



AUSTRALIAN *Wildlife*

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Celebrating a new century of wildlife preservation in Australia

Journal of Wildlife Preservation Society of Australia Limited trading as Australian Wildlife Society
(Founded 1909)

QUOLL - PHOTO BY ESTHER BEATON



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Suzanne Medway AM
Editor, Australian Wildlife



Sabine Borgis
Sub-Editor, Australian Wildlife



Front and back cover:

The koala (*Phascolarctos cinereus*) is an arboreal herbivorous marsupial native to Australia. It is the only extant representative of the family Phascolarctidae and its closest living relatives are wombats. The koala is found in coastal areas of the mainland's eastern and southern regions, inhabiting Queensland, New South Wales, Victoria, and South Australia. It is easily recognisable by its stout, tailless body and large head with round, fluffy ears and large, spoon-shaped nose. Photo by Luke Stambouliah.



Australian Wildlife Society

Conserving Australia's Wildlife
since 1909

Australian Wildlife

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

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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.

Articles and comments expressed in this magazine do not necessarily reflect the opinions of the Editor, Society or members. Articles contributed from outside sources are included for the reading enjoyment of members and to encourage discussion on different points of view.

Articles may be copied or quoted with appropriate attribution.

From the President's desk

Suzanne Medway AM - President

"My vision for the Society in the coming year is to expand and strengthen the environmental education program. Our research has shown that young people who study wildlife conservation at school and university develop a keen and abiding interest in the subject which can last a lifetime."



I am extremely honoured to step back into the President's role after successfully nominating to rejoin the Board of Directors at the 107th Annual General Meeting and being elected to the role of President at the Board of Directors' meeting in April.

My vision for the Society in the coming year is to expand and strengthen the environmental education program. Our research has shown that young people who study wildlife conservation at school and university develop a keen and abiding interest in the subject which can last a lifetime.

There will also be a renewed focus on supporting wildlife conservation volunteers through our two awards – the Serventy Conservation Award and the Community Wildlife Conservation Award. Both awards carry a cash prize and this has been increased to \$1,500 for the Serventy Conservation Award and \$3,000 for the Community Wildlife Conservation Award.

Of particular interest to me personally is encouraging and supporting wildlife rehabilitators and rescuers. I admire these unsung heroes who make such a contribution to saving Australia's precious wildlife. Volunteering is generally considered an altruistic activity but volunteering may have positive benefits for the volunteer as well as for the person or community served. We hope to encourage the government to give more assistance to wildlife rehabilitators in caring for sick and injured native wildlife. Their volunteer work saves the government and its agencies millions of dollars a year. I would like to introduce a third award given by the Society – a carer's award. This will be discussed and implemented at future board meetings.

I am delighted to welcome two new members to the board of directors – Trevor Evans and Wayne Greenwood.



Trevor Evans

Trevor Evans will bring to the board special skills in wildlife management. Trevor has always been involved in conservation. He was a coal miner for 20 years before deciding to pursue his life-long love of nature on a full-time basis. In 1996 Trevor, with wife Julianne, purchased 250 hectares of degraded land in the Lithgow valley and created Secret Creek Sanctuary, Cafe and Restaurant. In 2001 Trevor co-founded Australian Ecosystems Foundation (AEFI) and has been an environmental consultant for a number of large companies. Trevor recently managed the environmental side of the Emirates remote area 5-star resort project from inception through construction and then opening. Through AEFI he continues to assist with the rehabilitation of the Wolgan Valley property and its river. Trevor first became a member of our Society through AEFI in 2008. AEFI was the recipient of our Society's Community Wildlife Conservation Award for its fine example as a community organisation in action, providing scientific and educational input into the management of Australia's precious wildlife.



Wayne Greenwood, Suzanne Medway AM and Trevor Evans

Wayne Greenwood is a specialist in project management and will bring this skill to help reshape our Society for the 21st century. Wayne has been a member of our Society since 2009 and has a long-term interest in wildlife conservation with strong family connections in the country. He is very committed to helping save our native wildlife and to promote the Land for Wildlife project. He expects to retire to Kangaroo Valley soon and will have more time to devote to helping the Society and its projects. Wayne and his wife Jeanette's property is part of the Greater Eastern Ranges Wildlife Project and over the past few years he has been actively remediating areas of their property. This has enabled wildlife like lyre birds, echidnas and wombats to return in number to their property. Wayne is keen to promote wildlife conservation in all schools for future generations of children.

107th Annual General Meeting



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

The 107th Annual General Meeting of the Wildlife Preservation Society of Australia Limited trading as the Australian Wildlife Society was held on Wednesday 2 March in Sydney. The membership of the Society was well represented, with 36 attending in person.

David Murray, President, tabled the Annual Report for 2015 and highlighted the Society's achievements in wildlife conservation over the past year.

The Treasurer's Report for 2015 showing a strong financial balance was tabled and adopted by the meeting.

The current Auditor, Peter James Varley, CA Registered Company Auditor, was confirmed as the Society's auditor for 2016.

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

Noel Cislowski
Sash Denkovski
Wayne Greenwood
Stephen Grabowski
Trevor Evans
Ken Mason
Suzanne Medway

Chris Chan did not stand for re-election but acted as returning officer for the meeting. A formal vote of thanks for Chris was carried by acclamation.

A short profile on the seven elected directors follows.



L to R: David Murray, Tim Faulkner, Noel Cislowski and Patrick Medway

Noel Cislowski AM

Qualifications: AM, BA (Hons), A Ed, FTCL, FSDA, AMusA, CSCA. Appointed Board Member: 29 January 2009. Professional memberships: President of The Speech and Drama Association of NSW. Community associations: Chairman of Willoughby Symphony Orchestra Advisory Committee, past National Chairman of Orchestras Australia, Deputy Chairman of Sydney Cultural Council and Sydney Eisteddfod, Former Deputy Chairman of Board of Studies for National Institute of Dramatic Art (NIDA), Rotary Club of Chatswood. Appointed a Member of the Order of Australia (AM) in the Australia Day Honours 2016. Employment: Retired.

Sash Denkovski

Qualifications: Bachelor of Commerce, MPA, JP, Principal of Adenix Accountants. Professional accountant in practice at Rockdale, joined the Board in 2013 and was elected Treasurer. Professional memberships: member of Institute of Public Accountants, Justice of the Peace, ACPA (Associate member of CPA), member of local sporting associations. Community associations: Rockdale Chamber of Commerce, member of Society since 2005, strong interest in environmental and conservation issues and social justice.

Trevor Evans

Qualifications: Bachelor of Applied Science (Ecotourism & Ecosystem Management) - Charles Sturt University NSW. General Manager of Secret Wildlife Sanctuary, Lithgow, with wide experience in wildlife management, wildlife conservation and environmental education programs, hands-on experience in breeding rare and endangered species. Currently on a number of government and agency threatened species programs and projects. Conservationist of the year in 2010. Licences: Reptile Keeper's Licence - RK59930 - Class 1 Licence; Licence Outdoor Guide - NPWS of NSW; licence to hold endangered species; licence to exhibit Australian wildlife

- DPI 10032; licensed with Zoo and Aquarium Association. Recipient of the Wildlife Preservation Society Community Conservation Award 2009. Member since 2001. Vision of the Society is to further the endangered species projects.

Stephen Grabowski

Qualifications: Advanced Diploma Financial Services (Financial Planning), Graduate Certificate in Applied Finances, Justice of the Peace. Appointed board member: 7 May 2014, and member since 2002. Served as financial adviser to the Society since 2005. Professional memberships: member NSW Business Chamber; President, South West Sydney Regional Advisory Council; member of the Financial Planning Association of Australia. Community associations: Treasurer for P&F Magdalene Catholic High School. Sponsor and supporter of Narellan Jets, Camden Little Athletics, Christmas in Narellan, Narellan Masters Football Club. Employment: Stephen has been active in the financial services industry since 1992 with State Bank and Colonial State Bank and has been providing financial advice since 2001 in roles with Commonwealth Bank, Financial Services Partners, Hillross and boutique financial planning firms. Employment: Director of Grabowski Financial Planning.

Wayne Greenwood

Qualifications: BA, Master of Transport Management, Registered Project Manager and Dip PM, CMILT, AFAITI, MAIPM. Managing Director of Project Management Pty Ltd. Long-term interest in wildlife conservation with strong family connections in the country. Very committed to helping to save our native wildlife and to promote Land for Wildlife project. Expects to retire to Kangaroo Valley soon and will have more time to devote to helping the Society and its projects. Wayne and his wife Jeanette's property is part of the Greater Eastern Ranges Wildlife Project and over the past few years he has been actively remediating areas of their property, which has enabled wildlife such as lyre birds, echidnas and wombats to return in number to their property. Keen to promote wildlife conservation in all schools for future generations of children.



Two of *Australian Wildlife*'s regular contributors - Chrissy Banks and Calum Meney

Ken Mason

Ken Mason is a retired businessman having had successful careers in both the construction and entertainment industries. As a self-employed independent contractor, Ken worked tirelessly for the improvement of his industry, and was President of two industry organisations, the MRCAA

and Biscoe NSW. President of Lugarno Progress Association. As a musician/entertainer, Ken was the winner of several industry awards, and was for some years Treasurer and Committee member for the entertainment industry's "Mo Awards" Association. Ken and his family have had a lifelong interest in wildlife conservation and



L to R: Deidre Bowes, Margaret McGurgan and Colleen Murphy



L to R: John Grabowski, Alice Grabowski, Stephen Grabowski and Sash Denkovski

have travelled widely visiting many natural areas. During his previous three years on the WPSA board, Ken has strived to ensure that the Society is financially strong and commercially equipped to promote and support wildlife conservation programs across Australia and university student grants for bright young people to study wildlife conservation issues. He offered himself for re-election to the Board, with a commitment to continue to work for the successful future of the Society.

Suzanne Medway AM

Qualifications: Member of the Order of Australia (AM), Diploma of Business, Justice of the Peace for New South Wales. Suzanne is the immediate past president of the

Society and has a long experience and commitment to wildlife conservation across Australia. Suzanne joined the Society in 1988 and has been actively involved ever since. Suzanne has been the Editor of the *Australian Wildlife* magazine since 2002 when she became Secretary/Executive Director on the board. She was awarded Honorary Life Membership for her services to the Society in 2009. Suzanne introduced and has managed the university grant scheme since 2001 and raised funds for the UTS Wildlife Ecology Scholarship. Suzanne established and now maintains the website and social media as well as the membership database for the Society. Her previous business experience includes being Company Secretary for ADI Limited and AAA Insurance Company, and

she has served on several business enterprise boards. Suzanne was appointed a Member of the Order of Australia (AM) for her significant service to wildlife conservation in 2013. Suzanne's vision is to continue to promote wildlife conservation to a wider audience across Australia and especially to the younger generation involved in social media.

Annual Luncheon

The Annual Luncheon was held after the Annual General Meeting in the Adam Room at the Castlereagh Inn in Sydney.

2015 Serventy Conservation Award

Dr Clive Williams, Vice President of the Society and Chairman of the Judging Panel, announced the winner of the Serventy Conservation Medal for 2015 to be John Weigel. John has been an active wildlife campaigner for over 35 years. In the 1990s he devised and implemented a highly successful mobile education program for primary and high schools in all states. Over a million Australian school children were educated through this program. He has made 25 visits to the Kimberley Ranges making discoveries of previously unknown species. Two, a frog and a king brown snake, have been named after him. John's most recent venture was, with his wife, to invest \$1,000,000 in Devil Ark, a program at Barrington Tops, New South Wales, to provide a safe haven for the Tasmanian devil, after the outbreak of devil facial tumour disease occurred. He continues as Managing Director of the not-for-profit Devil Ark Conservation Fund. John is truly a man who has devoted his life to conservation and we welcome him to the list of those recognised by the Serventy Conservation Award.

Upon learning of his successful nomination, John replied:

"I'm totally flabbergasted! This is such an honour, and I'm so proud to accept it – even if through proxy of my co-manager Tim Faulkner. Tim and I have combined forces in recent years to elevate the applicability and success of one of Australia's most important conservation breeding facilities – Devil Ark. This has been a project requiring an effective team effort, and my wife Robyn and Reptile Park Curator Liz Vella have also been instrumental in the success of the program."



L to R: Pam Field, Diane Connor and Deidre Greenhill

On a personal level, I am warmed by the association of the Serventy name with mine – Vin and Carol remain my heroes, even with the passing of Vin some years ago now. I remember the mixture of delight and fear when I last saw him, as I pushed his wheelchair way too fast through the pathways at the Reptile Park. Here was a giant in the conservation and publishing worlds, yet the kindest, gentlest and most generous person I can think of, and here I was pushing him past alligators and giant tortoises at my place of work.

