AUSTRALIAN Wildlife

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Celebrating a new century of wildlife preservation in Australia

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

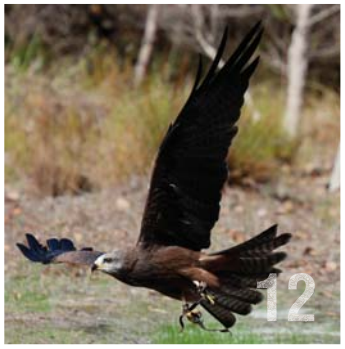
Photographing wildlife in Sydney Hasitha Tudugalle

Red-tailed black-cockatoo at the Mamre Homestead Wildlife show by Feathered Friends. This shot was taken as it was flying from one trainer's hand to another. I think this is the best photo of a bird in flight I've taken so far and it's one of my favourites. It also reminds me of the first time seeing these beautiful birds when I was on holiday at the Kakadu national park in Darwin last September

Full Story on page 8

Contents

features



regulars

Front cover

The mountain pygmy-possum, a tiny endangered species which is fast disappearing from its snowy habitats. Photo: Linda Broome

Back cover

Possum in Hyde Park. This was the first time I was trying out my Olympus E-620 and the first time I saw a possum. Photo: Hasitha Tudugalle

WILDLIFE PRESERVATION SOCIETY AUSTRALIA

Celebrating a new century of wildlife preservation in Australia

Australian Wildlife

is the official journal of the Wildlife Preservation Society of Australia Limited.
Founded in 1909, the Society is dedicated to the conservation of our unique Australian wildlife in all its forms.

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Corporate Members: $120
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Directors 2012

Notice to our members

The 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 Wildlife Preservation Society is an independent, voluntary, non-profit conservation organisation, formed in 1909, and is committed to the preservation of Australia's precious flora and fauna. We act as a watchdog and provide advice to government agencies and institutions regarding environmental and conservation issues concerning all aspects of wildlife preservation. Our mission is to conserve Australia's fauna and flora through education and involvement of the community. We are dedicated to the conservation of our unique Australian wildlife in all its forms through national environmental education programs, political lobbying, advocacy and hands on conservation work.

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

From the President's desk

Suzanne Medway - President

"Our participation in the liaison with Australian universities has certainly changed the focus and direction of our Society and I am sure will ensure that the next 100 years of our mission to preserve Australia's unique wildlife will be carried forward in safe hands."

Part of the text in the Society's mission statement reads: "...The Wildlife Preservation Society of Australia is totally committed to the preservation and protection of Australia's unique native fauna and flora in all its forms through national environmental education programs, community involvement, political lobbying and advocacy, as well as practical hands-on wildlife conservation projects. The Society's members are dedicated to preserving Australia's native wildlife for future generations of young Australians."

One of the particular areas of interest to me is environmental education programs. The first time I became involved in mentoring a young student was in 2003 when I attended a Reduction of Roadkill Seminar hosted by the NRMA. There I met a young student, Vanessa (Morrissey) Wilson, an Honours Student at the School of Biological, Earth & Environmental Sciences at the University of New South Wales. Vanessa's enthusiasm was inspiring and I was delighted to champion the awarding of one of our first grants to Vanessa to go towards her fauna-sensitive road design honours project on roadkill in the Royal National Park. Vanessa went on to become a member of our Society and now makes a very valuable contribution as a member of our board of directors.

In 2004 the New South Wales Government made a decision to aerial-bait 1080 in the state national parks to kill feral animals. 1080 had never been used in such a manner in the eastern states of Australia and we were concerned at the effect that widespread aerial baiting might have on native wildlife, especially small carnivores such as quolls. When we expressed our concerns to government, we were advised that there had never been research done on such methods and they recommended we consider funding this research project. This led to a grant being given to a young university student, Al Glen. We awarded funds to research the ecology of the spotted-tailed quoll and the effects of 1080 on these small animals. Al Glen completed his PhD at Sydney University on the interactions between native and introduced carnivores in Australia. Unfortunately Al was never able to join our board of directors as he then moved to Western Australia to pursue post-doctoral research with the Department of Environment and Conservation and the Invasive Animals Co-operative Research Centre.

