about road-wildlife issues. No doubt there are many other local groups engaging in similar activities. The hope is that compassionate conservation principles will enhance these existing programmes and provide greater acceptance and impact of their efforts.

The argument presented here is that ignoring individuals as part of our efforts to reduce impacts on fauna limits our capacity to engineer solutions and stems the acceptance of responsibility for reducing impacts of our way of life on other animals. This is a concern for all the animals dying on roads every day, and is also a concern for the moral wellbeing of humans. Rather than ignoring individuals we can use individuals as motivation for change. By encouraging local communities to confront the need to enable coexistence among humans and other animals, constructed in a positive and compassionate way for all involved, long-term and tangible solutions can be achieved.

We need to adapt, not just mitigate. We have a moral duty to construct transportation networks that do the least harm possible to the other animals we share the planet with.

Fauna-sensitive road design

The Roads and Marine Service's guiding principle with regard to impact of roadkill mitigation is to follow the process of 'avoid, minimise and mitigate':

1. Avoid impacts on habitat through the planning process. An example of this would be Bonville Bypass on the Pacific Highway, where the alignment was shifted to minimise impact on koala habitat.
2. Minimise impacts on habitat through the planning process. This is achieved by narrowing the footprint of the road, for example having steeper batter slopes or by reducing the width of the median.
3. Mitigate impacts on habitat through a wide range of amelioration measures:
   - Reducing construction zones
   - Underpasses, overpasses
   - Exclusion fencing
   - Landscaping and revegetation
   - Site rehabilitation
   - Traffic control such as driver education and awareness (e.g. 'wombats next 5 km' signs)

The RMS has spent considerable time and resources in the design and location of mitigation in the form of underpasses, overpasses and fauna-sensitive road design in general. Locations where the RMS has installed and monitored the effectiveness of fauna underpasses include Raymond Terrace, Bulahdelah to Coolongolook, Taree, Herons Creek, Raleigh Bypass, Lyons to Englands Roads Coffs Harbour, Brunswick Heads Bypass, Boganbar and Yelgun to Chinderah. Fauna underpass monitoring has also been undertaken on the F3. A wide range of fauna has been recorded using the underpass structures. Species range in size from the eastern grey kangaroo to the brown antechinus. Common species such as the brushtail possum, ring-tailed possum and bush rat have been recorded at underpasses in addition to listed threatened species such as koala, spotted-tailed quoll and long-nosed potoroo.

The RMS realises the importance of continued research and investigation. The RMS's approach to fauna-sensitive road design is a collaborative process with other government departments and groups undertaking research to ensure continuous improvement.

Roadkill in the Royal National Park, Sydney

Vanessa Wilson, AWS Scientific Committee member – national parks

Editor's note:

In 2003 Vanessa was awarded a grant of $2,000 by our Society to contribute towards her fauna-sensitive road design honours project on roadkill in the Royal National Park. The following is her report on the project.

After driving through the Royal National Park to Bundeena and back for 144 days straight, recording the details of all roadkill found along the 22-kilometre stretch of road between April and August, I'm quite happy to finally be having a break. There were many different parts to my honours project and some very interesting results were produced.

Throughout the study 112 vertebrate road-victims of 22 species were found, which equates to 0.035 kills/km/day. This road toll was made up of 74 birds, 36 mammals and two reptiles (both snakes). The most commonly found species was the little wattlebird (*Anthophore chiropteran*), followed by the yellow-faced honeyeater (*Lichenostomus chrysops*), the swamp wallaby (*Wallabia bicolor*), and the New Holland honeyeater (*Phylidonyris novaehollandiae*) – all of which had road tolls greater than 10. Most species recorded are locally common or abundant native animals, with the exception of one vulnerable grey-headed flying fox (*Pteropus poliocephalus*); one locally uncommon painted button-quail (*Turnix varia*) and four introduced Rusa deer (*Cervus timorensis*). Other mammals high on the hit-list included both common brushtail possums (*Trichosurus vulpecula*) and common ringtail possums (*Pseudocheirus peregrinus*). Secondary victims included the pouch young of two brushtail possums and one swamp wallaby – both possum joeys were at the 'pinky' stage, while the wallaby joey was fully furred and estimated to be around eight months old.