I take my hat off to the Medways (Suzanne and Patrick), and the Society for working with Vin through so many years, accomplishing so much, and for carrying on in an effective manner into the present – and no doubt into the future. Congratulations to everyone contributing to the cause – so far as I'm concerned, this award is a reflection of you lot! I wish I could be there, but am knee-deep in fundraising activities in the US."

Acceptance speech by Tim Faulkner

I'm pleased to accept the award on John's behalf. He would truly love to have been here – there are few 'moments of glory' like this one for a bloke devoting so much energy to seemingly unending campaigns. As some of you will know, John and Robyn Weigel have been at the helm of the Australian Reptile Park (ARP) for a very long time. They were close friends with Vin Serventy, and John has mentioned Vin's name to me many times during my dozen or so years on the Reptile Park team. John is the first to put forward the reality that few, if any, of us mere mortals will ever contribute the smallest fraction of the volume or effectiveness of Vin and Carol's published contributions and awareness campaigning for nature.

John's most passionate area of interest (well, besides birding...) for the past dozen years has been his effective leadership in the development of an effective mainland insurance population for the Tasmanian devil – something I will talk about later today.

Over the years both John and Robyn Weigel have played important roles



Tim Faulkner accepting the Serventy Conservation Award on behalf of John Weigel, presented by Clive Williams

in a range of conservation initiatives – mostly relating to Australian reptiles. A project that stands out is the rediscovery of Australia's rarest snake – the rough-scaled python in

a remote corner of the Kimberley Ranges of the far northwest, and subsequent establishment of a healthy and widespread breeding population in zoos around the world. During



John Weigel with co-worker Tim Faulkner



L to R: Tim Faulkner, Roz Holme, Kev Holme and Trevor Evans



L to R: Deidre Bowes, Chrissy Banks and Colleen Murphy



L to R: Sue Emmett and Elly Bluett

his many trips associated with that work over a thirty-year period, John made a number of important wildlife discoveries, and as a result has had two spectacular species that he discovered named after him – Weigel's toad and Weigel's pygmy king brown snake.

When John and Robyn moved to the front of the ARP ship in the mid-1980s, the life-saving snake venom production program that had been established thirty years earlier by Eric Worrell had deteriorated to a point where Australian lives were at risk. Through creative and time-consuming processes, John rebuilt the program – first at an off-site facility – later moving it to the Park at the old North Gosford location. By 1988 John was caring for and milking a sufficient compliment of the targeted five species of venomous snakes that the future for Australian and Papua New Guinea snake-bite victims was once again secure. Since those days, until he handed over the reins to others in the organisation, John extracted venom from taipans, king browns, tigers, browns, and death adders on over 35,000 occasions without suffering a significant bite – probably a record for any part of the world. Beyond the re-establishment of the Park's venom program, John and Robyn oversaw the rebirth of the iconic Central Coast tourism attraction. Following the move to Somersby, the Park has gone from strength to strength, and was twice the recipient of the prestigious award for 'Best Australian Regional Attraction'.

2015 Community Conservation Award

The award for 2015 was made to the Friends of the Brush-tailed Rock-wallaby Inc (BTRW). This group is based in the Kangaroo Valley and has been active in trying to prevent the extinction of the BTRW since 1995. The group has formed a close alliance with the local community, local landholders, local schools and with National Parks and Wildlife. There are now three colonies of BTRW, some on private land and some on land under government control. They have maintained an active fox control program and trained local landholders in fox baiting methods. The group has funded the fox shooting program and also the purchase of radio collars attached to captive-bred animals upon their release into the wild. By reducing the risk of predation, the Friends have been successful in saving

this animal from probable extinction in the area and trebling the number of animals at large. They are a great example of a successful community organisation at work.

Acceptance speech by Chris Pryor

President of Friends of the Brush-tailed Rock-wallaby

On 2 March I was delighted to receive notification that Friends of the Brush-tailed Rock-wallaby had won the Australian Wildlife Society's Community Wildlife Conservation Award for 2015. The Friends is a relatively young group, being only 21 years old. It is a great honour to be awarded this prize by such a well-respected centenarian organisation!

The Friends' vision is for a future where brush-tailed rock-wallabies (BTRW) thrive in the wild in a biodiverse Australia. This would seem to be a good fit for the aims of the AWS.

Our primary objectives are to raise awareness; develop community support; provide education; and obtain funding for the conservation of the brush-tailed rock-wallaby, which is listed as Endangered under the *Threatened Species Conservation Act 1995*.

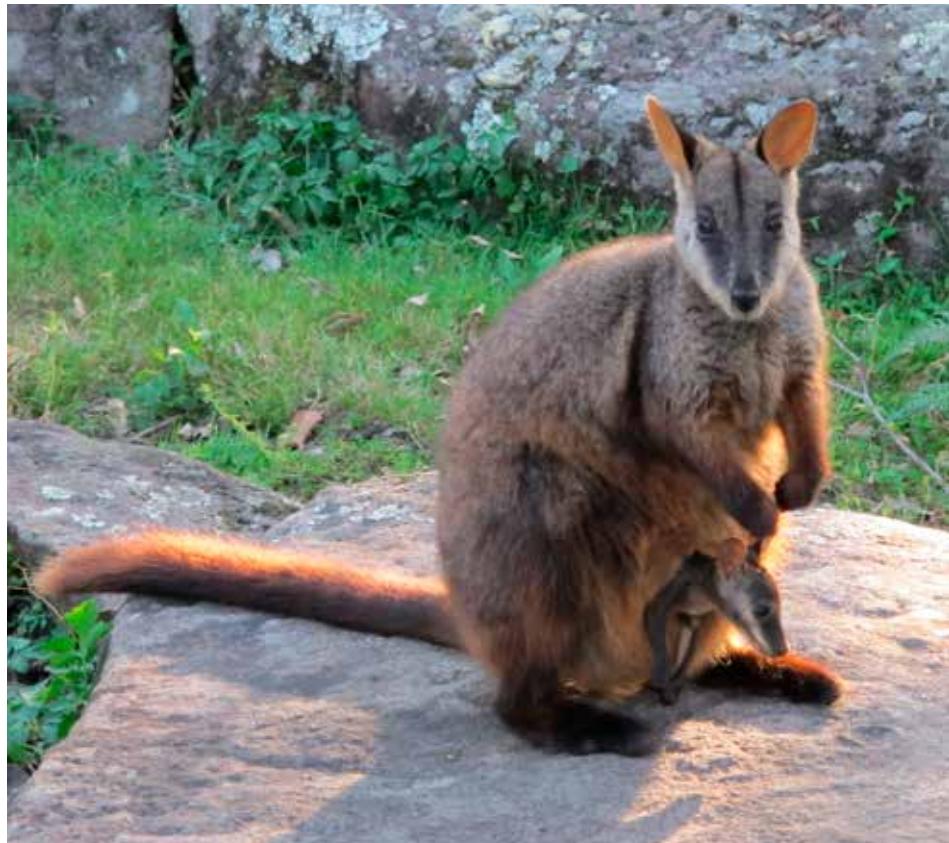
The Friends work in a three-way partnership with National Parks and Wildlife Service (NPWS), who are responsible for the NSW BTRW Recovery Plan, and the hugely supportive local community.

The on-ground recovery plan work, which is all done by NPWS, has two focuses: an intensive fox-control program (which of course benefits local biodiversity in general), and the release of captive-bred rock-wallabies to boost the local colonies. The rock-wallabies are bred at Waterfall Springs Wildlife Sanctuary, at Kurnura on the New South Wales Central Coast, and a handful of animals are released into one of the Kangaroo Valley colonies once or twice a year. The goal is to return the local colonies, which have **distinct** genetics, to self-sustaining populations so they can withstand occasional predation.

The BTRW habitat in the Kangaroo Valley area comes under many different tenures, so landholder support is essential to enable effective predator control. Foxes are the key predator,



Chris Pryor accepting the Community Conservation Award from Clive Williams



Brush-tailed rock wallaby mother and joey



Guest speaker at the luncheon – Tim Faulkner

taking joeys that have been stashed in little rocky refuges so that their mums can safely scale cliff faces, without a destabilising weight in the pouch. Sadly, rock-wallabies haven't evolved alongside the European fox, so they haven't developed the required survival strategies. With only 30 rock-wallabies across three colonies, the European fox **presents a real extinction risk**.

As you can probably guess, there is still plenty for the Friends to do. If you

would like to support this critical work, please visit <http://www.rockwallaby.org.au> .

You may be particularly interested in our symbolic adoptions program <http://www.rockwallaby.org.au/adopt> , whereby you can select a rock-wallaby from a family album of life-stories and receive newsletters throughout the year giving updates of your rock-wallaby and its family and friends.

We can also be found on Facebook if you would like to share us with your friends. <https://www.facebook.com/Friends-of-the-Brush-tailed-Rock-wallaby-190159674366571/>

Guest Speaker – Tim Faulkner

Tim Faulkner is a recognised leader in the Australian zoo industry and in conservation organisations. His working life has been dedicated to hands-on wildlife education and conservation. Tim is responsible for the day-to-day running of the Central Coast's largest tourism attraction, the Australian Reptile Park. Along with 35 staff and 50 volunteers, Tim is credited with the growing success of the park as the leading wildlife tourism attraction in New South Wales for both regional and global markets, attracting over 220,000 visitors a year, including regular bus tours of visitors from North and South-East Asia. Tim and Devil Ark are fighting to ensure the Tasmanian devil will not reach extinction. The threat of extinction is caused by an infectious cancer, devil facial tumour disease (DFTD). Unfortunately, the wildlife community is still searching for a cure or vaccine for DFTD. The only option to ensure the Tassie devil's survival in the wild is the reintroduction of healthy animals from breeding programs like Devil Ark.

Tim gave a stimulating and fascinating address to the luncheon guests. See the article on page 32 of this magazine to learn more about Tim's work with Tasmanian devils.



Members attending the 107th Annual General Meeting



STURT'S DESERT PEA

SUZANNE MEDWAY | PHOTOS BY KEN METCALFE

The Sturt's desert pea (*Swainsona formosa*) is a well-known Australian native flower that is the state floral emblem for South Australia.

Sturt's desert pea, genus *Swainsona*, is named after English botanist Isaac Swainson. The plant is famous for its distinctive blood-red leaf-like flowers, each with a bulbous black centre, or 'boss'. It is native to the arid regions of

central and north-western Australia, and its range extends into all mainland Australian states with the exception of Victoria.

The flower is referred to as the 'Flower of Blood' by some Koori groups. This title comes from the legend which tells of a young woman who escaped marriage to an elderly gentleman by eloping with her younger lover. The

shunned man and some of his friends tracked the couple down after some years and killed them both, as well as the relatives with whom they had lived. Sometime later, the old man returned to the place where he had slain the lovers and found the ground covered with the scarlet flowers that we know as the Sturt's desert pea.





Discovering the nudibranch

Melanie MacKenzie

Gliding past colourful sponges, scanning for seahorses, and dodging inquisitive toadfish are all part of the fun when it comes to scuba-diving under Blairgowrie Pier, but it's often a more secretive species that draws the marine naturalist and photographer to this haven on the Mornington Peninsula. The pier is a well-known place for spotting **nudibranchs**, the tiny 'butterflies of the sea', which often hide out on sponges or in clumps of seaweed attached to the pier pylons.

They might not look it, but these extraordinary creatures, some smaller than your little fingernail, are actually

related to snails. Most species are shell-less and their common name 'nudibranch' refers to their naked or exposed gills, but only a close encounter or well-timed photograph can truly reveal their beautiful and often bizarre forms.

Australian marine parks and sanctuaries play host to a huge variety of nudibranchs and related animals, from bubble shells, sea hares, side-gilled and sap-sucking slugs, to the true nudibranchs. In south-eastern Australia alone there are over 400 species, and the expert when it comes to these is the unstoppable Robert (Bob) Burn, who has authored over

100 publications and described over 90 species of these amazingly diverse marine invertebrates. The good news for all Australian wildlife lovers is that Bob's skills as a nudibranch world expert, enthusiastic educator and intriguing storyteller, have now been channelled into a fantastic new field guide, *Nudibranchs and related molluscs*. The new guide, part of the Museum Victoria Field Guide series, introduces readers to some of the more common and spectacular species from south-eastern Australia.

Bob still recalls finding his first nudibranch in 1954, having it



identified and hearing the wonderous sound of its Latin name – *Ceratosoma brevicaudatum* – “it just rolled off the tongue”. It was hinted that another of his finds might be something that had not been seen for 50 years, and while this did not turn out to be the case, it was already too late for Bob, who had found his calling. He decided that nudibranchs were well worth looking for when foraging on the reef at low tide. In no time at all he had found 100 different species, had identified what was possible and had described a number as new to science, including a couple that warranted a major article in *Nature*. Since then he has dedicated

over 60 years to collecting, observing and studying these amazing creatures.