Awarding these two grants to Vanessa and Al proved to be a catalyst to the introduction of the University Grants Scheme in 2005. I approached Al about awarding grants each year and Al came up with a proposal to benefit the preservation of Australian wildlife by supporting applied scientific research with a conservation focus and to further the Society's commitment to environmental education by supporting students with a research interest in wildlife conservation. He believed this would increase awareness of, and attract new members to, the Wildlife Preservation Society.

Under the proposed scheme, Al recommended the Society provide up to ten annual grants of $1,000 each year to honours or postgraduate students conducting research which will contribute to the conservation of Australian wildlife.

Al now chairs the Wildlife Preservation Society of Australia Limited University Research Grants Scheme Committee and this has proved to be one of the most successful projects our Society has undertaken in the last decade.

Last year our Vice President, Dr Clive Williams, suggested we participate in a WPSA/UTS Integrated Communication Project to publicise a certain aspect of our Society. It was proposed that WPSA and the UTS Communication Faculty join to facilitate a project to publicise a certain aspect of WPSA. Approximately 25 students responded to our brief to develop a communication strategy and produce a major piece of work. The collaboration with WPSA gave students experience in working with clients and producing a major piece of communication work.

This project was carried out in the first term of this year and our Society not only gained valuable insight to the minds and aspirations of young university students, but the four directors who participated actually had a lot of fun. This is a project we would definitely like to repeat, with a focus on another aspect of marketing our Society. Read more about this project on page 6.

Our participation in the liaison with Australian universities has certainly changed the focus and direction of our Society and I am sure will ensure that the next 100 years of our mission to preserve Australia's unique wildlife will be carried forward in safe hands.

If anyone has similar ideas of how we can cooperate and work with other universities, I would welcome their suggestions.

Thank you to all those members who entered the koala competition to win a silver coin. I will publish the winning entries in the summer edition.

Suzanne

Hasitha Tudugalle is a Sydney based photographer who enjoys photographing wildlife in his local area. See page 8 for the full story.

WPSA/UTS Integrated Communication Project

The Wildlife Preservation Society of Australia and the University of Technology Sydney entered into an exciting new project recently to review and promote the wildlife conservation work of the Society.

Early this year WPSA joined forces with the university students studying for a Bachelor of Arts degree in Communications at the University Technology Sydney to learn how to market a product to a new generation of young Australians. This project was undertaken by three of our directors – Suzanne Medway, Clive Williams and Patrick Medway – to gain valuable marketing advice and counsel on how to reach a new group of young people. Towards the end of this project we welcomed our newest board member, Chris Chan, to the project team.

Methodology

Five groups of five students were each given a brief on how to connect the Society to young Australians in the 18 to 30 year age group who aren't currently involved in environmental and wildlife conservation issues. We wanted to inspire them to take action towards a greater public awareness of the importance of wildlife conservation in our natural world for future generations of young Australians. We were also hopefully looking for the next generation of leaders to help run the Society and ensure its long-term survival and its valuable wildlife conservation work across Australia.

Wildlife conservation projects

There are a number of specific wildlife conservation projects with which WPSA is currently involved that can demonstrate how local actions can have an impact. (These include a program for the reduction of roadkill, a campaign for more marine parks and reserves, Australia-wide wombat conservation, other more focussed wildlife conservation projects such as marine sea turtles, bilby conservation, Australian sea-lion conservation on Kangaroo Island, numbat conservation in Western Australia, flying-fox protection programs, Tasmanian devil conservation and research, and finally, the small bird habitat conservation project.)

Specific campaign objectives were to increase public awareness of the successful wildlife conservation work of the Society, to increase public awareness of the Wildlife Preservation Society of Australia, to gain new members to support the work of the Society and raise brand awareness. Our own research indicated that our Society and its valuable and very successful wildlife conservation work were not widely known outside of our own membership area.

Sharina Chongprasith and Suzanne Medway

Long history of success

The Society has been in existence for over 100 years and nationally very active in wildlife conservation issues and has a very good reputation in both government and national conservation organisations, but the membership has been static for some time, with most members in the senior age bracket. Because of the age of the senior members, this section of our membership is gradually reducing.

With the introduction of the University Grants Scheme in 2005, membership in the 18 to 25 age bracket has been boosted and grown by 20 percent.

The Society is now beginning to attract a new and younger generation of wildlife conservationists and environmentalists, but the growth is very slow and retention rates of the membership are not good.