Vanessa Wilson measuring roadkill

We found that more roadkills occurred when the traffic volume was relatively low, during periods of low rainfall, near drainage culverts, and where there was a high percent of vegetation cover on the road verge. More mammals were killed in woodland where the posted speed limit was high (80 km/h), and fewer mammals were killed where a guard rail was present. More birds were killed near low vegetation such as heath, where many of them were regularly seen swooping from treetop to treetop directly in front of oncoming cars. Our driver behaviour and attitude questionnaires gained a fantastic response of 156 completed surveys. Over half (51 percent) of these respondents had hit at least one animal during their driving lifetime and almost as many (44 percent) had sustained some damage to their vehicle as a result. Of the respondents, 49 percent claimed to swerve to avoid hitting an animal, which suggests that many people are still unaware that swerving is extremely dangerous and braking is the only relatively safe avoidance action. On average, people considered roadkill to be a serious issue, but willingness to take certain actions to minimise roadkill increased with age.

The strongest response in the entire survey was that 83 percent of respondents claimed to drive slower where there are animals around (e.g. in wildlife zones). However, thanks to the two strategically installed traffic counters that were purchased with the help of a $2,000 grant from the Wildlife Preservation Society of Australia, we revealed that the average speed of vehicles on Bundeena Drive never once falls below the speed limit of 80 km/h. In fact, late at night, when nocturnal mammals are active, is when the highest average speeds occur – up to 13 km/h over the speed limit at 4 a.m. (ON AVERAGE!).

Thanks once again, WPSA, for all your help. The traffic counters were invaluable for this project and will continue to be used in future roadkill investigations by my supervisor, Dr Daniel Ramp.

The destruction of wildlife on our roads and what is being done to rescue it

Peter Buckley, Sydney Metropolitan Wildlife Services

As a community-based volunteer organisation, Sydney Wildlife receives over 12,000 calls a year from people seeking assistance or advice about our native wildlife. Our phone is answered seven days a week, 24 hours a day so messages are never left on answering machines. We believe all calls about our wildlife need to be answered and actioned immediately. Sydney Wildlife is a comparatively new organisation launched in May 1997 by the Hon. Pam Allan, MP, the then Minister for the Environment. As our name indicates we operate only in the Sydney area, from the Hawkesbury River in the north, to Picton in the south and from the foothills of the Blue Mountains to the ocean. Since inception our membership has grown from approximately 100 to over 450.

While we are interested in all aspects of ecology, we are particularly focused on native fauna and how it relates to and is affected by different factors within its environment. Sydney has many unique species that are faced with problems not found elsewhere in the state and it is these local issues that Sydney Wildlife aims to address in the years to come.

Animals cannot be isolated from the rest of the environment. Urban sprawl and loss of habitat are the major contributors to the demise of native animals, closely followed by domestic and feral animal attacks, and road strikes. Accordingly, education at all levels of the community should be a primary objective as it is the only truly effective weapon in the long-term conservation of wildlife and its habitat.

Being an entirely voluntary charitable organisation, we rely heavily on our members to make the difference. Members participate by undertaking wildlife rescues, foster caring for animals, helping out with fundraising, assisting with educational talks to community groups and displays at community fairs and fetes, and office administration work. We hold several basic training courses throughout the year (as well as specialist courses) and are always eager for new members.

As a wildlife rescuer and carer with Sydney Rescue, I am unfortunately often called to assist animals involved in road trauma. We are the last line in the process and in most cases an animal weighing a few hundred grams has little hope of survival when being impacted by a tonne of metal and plastic travelling between 60 and 100 kilometres per hour. We do what we can but in reality the first step is with us all as motorists and users of contemporary transport systems. We need to change our approach to how we see the world around us and adapt to allow it to exist with us instead of driving over it. In the meantime we'll do what we can.