Unbelievably, Bob’s nudibranch research has always been in a voluntary capacity through his work with Museum Victoria, the Marine Research Group of the Field Naturalists Club of Victoria, and the Malacological Society of Australasia. So what is it about these creatures that has lured a mild-mannered Geelong building contractor to a lifetime of weekend observation along the Victorian coast? “Nudibranchs are fascinating animals to watch,” says Bob. “They do not flit away like fish. They move deliberately

and slowly, the body twisting and turning as the animal searches out food or a mate. Small and minute species – those less than 5 mm long – are a beautiful sight of colour and shape to behold under a microscope”. No wonder he was hooked.

Not just a pretty face, nudibranchs and their relatives are also masters at defence, reproduction and concealment. Some are known to collect deadly nematocysts from their cnidarian food sources and squirrel these away for future defence. Bob tells me that one such example is the open oceanic nudibranch *Glaucus* that eats pelagic cnidarians like the Portuguese man of war *Physalia*. It has been known to sting bathers and beach goers who handle animals as they wash ashore after storms. He also talks of their diverse reproductive strategies. Mating ranges from trailing one after the other, to hermaphroditic coupling side by side, or gathering in “frothy orgiastic groups”. They lay egg ribbons or balloons from which a myriad of minute swimming larval forms will emerge. Sometimes an egg ribbon will contain far fewer but much larger eggs from which crawling miniatures emerge, immediately seeking food. With gorgeous colours, stripes, spots and fringes, many nudibranchs are also extremely good at hiding. They often mimic the look of their food source so that they remain concealed while feeding on a sponge, hydroid or seaweed. “Many burrow in the sandy or muddy bottom sediments, either to look for food or for protection, but to search for these will take you into yet another world”.

Thanks to Bob’s encyclopaedic knowledge of the group, and the amazing contributions of many talented collectors and photographers, the *Nudibranchs* field guide is filled with fabulous images, descriptions, identification keys and fun facts to fuel the fascination of any keen amateur naturalist, diver or photographer. Bob’s studies of nudibranchs have always led him to want to learn more about them, and this has turned out to be in his words a “never-ending joy for more than 60 years”. This guide will help you to enjoy them too, and Bob urges that you do so “at a leisurely pace”. As he points out, “Nudibranchs don’t run away, so you can take the time to watch

Above: *Burnaia helichorda*. Source: Leon Altoff, Marine Research Group. Photographer: Leon Altoff



Neodoris chrysoderma. Photographer: Neville Coleman

them, observe how much variation there is in a single species, and see what makes them different from a similar looking species. It is not difficult to find something that you think might be different or unknown, but it is only by careful observations and examination that you will prove your case."

So just remember, the next time you ramble along a rocky shore or snorkel past a sponge on a pier pylon, it might just be worth your while to linger. Did that sponge just move? Do you spy a sneaky pair of head tentacles (rhinophores)? Take a closer look and you might just be lucky enough to discover the wonderful world of nudibranchs.

About Melanie MacKenzie

Melanie works with a dedicated team to manage and maintain the Marine Invertebrate Collection at Museum Victoria. She also works closely with Museum Honorary Associate Mark O'Loughlin and colleagues on echinoderms – primarily sea cucumbers, contributing through fieldwork, lab work, research and photography to a variety of scientific projects and publications. Alongside her colleagues Mark Norman and Robin Wilson, Melanie is an editor of the Museum Victoria Field Guide series. She is about to embark on the



Sagaminopteron ornatum. Photographer: John Chuk

SO-AntEco expedition led by the British Antarctic Survey to investigate the diversity of life on the seafloor around the South Orkney Islands.

About Robert Burn

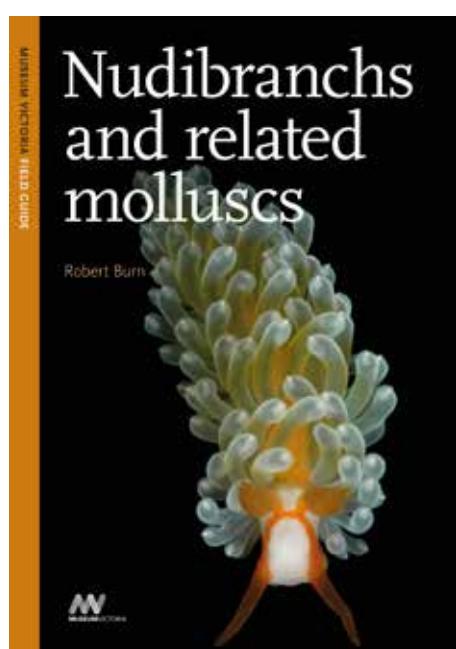
Robert Burn is an internationally respected authority on the marine group to which nudibranchs and related molluscs belong. Imbued with a love of these animals since childhood, he has over 60 years of experience collecting, observing and studying nudibranchs in the field and under the microscope. Robert's expertise is acknowledged through his honorary status with the Marine Biology section of Museum Victoria, the Malacological Society of Australasia, and the Field Naturalists Club of Victoria. He has been an Honorary Associate with Museum Victoria since 1962 and has been a member of the Malacological Society since early in 1952, the year of its foundation. Alongside his 'day job' as a third-generation building contractor in Geelong, Victoria, Robert has authored more than 100 publications on nudibranchs and other molluscs, including sections for *Coastal Invertebrates of Victoria: An Atlas of Selected Species* (1984), *Marine Invertebrates of Southern Australia* (1989), and *Fauna of Australia, Mollusca: The Southern Synthesis* (1998). He has described more than 90 species of nudibranchs and related molluscs, the vast majority from the coastline of Victoria. Many more species are known and await description.



Ceratosoma brevicaudatum, sea slug. Location: Australia, Victoria, Port Phillip, Rickett's Point. Source: Museum Victoria. Photographer: Julian Finn



Chromodoris tasmaniensis, sea slug. Photographer: John Chuk



Nudibranchs and related molluscs. The field guide is available from Museum Victoria shops, online, and all good bookshops.



Hermaea evelinemarcusae, sea slug, Opisthobranch. Photographer: John Chuk



Photo: Centre for Wildlife Research, courtesy S. Brown

TRANSLOCATION

THE CON IN CONSERVATION BIOLOGY Allen Greer

When a population of a threatened species lies in the path of a development, proponents often propose to move, or translocate, the population to another location. And the courts agree translocation can be a 'solution'. The NSW Land and Environment Court, for example, determined in February that the Shenhua Watermark coal mine in New South Wales can relocate its 'in-the-way' koalas to another place.

Although proponents can always find 'experts' to back their proposal, translocation is biologically and philosophically flawed.

The probable outcomes of a translocation are always uncertain.

If the animals are translocated to a place containing an existing stable population, there will be no room. The net numbers of animals in the habitat will remain unchanged and the net 'adjustment' deaths will roughly equal the number of animals translocated.

If the animals are introduced to a place that has never had the species, the chances the translocated animals will 'take' where no population has managed to establish itself before is, at best, an informed guess.

If the animals are introduced to a place that once had the species but no longer does without determining what factors caused the local population to go extinct and whether those factors

are still in play, a translocation is just a hopeful punt.

Operationally, translocations are often done and the development begun before it is known if the translocation has 'taken'. If it hasn't, the proponent already has his development while the threatened species has one less population. There will be crocodile tears and assurances that "we tried our very best", but there will be no penalty and, of course, no going back.

Putting the shoe on the other foot and having the threatened species'

Above: Koala clings for dear life as his habitat gets bulldozed around him. Photo: Centre for Wildlife Research, courtesy S Brown

defenders nominate the consultant would no doubt raise the cry of “bias” among developers, as ironic as that would be. But there are two other ways of achieving a fairer consultancy. First, both developers and environmental defenders would have to agree on the consultant. Second, consultants could be put on a rotation list and when a proponent needs a consultant, assign the one that has rotated to the top of the list.

Translocations almost always involve an overseeing government department. But like consultants and their clients, bureaucrats twig the will of their political pay-masters and self-regulate to self-perpetuate.

There is a new philosophy about nature in translocation as a conservation ‘solution’. It is that species and populations are now moveable whenever the ‘need’ arises. This is despite the fact species and populations are the product of, and are valued for, being evolved entities in historical continuity with a natural place. The end point of this new ‘species on wheels’ philosophy is that the translocation of species and populations to ‘naturalistic enclosures’ in faraway places is okay. Translocation is no longer a temporary solution to riding out the ‘rot’ for a better day. It is now part of the rot.

About Allen Greer

Allen Greer is a biologist who writes about science and nature. He wrote the *Biology of Australian Lizards*; the *Biology of Australian Snakes*, and the online *Encyclopedia of Australian Reptiles* (now discontinued). He has also written and currently maintains the online book-length *The Tasmanian Devil. Its Biology, Facial Tumour Disease and Conservation* (sugargum. wix.com/tasmaniandevil). He has written essays and opinion pieces for *Australian Quarterly*, *Australasian Science*, *Australian Financial Review*, *Crikey*, *the Drum*, *Hobart Mercury*, *National Times*, *New Matilda*, *Nature Australia*, *Public Sector Informant*, *Quadrant*, *Sydney Morning Herald*, *The Australian’s Higher Education Supplement* and *The Scientist* and over a hundred Letters to the Editor. He has no institutional affiliation or other conflicting interest.

The Australian Koala Foundation is the principal non-profit, non-government organisation dedicated to the conservation and effective management of the wild koala and its habitat.

The Australian Koala Foundation is totally opposed to the concept of translocation. They will continue to oppose all koala translocations until there is a national policy with robust ethical approvals and oversight in place. Translocations facilitate and sanitise the destruction of the landscape, moving the koalas out to pave the way for land clearing, urban and industrial development, and roads, with no long-term interest in the ultimate fate of the koalas displaced.

They are particularly concerned with the following issues:

- Current translocation practices doom the animals involved. There is a wealth of evidence to suggest translocations can be associated with significant koala mortality. There are many, many examples of translocations gone wrong – in Victoria, translocations with 80 to 100 percent mortality of moved animals (this entire program was subsequently disbanded); in Queensland one study showed up to 30 percent mortality; another 58 percent mortality. These are appalling figures, and could be higher still given the level of secrecy which surrounds many of these programs (sometimes called ‘research’ programs, but often conducted to allow unfettered development).
- And just where are these animals going to? Translocated koalas need to be moved to entirely vacant habitats. Moving koalas into already occupied habitats causes major social disruption; resident koalas reject translocated animals forcing them into danger on roads or into the path of dogs, or the translocated animals push out the existing residents.
- New habitats (so called ‘offsets’) simply will not be ready to receive new koalas for decades. Koalas simply cannot be expected to wait 10 or 20 years for the trees to grow.
- It is our experience that calls for increased koala translocations severely underestimates the commitment required to monitor the longer-term health and welfare of translocated koalas. Most projects may have started out with the best of intentions, but before too long difficulties become apparent. Inevitably costs rise and the whole project is ended prematurely. It is imperative that steps be taken, for example financial bonds, to ensure funding is available for the whole term of the exercise.

Douglas Kerlin BSc (Hons) MInfTech PhD
Chief Ecologist
Australian Koala Foundation
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Buying to save

By Caitlin Maxwell

Landowners work with The Nature Conservation Trust of New South Wales to place covenants on their land, helping the Trust to reach its goal of protecting over 50,000 hectares of private conservation land in New South Wales.

People purchase property for many reasons. Sometimes it is bought as an investment, other times it is bought to live on. But what about those people who are purchasing property for a different reason altogether?

For some, the motivation to purchase land is simply to *protect* it.

Through the Nature Conservation Trust of New South Wales (NCT), private properties can be placed under a conservation covenant in order to protect threatened ecosystems and the flora and fauna that inhabit the land.

This program has produced remarkable results for New South Wales' biodiversity, with the NCT recently announcing that it has reached its goal of protecting over 50,000 hectares of high-value conservation land on private property in the state.

Given that most of the land in New South Wales is privately owned, this is an important achievement for a state which is facing significant biodiversity

loss. Fifty-nine percent of mammals alone in New South Wales are listed as being threatened with extinction whilst Australia as a continent has experienced the largest documented decline in biodiversity in any continent over the past 200 years.

Various landholders have recognised the loss of biodiversity in New South Wales as an important issue to address. The NCT's covenants ensure the safeguarding and preservation of species and the complex ecosystems which are fundamental to our way of life.

The covenant is a legal, in perpetuity, agreement which provides landowners with certainty that the conservation work they undertake will be maintained into the future. NCT currently works with landowners of properties ranging in size from a few hectares to a 22,000-hectare property near Griffith, Mawonga Station.

Amanda Solly is one landholder who, motivated by her love of nature and passion for conservation, engaged the NCT to place a covenant on her land. In 2013, Amanda and her partner Christopher purchased Caladenia Park, a 110-hectare property in Albury, New South Wales.