UTS project aims:

The project aims by 2013 to achieve the following:

1. to connect with Australian youth in the 18 to 30 age bracket resulting in widespread awareness of the WPSA goals of saving Australia's unique wildlife in all its forms;
2. to grow membership of the Society by 10 percent;
3. to grow donations for the Society's wildlife conservation work;
4. to grow awareness of the wildlife conservation work of the Society across Australia by at least 10 percent. (As the Society does not have any research data on brand awareness we believe the Society does not have a high profile and other organisations would come to people's minds before WPSA);
5. to look for partnerships or sponsorships to fund the end products of this project;
6. to look for partnerships or sponsorships to fund some of our special projects – University

Grants, wildlife brochures, display materials, etc;

7. to look for partnerships or sponsorships to fund the production and printing of our quarterly magazine – *Australian Wildlife* – to enable us to reach more people;
8. to look for clients to advertise in our quarterly magazine – *Australian Wildlife;* and
9. to develop an organised program of activities to achieve these goals.

The five groups of students gave their final presentation to the board members of our Society in June, and we were very impressed with their enthusiasm and grasp of the issues concerning the growth of our organisation.

The best student presentation was then selected to present a week later to the entire communication faculty at UTS.

All five presentations were excellent in their own way and we took many exciting ideas on board to discuss further and to consider possible implementation in the future.

Change of name recommended

One consideration that we are excited about is the possible change of our brand name to **Australian Wildlife Society**. The students felt that the name Australian Wildlife Society is generic enough to encompass many wildlife issues, not just preservation! There are many instances where the general public confuses our name with other organisations and people often say Wildlife Protection Society rather than Wildlife Preservation Society. Research indicates that a maximum of three words in a title is better for memory retention.

Vision for the future

In changing the name of the Society the students asked us: what is the overall vision of the newly named AWS? Who do we want to become? We now need a roadmap of how we plan to get there and strategically focus on specific projects that will resonate with the Australian public.

Our Society has been using the title ***Australian Wildlife*** as the name of our quarterly magazine since 1934 and this name has been registered with the Office of Fair Trading to protect our new potential name.

Yoko Zhang, Chloe Kang, Ida Fabiansson, Patrick Medway, Clive Williams Sharina Chongprasith and Jennifer Gillis

As with all charities, our Society has to be very aware and carefully husband our income stream and this is something that will be addressed in the rebranding of the Society. As we receive no government funding and rely entirely on our own membership fees and return on investments to carry out our wildlife conservation work, seeking more support through sponsorship or partnerships is a recommendation that the Board will consider following.

The students also recommended that we take more credit for the wildlife conservation work we do and incorporate more publicity on Facebook and Twitter to reach this younger audience of potential supporters.

Updating the website

The first step to consider in our journey to market to a younger age group is to update our website under the new brand name **Australian Wildlife Society**. The two websites would run side by side initially and have a live Facebook feedback on the entry page.

We will also be looking at our very successful University Grants program and improving the scheme by paying particular attention to those students who joined as members but did not renew their membership.

University internship offer

We are now advertising for a bright young student to become an 'intern' to manage our social media campaigns. This will mainly involve Facebook and Twitter. If you happen to know any suitable person who might be interested, please contact the National Office.

Conservation partnerships

The UTS students also recommended that we actively strengthen our environmental alliances and connections with other wildlife conservation and environmental groups across Australia. It has certainly become apparent that the most successful conservation campaigns have been through coalitions of wildlife conservation groups all lobbying for the same action. By working together we can achieve so much more to help preserve and protect our native wildlife for the next generation of Australians.

Conclusions

The UTS project was an exciting and very worthwhile experience for our Directors on the Board. We learned at first hand some of the current thinking and attitudes of young university students and their energy level and capacity to come up with exciting ideas.

It is clear with the new ideas and suggestions being made that we will have to look at expanding our office facilities and even move more quickly to establish a new National Office for the work of the Society. The Directors were satisfied that the liaison with UTS provided a very valuable model to follow and it is our intention to repeat the exercise, focusing on a different topic, next year.

The active involvement of more of our members in helping to plan and direct our future is paramount.

If you feel you can contribute to the future of the wildlife conservation work of the Society please contact our honorary CEO on (02) 9556 1537.

PHOTOGRAPHING
WILDLIFE IN SYDNEY

HASITHA TUDUGALLE

I'm originally from Sri Lanka but moved to Melbourne in November 2010 and then to Sydney in April 2011.