Road mortality impact on a population of eastern quolls and Tasmanian devils

Menna E. Jones, Department of Zoology, University of Tasmania

The impact of road mortality on local populations of wildlife has rarely been quantified. In June 1991, the access road into the northern end of the Cradle Mountain – Lake St Clair National Park in Tasmania was widened and sealed. This occurred part-way through an ecological study of the dasyurid carnivore guild, during which populations were being monitored. In 17 months, the resident population of 19 eastern quolls became extinct and the devil population, of 39 individuals, halved. Concurrently, there was a dramatic increase in the number of roadkills. The main causal factor was probably an increase in modal speed of about 20 km/h – and a greater increase in maximum speed. Measures were implemented to reduce the incidence of vehicle/wildlife collisions. Measures directed at people included physically slowing traffic speed (using 'slow points') and increasing driver awareness (signs and pamphlets). Those directed at wildlife included deterring wildlife from crossing the road in the path of approaching vehicles (wildlife reflectors), and encouraging escape off the road (ramps across gutters and banks, and pipes for shelter). The 'slow points' were effective in reducing vehicle speeds by 20 km/h.

The eastern quoll population was re-establishing within six months, and after two years, had recovered to 50 percent of its former level. There was some indication that devil populations were recovering.

The effects of road mortality on species population dynamics are one of the most important and least documented issues concerning the ecological impacts of roads on wildlife. Roadkills do not appear to exert significant pressure on populations or conservation status of most common species, particularly smaller animals. There is some evidence, however, that road mortality can adversely affect larger species, those with small, fragmented or declining populations, or those that regularly and repeatedly come into contact with the road. Furthermore, some authors have conjectured that, in situations where small or discrete populations cannot sustain high levels of mortality through natural replacement, road mortality could cause local extinction.

Quantitative data on the impacts of road mortality on populations are few, even though roadkills are the major source of mortality for a number of species, including endangered species and mammalian carnivores. Roadkills are an important source of mortality for the remnant and endangered population of the eastern barred bandicoot (*Perameles gunnii*) in Victoria, and in urban Launceston, Tasmania, annual road mortality of the resident brushtail possum (*Trichosurus vulpecula*) population, at 50 percent, exceeds local birth rate. In 1991, part-way through a two-and-a-half-year ecological field study of dasyurid carnivores (*Marsupialia: Dasyuridael*) half of the access road into the study area, the northern end of the Cradle Mountain – Lake St Clair National Park, was widened and sealed to carry an increasing volume of heavy traffic such as tourist coaches.

Great oaks

from little acorns grow

When our Director, Clive Williams, learned that William Ryan, publican at the Harold Park Hotel in Sydney, was collecting 5 cent coins in his business, Clive approached him to consider saving them for our Society. William was taken by the link between the echidna on the coin and the echidna we have as our Society's emblem and readily agreed. Not only that, he arranged for Clive to speak to other hotels and businesses in his area. As a result we now have several businesses collecting coins on our behalf.

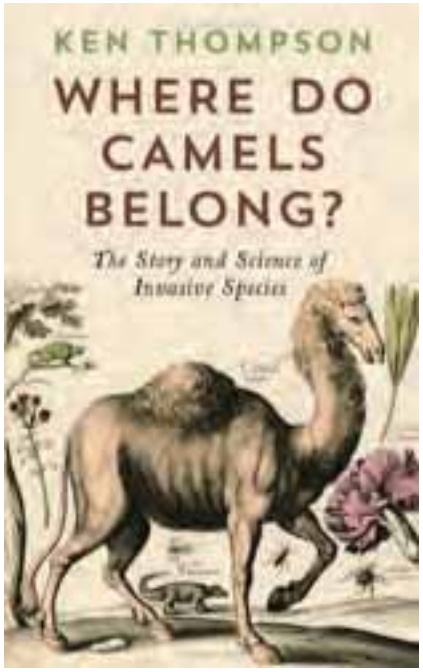
We have provided signs and collection boxes for those that required them.

The Society has now decided to invite all of you, our members and friends, to participate in this fundraising process. We have purchased collection boxes which we will mail to those of you who request them. Use them at home or at your place of work, invite friends and colleagues to take one and invite your friendly local businesses to join in. By this means small individual efforts can lead to a grand achievement. The proceeds will be used for the Society's programs, such as the university grants.

Once the collection box has been filled, just take it along to your nearest Commonwealth Bank. All the deposit details are printed on the bottom of the box. Once the coins have been banked, let us know your details and how much has been banked and we will send you a tax deductible receipt.