Having grown up in Albury and having lived there most of her life, Amanda decided it was time for her to give something back to the place she knew and loved. The NCT covenant covers 109 hectares of Caladenia Park, which is home to a range of beautiful native species including baby eagles, echidna, eastern grey kangaroos, rock wallabies, wombats, monitor lizards (goannas), brushtail possums and other marsupials. It is also a sanctuary for rare birds such as the endangered regent honeyeater and the turquoise parrot.

The regent honeyeater is one of the most endangered bird species in Australia. With a population as low as 400 birds, the species is at high risk of becoming extinct as it is unique to Australia. As the species' main threat is loss of its woodland habitat, the most effective means of protecting the regent honeyeater is through the process of covenanting the land.

The star of the property, though it is extremely rare, is the critically endangered crimson spider orchid. 'There are only about 20 of these beautiful native plants left in Australia.

Above: Ken Rippin at his property 'Close to the Edge'

We are lucky enough to have one on our property,' said Amanda Solly.

The couple's vision for Caladenia Park is to eventually build an education centre on the part of the property which is not covenanted, so as to teach visitors about the importance of conservation and the native species found on the property.

Louise Freckleton and her partner David were Sydney city-dwellers who decided three years ago that they wanted to leave the Big Smoke for a more peaceful life in the Australian bush. The couple purchased Highfield, a 300 hectare woodland property in Wagga Wagga, New South Wales.

Louise and David had always dreamt of being able to work on the land, while simultaneously rehabilitating it. "Bringing together conservation and farming is definitely a passion project. We love it and are grateful for the support and advice that NCT has provided," said Louise Freckleton.

The couple run a small lambing business, selling their produce at local farmers' markets and, at the same time, protect the threatened box gum grassy woodland on their property. Additional species protected by this covenant include native orchids, lilies and other wildflowers, hooded robins, the diamond fire-tail, the black-chinned honey eater and the aforementioned critically endangered regent honeyeater.

John V McCarthy AO, Chair of the NCT said, "There is no doubt that over the past five years, interest in private land conservation has increased significantly. We were able to reach our target of 50,000 hectares only through the outstanding efforts of private landowners."

To date, the NCT has protected 52,225 hectares across 109 private reserves in New South Wales. These reserves include lands with registered covenants and land held for sale in the NCT revolving fund. NCT private reserves provide refuge for a wide range of endangered ecological communities and habitat for many animal and plant species threatened with extinction.

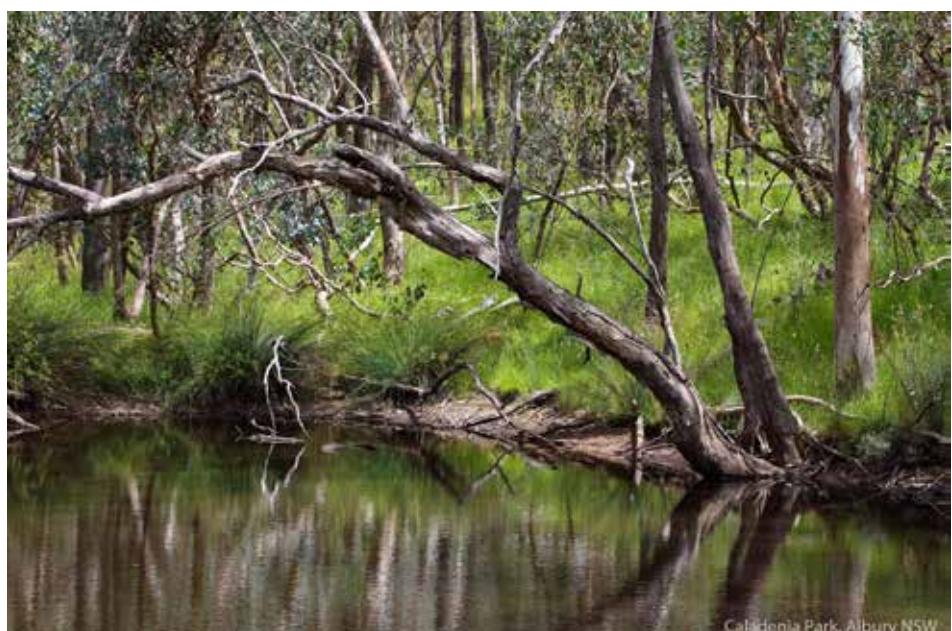
Some of these threatened species include the malleefowl, southern brown bandicoot and Hastings River mouse, Major Mitchell's cockatoo, eastern pygmy possum and Parma wallaby. The NCT's private reserves also ensure the preservation of six nationally threatened ecological communities,



Box gum grassy woodlands once occurred over an extensive area of south-eastern Australia, including the western slopes and tablelands of the Great Dividing Range, through southern Queensland, western New South Wales, the Australian Capital Territory and Victoria.



The regent honeyeater, with its brilliant flashes of yellow embroidery, was once seen overhead in flocks of hundreds. Today the regent honeyeater has become a 'flagship species' for conservation in the threatened box-ironbark forests of Victoria and New South Wales on which it depends.



Amanda and Christopher Solly's property, Caladenia Park, Albury

Caladenia Park, Albury NSW



Caladenia Park, Albury NSW

A monitor lizard (goanna) at the Solly's property Caladenia Park, Albury



The green tree frog is native to Australia and New Guinea. The species belongs to the genus *Litoria*. Larger than most Australian frogs, the green tree frog reaches 10 cm or more in length. Its average lifespan in captivity, about 16 years, is long compared with most frogs. Docile and well suited to living near human dwellings, Australian green tree frogs are often found on windowsills or inside houses, eating insects drawn by the light. The green tree frog screams when it is in danger to scare off its foe, and squeaks when it is touched. Photo by Georgia Beyer.



The squirrel glider (*Petaurus norfolkensis*) is a nocturnal gliding possum. This species' home range extends from Bordertown near the South Australian–Victorian Border through south-eastern Australia to northern Queensland. This species was thought to be extinct in South Australia since 1939 until a genetic test confirmed their inhabitance in this area. The squirrel glider lives in south-eastern Australia in the dry sclerophyll forest and woodlands. In Queensland, however, they occupy a wetter eucalypt forest. The glider will make a den in the hollow tree and line it with leaves. Here it will sleep and usually lives in groups of one male, two females, and offspring. Photo by Shannon Plummer.

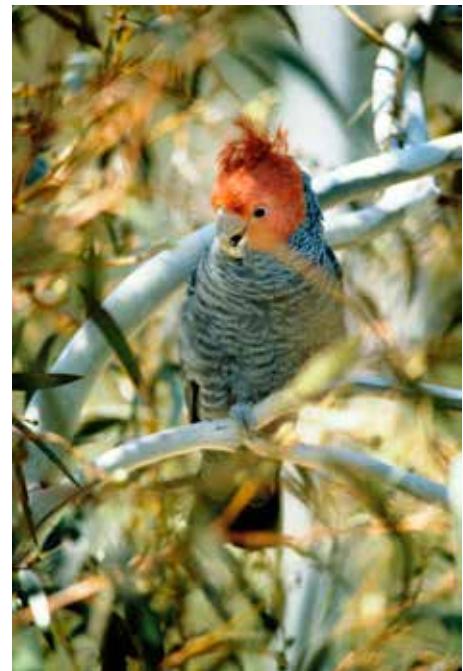
including the critically endangered white box–yellow box–Blakely's red gum grassy woodland and derived native grasslands among others.

In 2007, nature enthusiast Ken Rippin and his wife Mia partnered with the NCT to place a covenant on their property because they wanted to give something back to the land.

The Rippins were on a holiday in the country and noticed a sign which read 'protected wildlife area' and decided to investigate further. Upon discovering what this meant and learning about the NCT's work, the couple decided to purchase 'Close to the Edge' near Uki in the Tweed Shire Council.

The land sits between two large national parks, Mount Warning National Park and Mount Jerusalem National Park.

"By placing the property under covenant through the NCT, we are helping to form a protected wildlife corridor in a heavily forested area," said Ken Rippin.



The gang-gang cockatoo (*Callocephalon fimbriatum*) is found in the cooler and wetter forests and woodlands of Australia, particularly alpine bushland. Mostly mild grey in colour with some lighter scalloping (more pronounced and buffy in females), the male has a red head and crest, while the female has a small fluffy grey crest. It ranges throughout south-eastern Australia. The gang-gang cockatoo is the faunal emblem of the Australian Capital Territory. It is easily identified by its distinctive call, which is described as resembling a creaky gate, or the sound of a cork being pulled from a wine bottle. The name *gang-gang* comes from a New South Wales Aboriginal language. Photo by C. Smith.

Close to the Edge protects wallabies and an abundance of native birdlife and also has a beautiful creek running through it which is home to the iconic Australian platypus.

It is through the support of these landholders that the NCT has been able to reach its impressive target of protecting over 50,000 hectares of land. Fresh from this success, NCT has launched Yellowbox, a fundraising initiative which will enable it to protect even more private land.

This initiative will enable individuals to play their part in conservation protection on private land. For only \$10, individuals can protect a 10-square-metre piece of land, a Yellowbox.

“It’s an easy and yet tangible way for people to get involved in what we do,” said Mr McCarthy.

This is an exciting time for New South Wales as individuals have the ability to get involved and help conserve the state’s precious biodiversity.

For further information on NCT, visit www.nct.org.au. For further information on Yellowbox, visit www.yellowbox.org.au



The turquoise parrot is a species of parrot native to eastern Australia, from south-eastern Queensland, through New South Wales and into north-eastern Victoria. Found in grasslands and open woodlands dominated by *Eucalyptus* and *Callitris* species, the turquoise parrot feeds mainly on grasses and seeds and occasionally flowers, fruit and scale insects. It nests in hollows of gum trees. Much of its habitat has been altered and potential nesting sites lost.



The quoll is a carnivorous marsupial native to mainland Australia, New Guinea, and Tasmania. It is primarily nocturnal and spends most of the day in its den. Of the six species of quoll, four are found in Australia and two in New Guinea. Genetic evidence indicates that the quoll evolved around 15 million years ago in the Miocene, and that the ancestors of the six species had all diverged by around four million years ago. The quoll species vary in weight and size, from 300 g to 7 kg. They have brown or black fur and pink noses. They are largely solitary, but come together for a few social interactions such as mating, which occurs during the winter season. A female gives birth to up to 18 puppies, of which only six survive to suckle on her teats. The quoll eats smaller mammals, small birds, lizards, and insects. Its natural lifespan is between two and five years. All species have drastically declined in numbers since Australasia was colonised by Europeans, with one species, the eastern quoll, becoming extinct on the Australian mainland, now being found only in Tasmania. Major threats to their survival include the cane toad, predators, urban development, and poison baiting. Conservation efforts include breeding programs in captivity. Photo by Esther Beaton.



THE DANGER OF PLASTIC BAGS

MICHAEL SALT

We are constantly warned about the danger of plastic to our health and to the environment, yet plastic bags have become an accessory of modern life. Due to their long lifetime and people's laissez-faire attitude to their use and disposal, plastic bags are creating havoc to the earth's ecosystems. We've all seen the horrible photos of turtles choking on plastic bags or ocean vortices full of plastic, so why is our behaviour still largely unchanged?

The plastic bag problem

The most recent survey calculated that Australians used 4 billion lightweight single-use HDPE bags every year¹. That's over 10 million a day! Around 75 percent of these were from supermarkets, while other retailers

such as fast-food restaurants, service stations, convenience stores and other shops made up the rest. There are two major types of limited-use plastic bags: high density polyethylene (HDPE) and low density polyethylene (LDPE). HDPE is used in the lightweight plastic bags found in supermarkets, while LDPE form the heavier department store bags. Each plastic bag is then used on average for around 12 minutes, yet may take up to one thousand years to break down². It's time we reflected a little longer before mindlessly grabbing another plastic bag.

Both HDPE and LDPE plastic bags are actually recyclable, they can be recycled into useful products. This is being carried out by innovators such

as Replas, who are producing park benches, fencing and fitness equipment with the recovered plastic³. Recycling plastic bags, however, is not the norm. Once in consumer hands, plastic bags usually face one of three possible fates:

Being dumped - It is thrown into the bin, or used as the bin, and ends up as general landfill waste.

Litter - It never makes it to the bin, ending up as litter on streets, parks and waterways.

Improper recycling - It is incorrectly placed in the curbside recycling system, and ends up causing issues with machinery and the sorting process at recycling depots.



Large numbers of plastic bags, unfortunately, do end up in our rivers, lining the ocean floors and choking wildlife. Planet Ark estimates that 80 million plastic bags end up in our streets, parks and beaches. Once in the waterways, turtles, whales and seabirds mistake these bags for food or become entangled in them, resulting in injuries and death. Globally, it is estimated that plastic bags kill at least 100,000 birds, whales, seals and turtles every year⁴.