Since an early age, I have always carried a compact camera with me, capturing every moment I could. I had this crazy idea that when I got old I could have a biography of my life in pictures. But I never took photography seriously until I got my Olympus DSLR E-620 in May 2011 and began to explore Sydney with the camera as my companion.

On a visit to the Royal Botanical Gardens one day, I discovered all these birds I had never seen before, which were at the pond close to Farm Cove. I started taking pictures of them and I couldn't stop. There were ducks, ibis, herons, cockatoos, lorikeets and cormorants all coming to this area of the Botanical Gardens.

It brought back memories of when I was about six or seven years old. My dad built a huge cage in our garden in Sri Lanka and we got about four lovebirds. They quickly turned into about 10 to 15 of them and we had to give some away. I had a book called *Birds of Prey* and it had all these pictures of eagles, vultures, osprey, etc. I used to draw and paint these birds by looking at the pictures in the book but I never actually read the book because I hated reading as a child and was more into art and painting. Maybe that's why I like being around birds and nature.

I like outdoor activities. I recently joined a local dragon boat club and took up dragon boating which I'm currently enjoying.

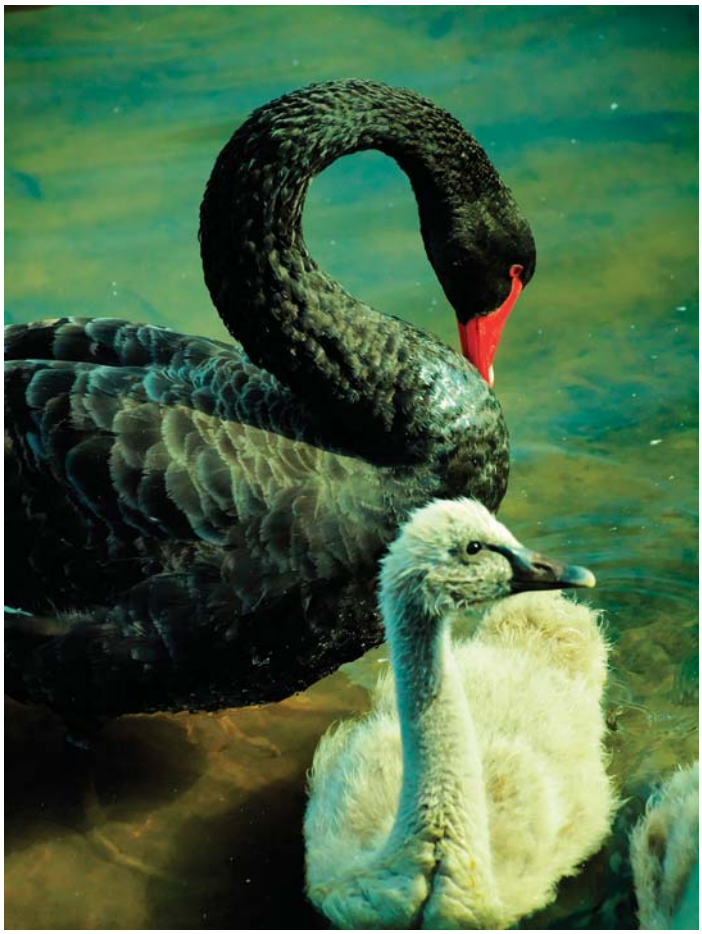
I have been photographing for more than a year now and think I am getting better at it, and have recently developed an interest in taking photographs of birds in flight.

Previous Page: Phoenix the black kite. I recently went to Mamre Homestead wildlife show with Feathered Friends Travelling Zoo. I loved it. The bird show was amazing. They fly the birds right over your head; you can feel the beat of their wings. I took some fantastic photos that day. There were only about 12 people who came to watch the show, which was good because we were all able to interact with the birds