Email us at info@wpsa.org.au for your collection box.

Book Reviews



Where do camels belong? The story and science of an invasive species by Ken Thompson

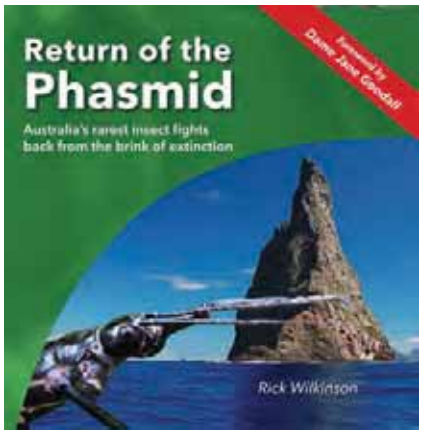
Where do camels come from? The Arab world may be the obvious answer. But they are relative newcomers there. They evolved in North America and retain their greatest diversity in South America, while the only wild dromedaries are in Australia.

This is a classic example of the contradictions of 'native' and 'invasive' species, a hot issue right now as the flipside of biodiversity. Do we need to fear invaders? Can we control them? Do we choose the right targets? And are the natives always good guys?

We have all read a lot of information about introduced species: they run rampant through our ecosystems, costing billions to control each year. They are also accused of driving native species extinct. Indeed, alien species are often cited as one of the big threats to biodiversity.

Ken Thompson puts forward a fascinating array of narratives to explore this crucial question – why only a minority of introduced species succeed, and why so few of them go on to cause trouble. He discusses, too, whether our fears could be getting in the way of conserving biodiversity and responding to the threat of climate change.

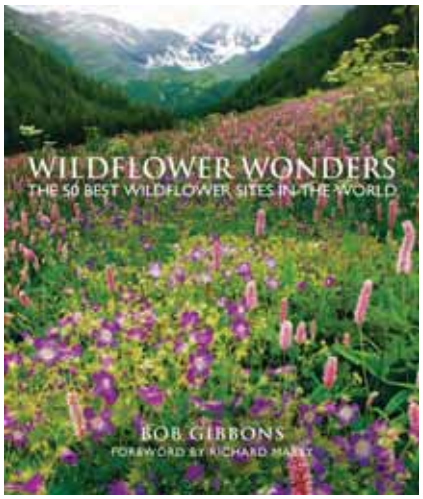
Publisher: Allen & Unwin | RRP: $27.99



Return of the Phasmid: Australia's rarest insect fights back from the brink of extinction by Rick Wilkinson

When a ship ran aground more than 60 years ago on beautiful Lord Howe Island in the south-west Pacific, rats escaped and attacked the unique Lord Howe Island stick insect, also known as a 'land lobster'. But more than 40 years later a minute colony was amazingly discovered on Balls Pyramid, a barren 500-metre-tall pinnacle of rock just 23 kilometres away from the island. Blending science, adventure and history, this book is the enthralling true story of the rarest insect in Australia, perhaps the world, and how Australian scientists and environmentalists worked to save it from extinction and, possibly, return it to its original environment.

Publisher: Media Dynamics | RRP: $34.95



Wildflower wonders: The 50 best wildflower sites in the world by Bob Gibbons

Wildflower Wonders showcases the most spectacular displays of wild blooms on the planet. This magnificently illustrated volume features 200 panoramic, full-colour photographs as well as a colour map for every site and at-a-glance information panels that highlight the kinds of flowers at each location and the best times to see them in bloom. The informative text gives a botanical profile of each location, and also describes the ecology and conservation status of these sites and the animal life to be found at them.

Publisher: Bloomsbury Natural History | RRP: $35.00

Australian Wildlife Society

Community Wildlife Conservation Award

The Australian Wildlife Society Community Wildlife Conservation Award is an annual award to a community conservation group that is making a major contribution to wildlife preservation in Australia.

Our Society is very conscious that we need to join together with other conservation groups to save and protect all native Australian wildlife populations in all its many and varied forms across Australia.

The Australian Wildlife Society wants to recognise and help these conservation groups continue with their good work on behalf of the whole community. 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.