Government intervention

In 2008, Victoria conducted a trial of a 10 cent levy on bags, which produced a 79 percent reduction in plastic bag usage⁵. The funds raised were directed to key environmental projects. Deplorably, the Victorian government chose not to expand the trial, as they believed the costs outweighed the benefits. Their economic analysis

and this decision failed to take into consideration the incalculable social and environmental benefits of reducing plastic bag pollution. Some hope could be drawn from the southern state's statement that they intended in the future to discuss the issue of plastic bag usage with the Australian Capitol Territory, Northern Territory and Tasmania.

Seven years have passed in Victoria, and we've seen the population grow by around one million people. We've seen three different premiers and seven noisy Grand Prix races hit the streets of Melbourne, yet no action has been taken to reduce the flow of plastic bags.

"It's high time that the rest of the State governments followed the leadership of South Australia, Northern Territory, ACT and now Tasmania by introducing a ban on single use singlet style plastic bags, and supporting other commonsense environmentally friendly policies such as a system for bottle and can refunds." Clean Up Australia Chairman Ian Kiernan AO

In stark contrast, South Australia has shown national leadership on the issue by introducing a ban on lightweight HDPE bags in 2009. Since the ban, it is estimated that more than nine out of 10 shoppers take their own bag to the supermarket, resulting in a whopping 400 million fewer bags in South Australia annually⁶. Tasmania, the Northern Territory and the Australian Capital Territory have also taken action on the issue and introduced legislation to ban lightweight plastic bags.

Community-led action

In the absence of national or state leadership on the issue, community groups and concerned citizens are taking action. There are now many community-led bans being promoted throughout Australia. The beachside town of Torquay in Victoria has guided citizens away from relying on plastic bags by placing reminders in shopping centre carparks, educating retailers, and working with those retailers to provide alternatives to single-use plastic bags. One example is the popular Boomerang Bags Boxes that allow shoppers to simply borrow reusable bags if they did not

bring their own. On their next trip to the shops the borrowed bags are returned to the Boomerang Bags Box for others to borrow. A number of shops, including IGA Supermarket, in Torquay have taken advantage of this system to reduce the number of plastic bags they hand out to their customers and the feedback has been excellent with shop owners also reporting a reduction in costs through this initiative.

Boomerang Bags Boxes involve significant community engagement, with the boxes being made by Torquay Community Men's Shed from recycled fence palings, and the reusable bags handcrafted by volunteers at Spring Creek Community House from recycled curtain material. Plastic Bag Free Torquay estimates that in 2015 there has been an increase of about 60 percent in the number of people shopping with reusable bags, which has greatly reduced the number of single-use plastic bags littering the streets, beaches and waterways of Torquay, by up to 400,000 bags.

What can you do to help?

Every Australian should take responsibility for this issue. I advocate applying the **Avoid, Reduce, Reuse and Recycle** principle for sustainability to your behaviours towards plastic bags:

Avoid - Say "no" to taking a bag at the checkout, by carrying your own reusable fabric or green bag when you go shopping. Keep a couple of spares in your car or handbag so you're always ready. Start shopping at stores who promote use of containers, jars or paper as alternatives to plastic bags.

Reduce - If you must take a plastic bag, try to minimise the number you use by filling bags to their maximum capacity. Encourage friends and family to reduce their usage too.

Reuse - If you do become a closet owner of a plastic bag, make sure you reuse for a purpose that requires a plastic bag. Take it back

Above left: A sea turtle with a plastic bag on its nose. Throughout the world, around one million seabirds and 100,000 marine mammals are killed every year by plastics, either entangled and strangled or choked and starved.



Boomerang Bags Boxes

to the shops to transport your groceries or to collect your fruit and vegies.

Recycle - Once you've done everything you can do with the plastic bag, take it to a supermarket where they are collected for recycling. Some Australian supermarkets offer a plastic bag recycling collection at the front of the store (to find your nearest centre visit - *'RecyclingNearYou.com.au'*). **Do not put them in your curbside recycling bin as they wreak havoc with machinery at the recycling depot, and end up in the wrong place!!!**

Clean Up Australia offers resources to small businesses to help guide them to become plastic bag free - www.noplasticsbags.org.au

Ready to do more?

If you are moved by the issue and motivated to do more, there are a number of advocacy groups which have formed in the laggard states to bring about change. These groups are calling for state government action through petitions. Find the relevant petition in your state, sign and share with friends. If you live in Queensland, New South Wales or Victoria you can find your Plastic Bag Free campaign by searching



Millions of tonnes of rubbish enter the world's oceans each year. This plastic pollution rides the ocean's currents and reaches the furthest corners of our seas. Plastic is now even in the Antarctic wilderness.

Facebook or the web for *Plastic Bag Free (Your state)*.

<https://www.facebook.com/PlasticBagFreeQLD/>

<https://www.facebook.com/PlasticBagFreeNSW/>

<https://plasticbagfreensw.squarespace.com/>

<https://www.facebook.com/PlasticBagFreeVictoria/>

<http://www.plasticbagfreevictoria.org/>

Plastic bags have a huge impact on the environment and wildlife. In the face of failing government leadership, local communities are taking action to drive change. As caring citizens, all of us can do more to bring about change for the good of the planet. We can avoid using plastic bags, start recycling properly, and join the community-led action by signing the petition in our state.

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Avoid, Reduce, Reuse, Recycle



Michael is studying for a Master of Environment at the University of Melbourne and is concerned with changing the modern consumerist culture's effect on the environment. Michael has spent time with the UNFCCC in Germany, where he helped prepare communications for international climate change mitigation and adaptation projects. He is currently helping to spread the message of Plastic Bag Free Victoria, who are demanding the Victorian Parliament introduce legislation to ban plastic bags in Victoria.



SEAFOOD SUSTAINABILITY

SUZANNE MEDWAY

Australia's ocean treasures are at risk from land-based pollution, habitat damage, marine pests, oil and gas developments, climate change and fishing.

Did you know that at last count there were 15 Australian fish species considered overfished in commonwealth waters, with some of the fish targeted in state waters also under pressure? To add to this pressure, the demand for seafood is increasing. So how can we best address the need for our oceans to be used sustainably for fishing while continuing to enjoy a high-quality seafood supply?

Sustainable seafood

Sustainable seafood is sourced within the natural limits of our oceans with minimal damage to ocean life and habitats. However, that measure is too broad if we want to look at the sustainability of individual fisheries and the species they target.

While Australia has a vast fishing area (Australia's Exclusive Economic Zone is about 16 million square kilometres), the nature of the marine environment means that its fish stocks are nowhere

near as large as those in the more nutrient-rich Atlantic waters. So there is a real need to sustainably manage this limited natural resource.

Australia has a vast coastline, and many of our major fisheries are in remote coastal locations.

The commercial fishing industry provides a valuable source of employment and income in many rural communities.

The Australian Fishing Zone (AFZ) is the world's third largest in the world, covering nearly nine million square kilometres.

The AFZ extends 200 nautical miles from the Australian coastline including our external territories, such as Christmas Island in the tropical Indian Ocean, and Heard and McDonald Islands in the Subantarctic.

Overfishing has been a characteristic of the Australian fishing industry for

decades, but now state governments, including New South Wales and Queensland, are 'buying back' commercial fishing licences in order to reduce catch effort.

We're at a point in time where there simply isn't enough fish in the sea. With over three-quarters of our global fish stocks either overexploited or fished right up to their limit, there are only a few fisheries that will be able to serve up the planet's increasing demand for seafood.

Above: Mussels - though originally caught wild along the southern coasts of Australia, commercial stocks were damaged by over-exploitation and mussels sold today are all farmed. The commercial species in Australia is blue mussel, while green mussels are imported from New Zealand. Import regulations mean that green mussels have been frozen and will be dead, while local mussels are sold live and whole in the shell. They are available year round from aquaculture in NSW, VIC, SA, Southern WA and Tasmania.

Aquaculture, or farming seafood, is often held up as the solution to the global fishing crisis.

However, with a continued requirement for wild-caught fish to feed fish grown in captivity, there is still a cap on how much farmed produce can provide.

There have been over 6,000 marine species recorded in Australian waters and our isolation has produced many which are endemic to Australia.

Australia is renowned worldwide for its unpolluted waters and good fisheries management regimes that ensure the highest quality, sustainable seafood.

Commercial fishing is Australia's fifth largest food production industry. It is worth more than \$2 billion to our economy every year. Australia has a number of high-value fisheries such as rock lobster, tuna, abalone, Patagonian toothfish and a variety of prawn fisheries, which are highly sought after and generate valuable export dollars from a variety of overseas markets.

Put simply, 'sustainable seafood' is fish or shellfish that reaches our plates with minimal impact upon fish populations or the wider marine environment.

It's not just the numbers of fish left in the ocean that matters, it's the way in which the fish are caught, the impact on the seafloor, other marine wildlife and how fishing affects the healthy and natural functioning of marine ecosystems.

The state of Australian fisheries

Less than one percent of Australia's marine environment is fully protected from fishing and mining. Many of Australia's commercially caught fish are fully or overexploited, and more marine species become threatened every year. Important habitats such as coral reefs and inshore areas are also under pressure because of the effects of land clearing, climate change and irresponsible coastal development.

How can you help – sustainable seafood

Ask before you buy – start a sustainable seafood conversation. Ask questions of fishmongers, supermarket assistants and waiters before you buy. Retailers may not have all the answers, but by starting a conversation we are encouraging our seafood suppliers to find out more about the product that they supply from our oceans. The more our suppliers hear questions about the sustainability of



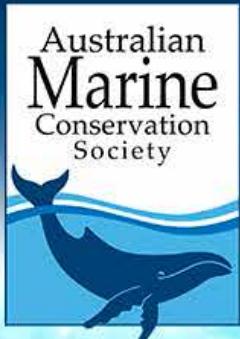
Bream - mainly wild caught estuary fish, but are also found in inshore coastal waters. They are available year round, with individual species peaking at different times of the year.



Blue swimmer crab - there are many species of crabs but the main three you will see at market are mud crab, blue swimmer crab and spanner crab. Crabs are usually sold either live or cooked, as they deteriorate rapidly when stored dead. They are caught using baited pots and other traps, and as bycatch of trawl fisheries.



Australian salmon - under-utilised and not especially well regarded by chefs or consumers. Because of this they are a low priced seafood option. If they are fresh and handled correctly Australian salmon are moist and very enjoyable. They are also very high in Omega-3 fatty Acids.



Australia's Sustainable Seafood Guide

A guide to choosing your seafood wisely...



Enter seafood name



Search



A-Z Listing



By sustainability



Donate

It can be confusing for consumers to know what is sustainable and what isn't; that's why AMCS produces the only comprehensive sustainable seafood guide in Australia. They make it easy to access with online, phone app.

their products, the more they start asking questions of their suppliers.

The ripples of demand for sustainable seafood then pass up the supply chain and become waves, helping drive change in the way our fish and shellfish are caught or farmed.

It is up to all of us to help make our seafood sustainable.

What should I ask when buying seafood?

"Is the species overfished?" – if it is, then say "no thanks". Give overfished species a break by making an alternative choice.

"How was it caught or farmed?" – did that method damage the environment or catch large amounts of marine wildlife? Choose seafood from fishing or farming methods that have low impacts on the marine environment, its species and habitats.

"Is it a deep-sea, slow-growing or long-lived species?" – deep-sea species are generally slow-growing and long-lived. This makes them particularly vulnerable to fishing pressure, and means that they take longer to recover from impacts on their populations. Give these species a break too.

"Where is it from?" – local is not always more sustainable. Knowing where the seafood comes from is one of the key questions in helping make an informed seafood choice. Australian and imported species are assessed separately in this guide to help you make a better choice.

Overfishing and illegal fishing

Overfishing has already decreased part of Australia's fish stocks to dangerously low levels. Two major factors account for this problem: the fact that some areas have low biological productivity (and hence fish stocks do not regenerate quickly), along with intensive fishing efforts by commercial and recreational fisheries.

Eighty-two species that were assessed in Australian waters were classified as overfished. Species that remain subject to overfishing include the southern bluefin tuna, blue warehou, silver trevally, orange roughy, and bigeye tuna in the Pacific and Indian Oceans beyond the Australian Fishing Zone.

Illegal fishing places further pressure on some species, with Patagonian toothfish in the Southern Ocean and shark (for fins) in northern Australian waters being the worst affected.

Illegal fishing covers a wide range of activities. It can involve fishing off-season, trawling in prohibited waters, netting protected species, using banned equipment, exceeding catch quotas, fishing by unlicensed or stateless vessels, and the use of flags of convenience to avoid regulation. Unauthorised fishing is linked to other types of organised crime, including the transport of illegal drugs and weapons.

Longline fishing

This is controversial in some areas because of bycatch, fish caught while seeking another species or immature juveniles of the target species. This can cause many issues, such as the killing of many other marine animals while seeking certain commercial fish. Seabirds can be particularly vulnerable during the setting of the line. Mitigation techniques include the use of weights to ensure the lines sink quickly, the deployment of streamer lines to scare away birds, setting lines only at night in low light (to avoid attracting birds), limiting fishing seasons to the southern winter (when most seabirds are not feeding young), and not discharging offal while setting lines.