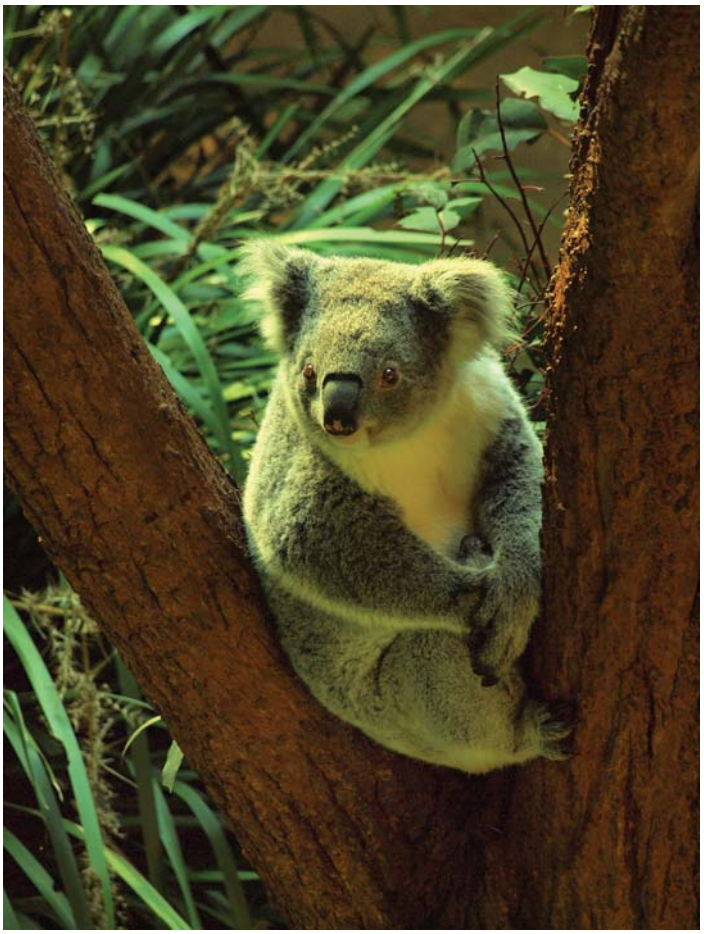
Casper the barn owl at Mamre Homestead. The handler was kind enough to let me hang around and take some pictures of Casper being trained

Bearded water dragon at the Royal Botanical Gardens. It was hiding behind the rocks at the smaller pond near the cafe. I saw it when it got away from an Indian mynah that was trying to attack it