The Award

Our Society will present a crystal trophy and a cash award of $2,500 to the winning conservation group that is helping to save our precious Australian wildlife.

Nominations

Nominations for the Australian Wildlife Society Community Wildlife Conservation Award should be made in writing to be received by our Society by 31st December. Nomination forms can be downloaded from our website at www.australianwildlife.net.au. Completed nomination forms can be sent to the Australian Wildlife Society by email to info@australianwildlife.net.au or faxed to 02 9599 0000 or mailed to PO Box 42 Brighton Le Sands NSW 2216

Selection Procedures

The decision on the granting of each year's award will be decided by a full meeting of the Council of the Australian Wildlife Society.

For further information, please contact the National Office on Tel 02 9556 1537.

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

Australian Wildlife Society

The Serventy Conservation Medal

The Australian Wildlife Society created the Serventy Conservation Medal in honour of three members of the Serventy Family.

In memory of Dr Vincent Serventy AM, who was a member of the Wildlife Preservation Society of Australia for more than fifty years, President for thirty years and was the President of Honour. Over the sixty years of his environmental work in Australia, and internationally, Vin worked to realise his vision of a world whose people understand that we do not own this earth, but are trustees for its future, and that we should live in harmony with nature. He has justly been called the '*father of conservation in Australia'*.

In memory of Lucy Serventy who seventy years ago became a Life Member of the Society and so began a lifetime interest in conservation.

In memory of Dr Dominic Serventy, who as the elder of the eight strong Serventy clan, played a leading part in encouraging their interest in natural history. He is regarded as among the world's greatest ornithologists.

Our intention is to award the medal to those who labour as a volunteer in the conservation field for a love of nature and a determination that is should be conserved.

Medal Design

The medal has been designed by Australia's foremost sculptor Stephen Walker. The Australian Wildlife Society also gives a cash reward of $1,000 to the winner. Many conservationists in the past have suffered financially for their devotion to the cause. This cash award will be some tribute for their dedication. The bronze medal will be a constant reminder that the conservation movement has remembered their work in the past, just as history will remember the same achievements in the future.

Nominations

Nominations for the ***Serventy Conservation Medal*** should be made in writing to be received by our Society by 31st December. Nomination forms can be downloaded from our website at www.australianwildlife.net.au. Completed nomination forms can be sent to the Australian Wildlife Society by email to info@australianwildlife.net.au, or mailed to PO Box 42 Brighton Le Sands, or by fax 02 9599 0000.

Selection Procedures

The decision on the granting of each year's medal will be decided by a full meeting of the Council of the Australian Wildlife Society.

For further information, please contact the Secretary of the National Office on telephone 02 9556 1537 or by email info@australianwildlife.net.au

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

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 42
Brighton Le Sands NSW 2216
Tel: (02) 9556 1537
Fax: (02) 9599 0000
Email: info@wpsa.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

I will give:

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

☐ My choice of $ per month _____

Signature Date

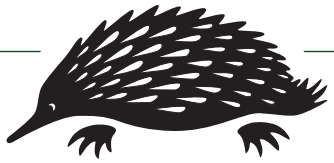
This authorisation is to remain in force until cancelled by the donor and in accordance with the terms described in the Agreement below.

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: $1,000

(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)

☐ Cheque ☐ Money Order ☐ Mastercard ☐ Visa Card Security Code (CSC) __ __ __ __

Card Number: |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Amount $.....

Name on Card: .....Expiry:..... Donation $.....

Signature:..... **Total** $.....

Mail to the: **Wildlife Preservation Society Limited**
PO Box 42, Brighton Le Sands NSW 2216.
Email: info@wpsa.org.au Website: www.wpsa.org.au

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.

Brad Leue Photography

Blowhole Beach, Deep Creek Conservation Park SA: Deep Creek is 45 km^2 of natural bush land that runs alongside the Southern Ocean. It offers beautiful hikes through bush land, cliff faces and some of the best coastal views South Australia has to offer. It also offers a large variety of native wildlife, including western grey kangaroos, short-beaked echidnas and more than 100 bird species.

Koalas were actually introduced to Kangaroo Island in the 1920s when 18 koalas from Victoria were released in the Flinders Chase National Park. Koalas now flourish in many areas throughout the Island.