Australian Fisheries Management Authority

AFMA uses a range of approaches to protect our fisheries, including monitoring our vessels, tracking our catch and cooperating with other countries to protect shared fish stocks.

An effective monitoring, control and surveillance program is not just about policing. The setting of rules, collection of information, making sure rules are being followed, and educating fishers and fish buyers of the rules are all important aspects of combating illegal fishing.

Supporting AFMA compliance programs are strong fisheries legislation, including strict rules and regulations with clear penalties and sanctions.

Fishers and fish buyers caught breaking rules can be fined on the spot, their licence to fish can be suspended or, for the more serious cases, they can be prosecuted or have their catch seized.

By making the choice to only buy and eat sustainable seafood, consumers can contribute to the long-term health of our oceans. This choice also supports those fisheries operating sustainably and encourages others to follow suit.

The Australian Marine Conservation Society (AMCS) is the voice for Australia's ocean wildlife. AMCS is Australia's only national charity dedicated to protecting ocean wildlife and their homes.

They are an independent charity, staffed by a committed group of professional and passionate scientists, educators and advocates who have defended Australia's oceans for 50 years. Their paid and volunteer staff work every day on behalf of the community to protect our ocean wildlife.

AMCS works on the big issues concerning the sea – to recover our threatened species, make our fisheries sustainable and create marine national parks, places in the sea where our wildlife is safe from harm.

Our oceans are under pressure from unsustainable fishing practices but everyone can make better choices about the seafood they eat so we can continue to enjoy the seafood we love in the future.

It can be confusing for consumers to know what is sustainable and what isn't; that's why AMCS produces the only comprehensive sustainable seafood guide in Australia. They make it easy to access with online, phone app and printed versions including an easy-to-carry and free printed 'mini guide'.

AMCS continues to drive the sustainable seafood movement in Australia. There have been some genuine positive changes in the sustainable seafood industry over recent years, championed by AMCS and responsible Australians who love their seafood and also love their oceans.

Australia's Sustainable Seafood Guide is the only comprehensive, up-to-date, reliable and credible source of information on the sustainability of Australian seafood. AMCS haven't only assessed the health of the fish stock, but also the whole impact of fishing or farming methods on the marine environment in order to pass on comprehensive advice to consumers.

AMCS recommends that when you're next at the supermarket, fishmonger, restaurant or fish and chip shop, you use Australia's Sustainable Seafood Guide to make a better choice about your seafood purchase. The guide features a simple traffic light system: green-listed species are a Better Choice, Eat Less of amber species and Say No to red-listed seafood. To make it as easy as possible the guide is available as a smart phone app, online and in printed form.

Every time you use the guide and ask questions about seafood sustainability at the point of sale you are helping to drive the changes in fisheries and aquaculture management needed to ensure a healthy future for our oceans, seafood and the long-term future of people who rely on seafood to make a living.

Continuing to assist the public to make informed choices via the Australian Sustainable Seafood Guide and outreach to restaurants, chefs and suppliers via the Good Fish Project are key to maintaining the momentum for a sustainable future for our oceans.

Relevant links are:

www.marineconservation.org.au
www.sustainableseafood.org.au
www.goodfishproject.com.au



Devil Ark Giving hope to the Tasmanian devil

John Weigel AM

When I first heard about the devil facial tumour disease (DFTD) in 2002, I had no idea how serious the epidemic would prove to be, and how it would threaten the very existence of the iconic Tasmanian devil. How could the marsupial world's number one tough-guy succumb to some punk newcomer disease? Devil numbers were estimated to be as high as 150,000 – and the fighting character of the world's largest (and most charismatic) carnivorous marsupial was legendary – providing inspiration for the popular Warner Brothers cartoon character.

But within a few short years the survival of the Tasmanian devil was far from certain. As the horrible truth about DFTD emerged, predictions of extinction were increasingly being made, while researchers frantically scrambled in search of hope. The inevitable association between the decline of Tasmanian devils with the earlier loss of the Thylacine seized the attention of the

Australian public and a range of relevant government and conservation agencies. Wildlife biologists worried about a broader and potentially catastrophic flow-on effect to come in the wake of the DFTD juggernaut. The success of feral predators in Tasmania has been hitherto suppressed by the devils through competition and perhaps predation. The predicted readjustment in numbers of feral dogs, cats and possibly foxes in the rush to fill the ecological void left by the devils could place perilous pressure upon a handful of additional marsupial species such as eastern barred bandicoot and eastern quoll, for which Tasmania has up until now provided a last-stand stronghold.

For many in the Australian zoo industry, the gloomy forecast for the wild population, combined with the simultaneous extirpation of the cause of the extinction, made the establishment of a representative insurance population a once-in-a-career priority. In 2005

my organisation – the Australian Reptile Park (ARP) – along with other members of the Zoo & Aquarium Association began working with the overarching Tasmania-based Save the Tasmanian Devil Program with the aim of providing a mainland 'insurance population' of healthy Tasmanian devils – away from the disease front. This vision of a genetically robust population of captive or semi-captive devils that could be post-apocalyptically returned to the wild was by and large accepted by all relevant government agencies and stakeholders by the end of that year. In 2006 the Reptile Park received the first insurance population devils for this combined effort following an onerous quarantine process in Tasmania to guard against the risk of shipping DFTD-infected devils. A year later we imported additional founder animals, while an equal number were received by a combination of other mainland zoos.

Above: John Weigel with rough-scale python.

A big idea

Because of the dangerous aggressiveness of Tasmanian devils towards one another when maintained in confined enclosures, traditional husbandry methods involve keeping mature individuals in separate pens for extended periods, bringing small groups together for periods of socialisation or brief periods of mating. This level of keeper interaction raises the costs. In addition to poor cost efficiency, we felt that natural behaviour was very much suppressed, suggesting the long-term risk of genetically based 'captive adaptation' – the bane of small population breeding programs that excessively interrupt natural ecology and social behaviour of a species. Although breeding success within our 'intensively' managed complex of 40 pens was highly successful, the apparent deficiencies made it unsuitable for a much-expanded project involving hundreds of devils maintained for a period of up to 50 years.

Instead, my team and I began contemplating a 'big systems' approach – one that would be as cost-effective as it would be inductive to the preservation of wild-type behaviour. By early 2007 we were talking to our zoo partners about clusters of 'free-range environmental enclosures' that would be spacious enough, and contain sufficient environmental variation – including potential den sites – to support a mixed social grouping of say, six to ten relatively unrelated devils each. In 2008 we presented the 'Devil Ark' concept at a four-day IUCN workshop in Hobart dedicated to finding a coordinated approach to saving the Tasmanian devil, where enthusiastic support was received from the participants, including most if not all relevant stakeholders such as researchers, wildlife managers, zoos and government representatives. But as often occurs with breaks from traditional thinking, the idea itself can be the relatively easy part, while effective implementation of the idea requires a whole lot more work! It took another two very busy years to overcome a seemingly endless range of practical and bureaucratic impediments before construction of Devil Ark could be reasonably contemplated.

High on the list of challenges was the daunting task of finding a suitable property. Physically, the property needed to be big enough – at least 300 ha, and of such a nature that digging many

kilometres of 600 mm deep trenching in association with escape-proof fencing was possible. Ideally, the environment would be 'Tasmania-like' in climate and character. But the overriding consideration that trumped all others was that it had to be available at a miraculously low cost. This overriding requirement certainly narrowed the range of choices! In fact, in the end there was only one choice – a heavily timbered property positioned high in the Barrington Tops of New South Wales. The 500-hectare site was generously provided by the James Packer family at the kingly rental rate of \$1 per year for a starting period of 30 years. A lucky break for an unlucky marsupial species.

Construction of 'Stage 1' of Devil Ark commenced mid-year in 2010 and was completed by the end of the year. An initial 30-hectare complex was defined by three kilometres of high-security perimeter fencing, and included within it a dozen escape-proof enclosures of varying sizes, including six breeding enclosures of approximately four hectares each. A bank of ten small (100 m²) holding pens was built to accommodate single devils on an as-needed basis. The works were conducted using contracted machine operators and fencing contractors, with all planning, direction and support labour provided by ARP.

Devils back on the ground in New South Wales – a half-millennium later

In January 2011 the completion of the first stage of the Devil Ark project was signalled by the arrival of the first 47 'founders' – a mix of wild-caught devils

post-quarantine, and strategically chosen progeny from the Australian Reptile Park's in-house breeding program – where numbers had swollen to 65 devils. The first group of founders took to their spacious Devil Ark pens with apparent zeal, and for the first time for many, began behaving like wild Tasmanian devils. This marked the first time in hundreds of years that the species had a taste of at least semi-wild existence on the Australian mainland, where it had previously been widespread and abundant. The popular belief is that mainland 'Tasmanian' devils and Thylacines were out-competed, and perhaps preyed upon by the introduced dingoes.

Initially, three breeding enclosures were stocked in configurations of six or eight mature devils in equal sex ratios. The social dynamics that unfolded in the pens were monitored nightly by infrared cameras and electronic sensing devices. By the end of the first breeding season it was apparent that properly functioning social groups had taken shape in each of the enclosures. Eight of the ten mature females produced young that first year, and all 20 resulting joeys survived through the weaning process unscathed. In fact there were no significant injuries to any devils in any of the established social groups – a very encouraging start!

In 2012 two additional breeding pens were deployed, increasing the number of reproductive-aged females in social groups to 18. Of these, 14 produced litters, yielding a total of 36 joeys. The influx of joeys and additional founders contributed to a population of 140 Tasmanian devils prior to the



Around 25 joeys are born after a 19-21 day gestation period, but only the first four that attach to the mother's teat will live, so it's survival of the fittest right from the start.



John Weigel and daughter Blanca with Prime Minister John Howard on occasion of John receiving his AM in 2008.

2013 breeding season. By August 2013, 19 of 24 mature female Tasmanian devils within the social groups were carrying 'jelly-bean' stage pouch young. It is a frustrating reality that ongoing expansion of Devil Ark can only keep pace with fundraising success.

The numbers game

Despite the best efforts of a range of researchers and wildlife managers – and a peppering of encouraging news releases of 'breakthrough' discoveries over the past decade, the spread of DFTD continues unabated. Predictions of disease resistant devils to the west were dashed when the disease demonstrated an ability to rapidly adapt to overcome all challengers. At least a dozen strains of DFTD were identifiable by 2009.

With up to 90 percent of the pre-disease population already gone, and no feasible 'silver bullet' on the horizon, increasing hope is extended to the STTDP Insurance Population Strategy. STTDP consultant research geneticist Professor Kathy Belov wrote in *ABC Science* in August 2012:

"Vaccine development takes time, and time is something the devils don't have.

The best thing we can do now is to support the captive insurance program. This program holds and breeds devils free from the disease in zoos and fauna parks - both in Tasmania and on the mainland - with the long-term goal of returning disease-free devils back into Tasmania."

Now, four years later, the insurance population now comprises of over 500 Tasmanian devils, with more than a third of these held at Devil Ark. At first blush this sounds quite positive, given that the program population geneticists are prescribing an 'effective population' of 500 devils to adequately retain the targeted level of genetic diversity over a period of up to 50 years. Unfortunately, there is a big difference between 'census population' – the actual number of Tasmanian devils held in captivity and on Tasmanian islands and (proposed) peninsulas, and the corresponding 'effective population' that they represent. Wikipedia provides a definition of effective population as "the number of individuals in an idealised population that has a value of any given population genetic quantity

that is equal to the value of that quantity in the population of interest". In principle, population geneticists assign a given small population a coefficient of effectiveness value based on the extent of influence extended to the planning and coordination of pairings to best preserve genetic variation within that population. Within the varied husbandry models currently in practice or under consideration within the Tasmanian devil insurance population, a relatively high effectiveness score is afforded to the most intensively coordinated pairings of devils (i.e. within the intensive holdings in zoos where the devil-per-pen methodology provides ultimate control over the composition of pairings). In this instance a genetic effectiveness value of 0.5 has been estimated. This means that zoo holdings of say, 200 devils would be equivalent to an effective population of 100. If not for the relatively high costs of maintaining devils in this manner, coupled with the likely drain of natural behaviours over time, this husbandry model might be an insurance population panacea.

On the other end of current and proposed small population management systems for devils, islands such as Maria Island east of Tasmania, where a high-profile release of captive-bred devils was recently undertaken, as well as 'virtual islands' such as large free-range enclosures or the proposed fenced-off peninsulas in Tasmania provide little or no scope for strategic pairings and are accordingly assigned an effectiveness value of only 0.1 – wherein the proposed sustainable population on Maria Island of 150 devils represents an effective population of only 15.

The Devil Ark model, wherein an intermediate degree of genetic coordination is provided, is regarded as having an effectiveness coefficient of 0.25, so that in effect, the current population of 180 devils presents an effective population of 45 – three times greater than the eventual potential of Maria Island at the tiniest fraction of the cost of implementation. In its three short years of operation Devil Ark has proven to be far and away the most cost-effective element of the insurance population with regards to both census population and effective population size. This cost efficiency and underlying practicality of the modular Devil Ark model – where the number of spacious pens containing eight mature devils can be adjusted upwards as needed – is a fundamentally important consideration when weighing the prospective long-term roles of the various husbandry models that are shaping up within the broader insurance population.

What price the devil?

The goal for the first stage of the Devil Ark project was to establish a cost-effective working model comprising a complex of functional social groups of devils that breed readily while retaining wild-type behaviour. This has been accomplished with resounding success, and the existing facility can accommodate an ongoing population of 180 devils at a cost of approximately \$1,300 per devil per year. This level of operational costing stands in stark contrast to the experience of other existing husbandry models, including the 'intensive' mainland facilities, which can exceed \$10,000 per devil per year.

The envisioned second stage of development for Devil Ark is to expand the complex to accommodate 360 devils by 2017. There is sufficient land at the spectacular Barrington Tops site to

expand as needed to accommodate a population of well over 1,000 Tasmanian devils (an effective population of 250) for as long a period as required. Improved operational efficiencies at this population would see the annual cost per devil reduced to an estimated \$900.

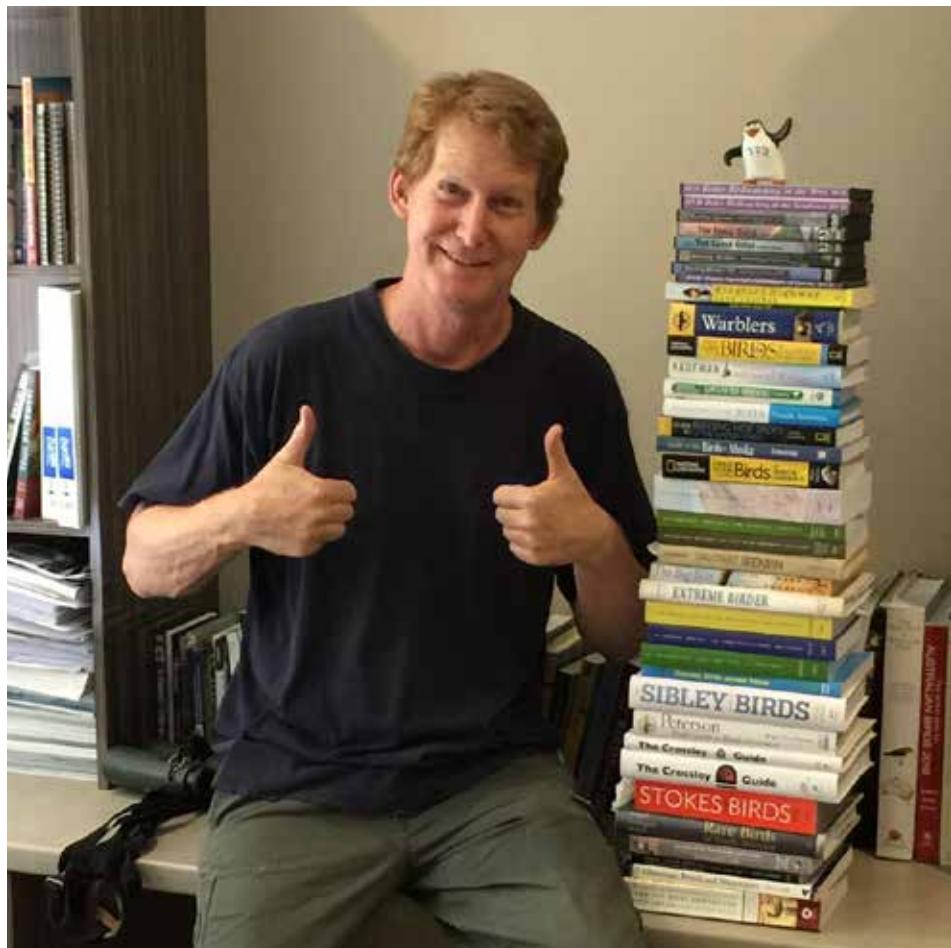
The Devil Ark team remains positive about its potential role in securing a future for the Tasmanian devil with an eventual reintroduction program after DFTD literally consumes itself to death. The new and effective system for maintaining large numbers of the cranky marsupials in modular environmental pens is working well, perhaps with scope for further improvement. The Devil Ark model is identified in the Save the Tasmanian Devil Program Meta-population Strategy review as the most appropriate format for large-scale expansion of the insurance population when required. The critical 'when required' refers to the point in time when the disease has spread to the west coast of Tasmania – an event predicted to occur within the next three to five years.

Having demonstrated scope to maintain half of the insurance population into the future in naturalistic conditions for

less than \$1 million per year, it remains an urgent imperative to find the funding required to continue building and populating Devil Ark.

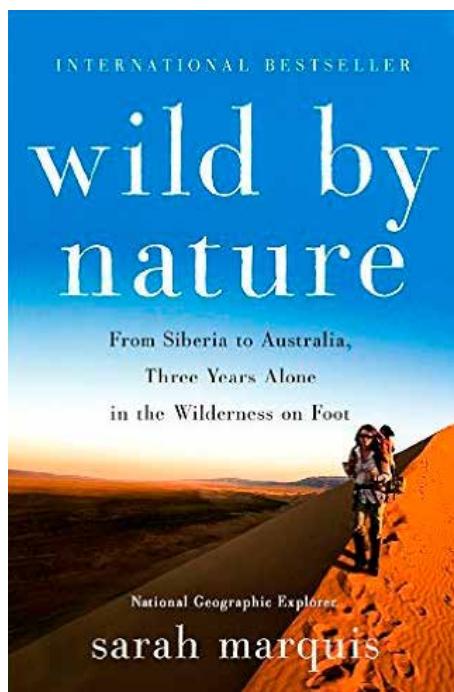
I remain personally confident that the establishment of a successful insurance population is achievable, and that Devil Ark can play a linchpin role to this end. This means that even if the on-the-ground efforts to curtail the spread of DFTD fail, the overarching conservation mission to save the Tasmanian devil is refreshingly 'winnable' in comparison to the plights of many mainland species for which either habitat loss or predation by feral pests are critical factors.

Devil Ark Inc is an independent charitable organisation with tax deductible gift recipient status. Professional fundraising staff has been retained to more aptly pursue the essential resources required. A managing Board of Directors conducts the business of Devil Ark, while the Devil Ark Advisory Committee – comprised of industry representatives and experts from both the mainland and Tasmania – meets two to three times a year to steer the on-the-ground development and management of Devil Ark.



John Weigel

Book Reviews

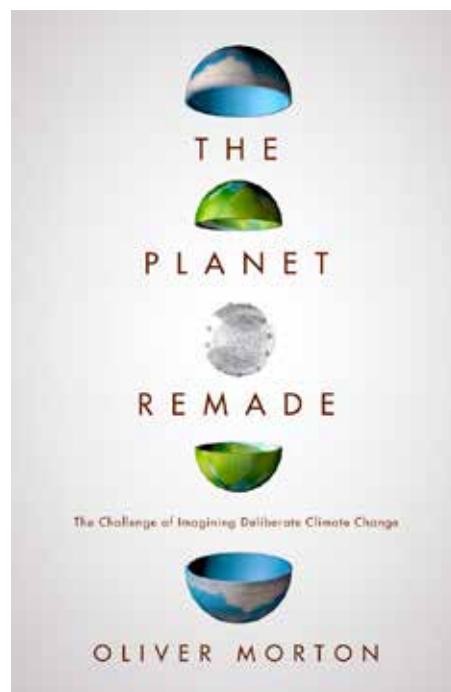


Wild by Nature: From Siberia to Australia, Three Years Alone in the Wilderness on Foot by Sarah Marquis

In *Wild by Nature*, National Geographic Explorer Sarah Marquis takes you on the trail of her ten-thousand-mile solo hike across the remote Gobi desert from Siberia to Thailand, then transported by boat to complete the hike at her favourite tree in Australia. Against nearly insurmountable odds and relying on hunting and her own wits, Sarah Marquis survived the mafia, drug dealers, thieves on horseback who harassed her in her tent every night for weeks, temperatures from subzero to scorching, life-threatening wildlife, a dengue fever delirium in the Laos jungle, tropical ringworm in northern Thailand, dehydration, and a life-threatening abscess. This is an incredible story of adventure, human ingenuity, persistence, and resilience that shows firsthand what it is to adventure as a woman in the most dangerous of circumstances, what it is to be truly alone in the wild and why someone would challenge themselves with an expedition others would call crazy.

Publisher Allen & Unwin

RRP: \$29.99

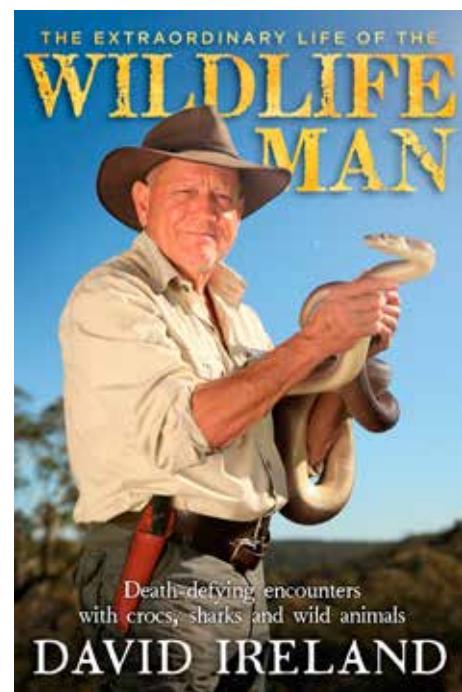


The Planet Remade: The Challenge of Imagining Deliberate Climate Change by Oliver Morton

The Planet Remade explores the science, history and politics behind these strategies. It looks at who might want to see geo-engineering techniques used, and why – and why others would be dead set against any such attempts. Throughout history, people have made huge changes to the planet – to the clouds and the soils, to the winds and the seas, to the great cycles of nitrogen and carbon – that are far more profound than often realised – and which can help us to fundamentally rethink our responses to global warming. With sensitivity, insight and expert science, Oliver Morton unpicks the moral implications of our responses to climate change, our fear that people have become a force of nature, and the potential for good in having such power. *The Planet Remade* is about imagining a world where people take care instead of taking control.

Publisher: Allen & Unwin

RRP: \$39.99



The Extraordinary Life of the Wildlife Man by David Ireland

This is an edge-of-your seat adventure. It's one man's story of how he learnt to live by the law of the jungle: those who adapt, survive. This wildlife expert and filmmaker has been bringing nature into people's lounge rooms for over thirty years. He knows his animals inside out, and they, in turn, have helped him to understand human nature, sense danger and trust his instincts. The Wildlife Man, who has stared down a charging elephant, stopping it in its tracks, is a far cry from the sickly asthmatic kid who suffered at the hands of schoolyard bullies.

Publisher: Penguin Books

RRP: \$34.99



AUSTRALIAN WILDLIFE SOCIETY

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

ANNUAL REPORT FOR 2015

A year in review

AWS has continued to support the Linnean Society's campaign to protect the Cleften limestone caves from proposed dams on the Belubula River. The scientific symposium organised by the Linnean Society was a great success, and attended by CEO Patrick Medway, and President David Murray. The case for protecting the caves has broadened to one for protection of the whole river system (*Australian Wildlife*, Summer 2016, p. 5).

AWS has also supported a proposal for a new Bargo Gorge National Park, as this would provide a vital wildlife corridor connecting the coast to the Blue Mountains. The proponents of the national park requested that the JR Stud residential development above the gorge should have a buffer zone of 150m from the edge of the gorge. Fortunately, Wollondilly Council has adopted this as a condition for development consent, so protecting water quality in the Bargo River.

We identified that the future of the Society lies with a new generation of young Australians who have a passion for wildlife conservation.

Our research indicated that young people who study wildlife conservation at university develop a keen and abiding interest in the subject which can last a lifetime. You too can make a donation to the Wildlife Science Ecology Research Scholarship at any time. Donations are fully tax deductible under our registration as a DGR status Item 1 on the table in section 30.15 of the *Income Tax Assessment Act 1997*.



David Murray, Noel Cislowski, Ken Mason and Patrick Medway at the 2015 AGM

Oldest life member turns 102

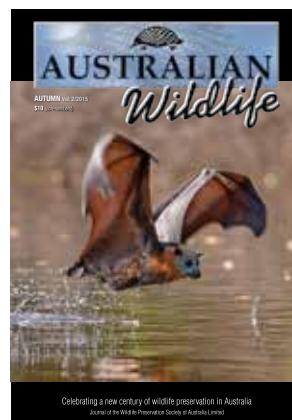
Our Society's oldest member, Mrs Margaret Deas, turned 102 in January and celebrated her birthday by raising over \$6,000, which was donated to our marine turtle project. Margaret was made an honorary life member for her contribution to the Society and its projects.

Australian Wildlife magazine

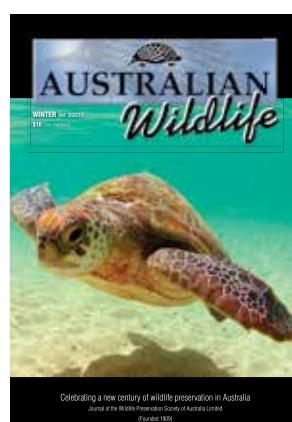
Our coloured Australian wildlife magazine is the flagship of the Society and has proved to be extremely popular amongst all of our members.



Summer Cover



Autumn Cover



Winter Cover



Spring Cover

Our fortnightly email wildlife newsletter has also proven to be very popular with our members across Australia and we encourage them to forward the newsletter on to their family, friends and associates to help spread the wildlife conservation word.

2015 – University Student Grants Scheme

The Australian Wildlife Society's University Research Grants are scholarships offered to honours or postgraduate students at Australian universities. Each year, ten grants of \$1,000 are awarded. Grants are available for research projects of direct relevance to the conservation of Australian wildlife – plant or animal. Grants may be used for the purchase of equipment and consumables, travel expenses related to field research, or attendance at conferences at which the students are presenting their work. The winners for 2015 were:

Bianca Amato, School of Natural and Built Environments, University of South Australia
Project: The contribution of native flower visitors and their host plants to crop pollination on the Yorke Peninsula, South Australia

Benjamin Arthur, Marine Science, University of Tasmania.
Project: Changing climate and the winter foraging ecology of Antarctic fur seal populations

Matt Christmas, University of Adelaide.
Project: climate adaptation of the hop bush, *Dodonaea viscosa*, along an environmental gradient

Amanda Edworthy, Research School of Biology, Australian National University.
Project: Dispersal and genetic structure of forty-spotted pardalotes across fragmented landscapes: conservation of an endangered songbird

Christine Evans, Flinders University.
Project: The hidden costs of extra pair paternity: implications for survival and reproductive success in an endemic woodland bird

Sarsha Gorissen, University of Sydney.
Project: Conserving the endangered fauna of highland swamps

Emily Gregg, School of Biosciences, University of Melbourne.
Project: No water, no hope: the on-ground feasibility of a waterless barrier to prevent the spread of cane toads in Western Australia

Harry Moore, School of Life & Environmental Sciences, Deakin University.
Project: By suppressing both the abundance and activity of invasive mesopredators in arid environments, could dingoes have a positive influence on native mammal species?

Estibaliz Palma, School of BioSciences and the Faculty of Sciences, University of Melbourne.
Project: Plant invasion ecology: relationship between species traits and demographic dimensions of invasiveness

David Hamilton, Department of Biological Sciences, University of Tasmania.
Project: Contact networks and transmission of facial tumour disease in the Tasmanian devil

Wildlife Science Ecology Research Scholarship

The 2015 Australian Wildlife Society Wildlife Ecology Research Scholarship has been awarded to UTS School of the Environment PhD candidate Ray Mjadwesch. In 2014 UTS postgraduate student Ray Mjadwesch commenced his thesis researching the history and status

of the four large macropod species, the western grey kangaroo (*Macropus fuliginosus*), eastern grey kangaroo (*M. giganteus*), the wallaroo/euro (*M. robustus*) and the red kangaroo (*M. rufus*), in New South Wales. Ray is using, amongst other things, vegetation types and land use in New South Wales to characterise landscapes in terms of habitat values for kangaroos, and is then sampling various habitat types to develop stratified population models for the species within a contemporary land-use context.



Ray Mjadwesch receiving his award from Patrick Medway

Donations, bequests and gifts

During the year we continued with our bequest program to encourage donors to support our wildlife conservation work across Australia through the website and through general publicity. We are very grateful to all our members for considering using the bequest program to help the Society with its long-term planning. We are grateful to the late Renee Loma Ruelberg for her generous bequest to environment programs. Please contact the National Office for more details on the Bequest Program and on how to join the Friends of the Society and make a regular monthly donation to support our national wildlife conservation programs.

2015 Conservation Group Grants

The Board of Directors carefully considers all requests for grants from other wildlife conservation groups and places a special emphasis on native wildlife research, conservation and the preservation of wildlife habitat. The Society makes regular contact with wildlife caring groups across Australia to find out how they are faring, what their main projects are and how we can be of assistance to them in preserving native wildlife and its vital habitat. We lobby organisations and government bodies on their behalf and make donations to assist them in their special wildlife conservation projects.

Conservation grants were made to the following projects:

- Cairns Sea Turtle Rehabilitation Centre
- Wedge-tailed Eagle Satellite Research Project
- Bat research in Cleftden limestone caves

NCC Turns 60 years

Our Society has been a member of the Nature Conservation Council since its inception and several of our presidents have served on the council. Our directors joined the celebrations at a special function to mark 60 years of standing up for nature and communities.



Vice President Dr Clive Williams OAM, Professor Don White and CEO Patrick Medway AM at the NCC anniversary celebrations

Financial Report summary

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

Wildlife rescue calls

We continue to receive numerous and wide-ranging distress calls for help from members of the public about sick, injured and stranded wildlife. We note with some concern that the Victorian government has been asked to remove the bare-faced or common wombat from the list of protected native species, which will allow some local farmers to destroy wombats on their property. We are fortunate to have the support of the various national wildlife rescue services that do such valuable and selfless work to help rescue, save and rehabilitate our native wildlife. We are constantly reminded of the necessity of our organisation to stay vigilant and to continue to protect and preserve our native wildlife from attack and abuse. Recently we became embroiled in a disastrous situation where loggers clearing land were covering over wombat burrows in contravention of their conditions to clear the site. After extensive litigation the matter was resolved but we remain on guard against further breaches of the conditions in their permission to log the site.

Awards

The winners of the Serventy Conservation Medal were Helen Bergen and Ray Mjadwesch. Not only have Helen and Ray been responsible for directly saving the lives of many injured animals, they have saved many more by educating the public on how to live harmoniously with wildlife.



Presentation of the Serventy Medal. L to R: Ray Mjadwesch, Dr Clive Williams OAM, Helen Bergen and Dr David Murray

The winner of Community Wildlife Conservation Award was Wild Mob of Brisbane. Although Wild Mob has a Brisbane base, its work ranges from the Barrier Reef to Tasmania. They have focused their attention on saving endangered species.

Conferences and wildlife research seminars

The Society's directors attended and contributed to a number of important wildlife conferences and meetings throughout the year. We actively initiated and sponsored many of these conferences and participated in others. AWS is an active member of the Nature Conservation Council of New South Wales. Our Society's CEO is a representative on the NSW State Pest Animal Control Council and an appointed member of the NSW Kangaroo Management Advisory Panel. He provides expert advice and assistance on wildlife conservation matters and keeps the Society abreast of environmental and conservation developments by government officials. A major conference during the year was the AWMS conference in Brisbane which featured research on the Australian dingo. Our directors also attended a Seed Seminar at Mt Annan Botanic Gardens and the NCC AGM.

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



Vice president Ken Mason and NSW Minister for the Environment the Hon. Mark R Speakman SC MP at the 2015 NCC AGM

Fundraising



A major fundraising initiative was launched when our Vice President, 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 provided signs and collection boxes for those that required them and then invited our members and friends to participate in this fundraising process. By this means small individual efforts can lead to a grand achievement. The proceeds are being used for the Society's programs, such as the university grants.

Once the collection box has been filled, it can be taken along to the nearest Commonwealth Bank. All the deposit details are printed on the bottom of the box.

A special thank you to all our members

May I wish every member of the Society a happy, healthy and prosperous 2016 and thank you all most sincerely for your tremendous support and continued dedication and commitment in helping the Society to preserve and protect our native wildlife for future generations of young Australians.

David Murray PhD, PRESIDENT | 31 December 2015



Brown falcon. Photo by Michael Ritchie



Bequest Program for wildlife conservation work

The Society has a Bequest Program to assist with their wildlife conservation work across Australia. Interested members are invited to complete the bequest form on page 46 in this issue of "Australian Wildlife" and send it to the National Office for processing.

In recent times much of the Bequest Program has been dedicated to our Society's environmental education programs, which are designed to educate the next generation of young Australians about our precious native wildlife in all its forms. There is an urgent need for further wildlife conservation work in this field.

Many families have already included a bequest in their personal last will and testament dedicating funds to the ongoing wildlife conservation work of the Society. You might like to consider including a bequest to the Society in your own will.

Friends of Australian Wildlife Society

The Society has been dramatically expanding its conservation and environmental work program and has embarked on an exciting new chapter in its history of wildlife conservation in Australia.

You can be a part of the Australian Wildlife Society's conservation future by becoming a 'Friend'. Application form is available from our national office.

University Grants Scheme

The Society already offers Wildlife University Research Grants of \$1,000 each for honours/postgraduate students currently studying at any university in Australia, but the new award is aimed at a more significant level and for potentially a larger sum of funding to study wildlife conservation at the University of Technology Sydney.

The aims of this scholarship are: 1) to benefit the preservation of Australian wildlife by supporting applied scientific research with a wildlife conservation focus; 2) to further the Society's commitment to environmental education by supporting science students with a research interest in conservation; and 3) to increase awareness of, and attract new members to, the Wildlife Preservation Society of Australia and its wildlife conservation work.

We can also name a University Wildlife Education Scholarship after any person who is prepared to make a significant donation to this innovative program. We currently have ten national scholarships and a major university scholarship scheme at the University of Technology Sydney. We would be pleased to provide further information to members at any time.

Please contact the National Office at any time for further details of the Bequest Program, the Friends of Australian Wildlife Society and the University Grants Scheme.

Wildlife Preservation Society of Australia Limited
University Research Grants

The Grants are available to third year or final year students in Australian universities. Grants are available to research projects of third year students in the conservation of Australian wildlife by supporting applied scientific research in the following fields: the biology of Australian native animals, the ecology of Australian native animals, the impact of human activities on the environment and to research methods of and effects of new methods in the Wildlife Preservation Society.

To continue 100 years of wildlife preservation in Australia in 2010, ten additional annual grants of \$10,000 have been introduced. These will be awarded to just recipients who have achieved excellent results in the relevant projects for which they received the initial grant.

2001 Recipients

2002 Recipients

2003 Recipients

2004 Recipients

2005 Recipients

2006 Recipients

2007 Recipients

2008 Recipients

2009 Recipients

2010 Recipients

Email: info@wpsa.org.au Website: www.wpsa.org.au

WPSA
Established 1909 - 2010

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: accounts@aws.org.au

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

All donations of \$2 or more are tax deductible.

Your Details

Name: Dr / Mr / Ms / Mrs / Miss

Address:

State:

Postcode:

Phone: Home

Work

Email:

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

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

Credit Card Payments

I am paying by: Visa MasterCard

Card Security Code (CSC) _____

Card No. _____ Expiry date ____/____

Name on card

Signature

Regular Payment can be made by EFT

BSB: 062 000

Account No: 1043 2583

Account Name: Wildlife Preservation Society of Australia

I will give:

\$10 per month \$15 per month \$25 per month \$50 per month

My choice of \$ per month _____

Signature

Date

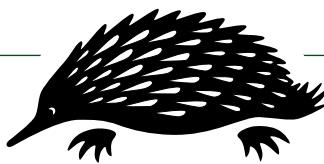
This authorisation is to remain in force until cancelled by the donor and in accordance with the terms described in the Agreement below.

Deduction will be made on 15th of each month.

CREDIT CARD AUTHORITY

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

Membership Form



WILDLIFE PRESERVATION SOCIETY OF AUSTRALIA LIMITED

PO Box 42 Brighton Le Sands NSW 2216

Membership

Become a member of the Wildlife Preservation Society Limited

Simply fill out this form.

Name:.....

Address:.....

City/Suburb:..... Postcode:

Telephone:..... Fax:

Email:

Membership category (please tick)

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

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

Three year membership (please tick)

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

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

Payment details (please tick)

Direct Debit Cheque Money Order Mastercard Visa

Card Security Code (CSC) _____

Card Number:.....

Amount \$.....

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

Donation \$.....

Signature:.....

Total \$.....

Mail to the: Wildlife Preservation Society Limited

PO Box 42, Brighton Le Sands NSW 2216.

Email: accounts@aws.org.au Website: www.wpsa.org.au

Direct debit: BSB: 062 000

Account No: 1043 2583

Account Name: Wildlife Preservation Society of Australia

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

Consider - A Bequest

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

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

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

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