Tree kangaroo sleeping on a tree at Taronga Zoo

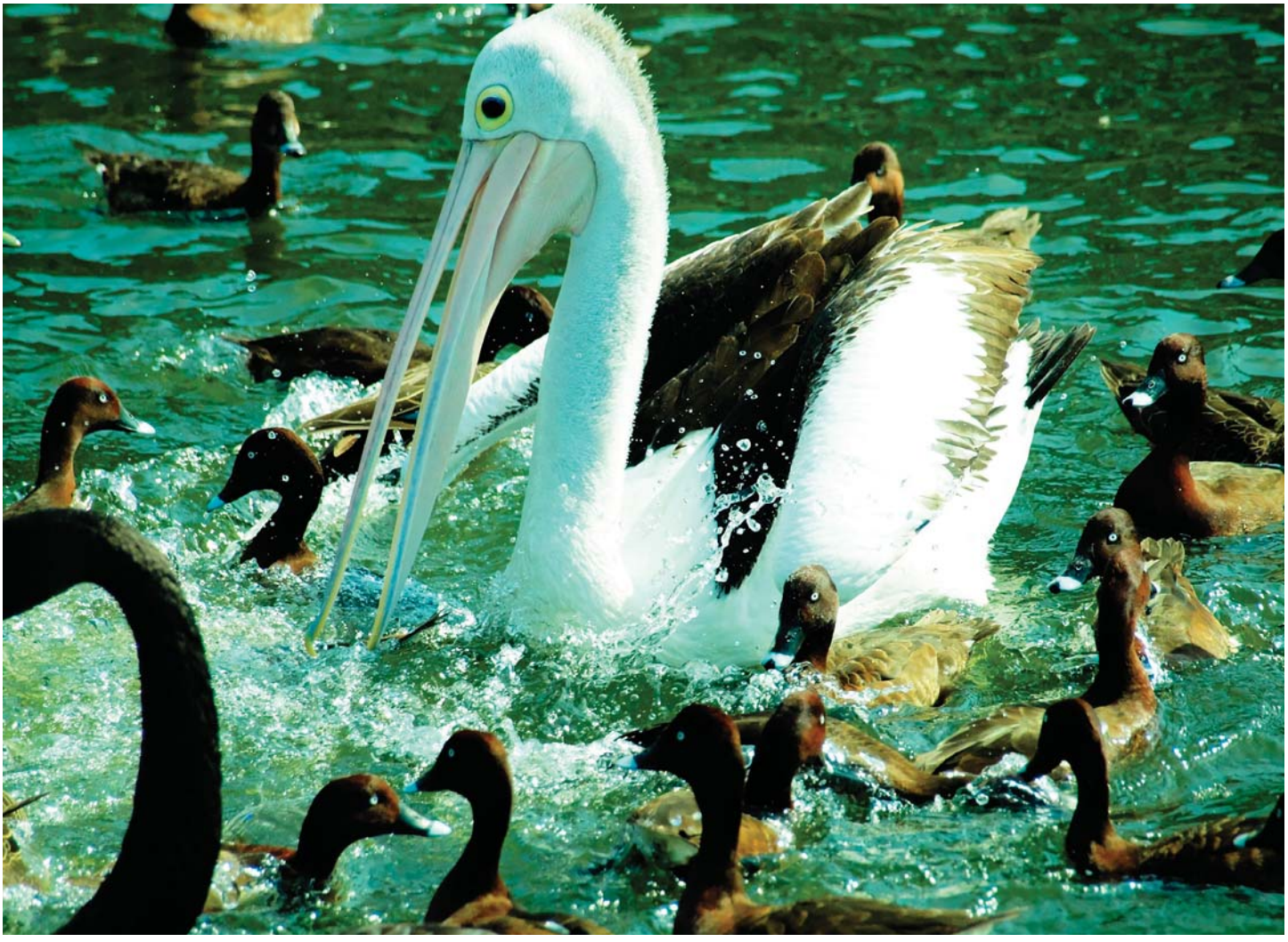


Black swan and its cygnet taken at the Duck Pond in Centennial Park



Koala at Taronga Zoo

Australian darter, taken at Centennial Park. This is the only one I've spotted so far. I managed to get up close, about two metres away from this bird and was sitting on the ground clicking away until it took off



Ducks, swans, Eurasian coot, pigeons and a pelican, all gathered to be fed by the people at Centennial Park. It was an amazing sight to see. With the pelican in the middle, the other birds had no chance

Enraptured with raptors

Chrissy Banks

Eagles Heritage and Wildlife Centre is located in the heart of the Margaret River region, Western Australia, and is situated on 29 acres of natural bushland alive with native fauna and flora.

I've come to visit with raptors (birds of prey) to find out just what it takes to be involved in raptor rehabilitation.

Philip Pain, owner/curator, has been rehabilitating raptors for over thirty years. In 1984 he founded The Society for the Preservation of Raptors (Inc) to promote cooperation among specialist raptor rehabilitators. Dedicated to the rescue and rehabilitation of Australia's native birds of prey, the Society quickly had an overflow of birds needing care. Phil founded Eagles Heritage in 1986 to cope with the influx. In 1988 the Centre was opened to the public for educational purposes. Visitors can walk a one-kilometre track leading past specially designed bush-pole aviaries home to permanently disabled raptors that due to their injuries are unable to return to the wild.

Away from public view, Eagles Heritage also has seven acres dedicated to the treatment, care and full rehabilitation of many birds that are successfully returned to the wild. Along with the small hospital site, Phil has a training room for volunteers and others wishing to have a career in wildlife rehabilitation.

The day we visit is a perfect one: wintry blue sky, crisp air and the smell of bush after rain drifts on the breeze. Inside a homely building the children and I are greeted by a black Labrador. While she licks the kids I chat with Kathy Pain. 'Most of our birds have injuries not easily detected,' I'm told. 'A common injury is eye damage often caused by collision, mostly with cars. It's known as impact cataracts, where the lens is damaged and scarring causes vision impairment. Others have wing damage that impairs flight. A raptor that can't see or fly properly can't hunt or avoid dangers.'

Above: Black kite – also known as the firebird, fork-tail and Kimberly seagull kites. They are opportunistic feeders and often travel in packs of up to fifty

Keen to see for myself, I pay our entry fee and step out onto the grounds. Immediately, a long, plaintive cry shatters the peace. To our right a large brown and white raptor is peering intently at us. I can't identify the species and wonder why it keeps up that mournful call. I make a mental note to ask Phil later and follow my children who are beckoning madly from in front of the first aviary on the tour.

It holds a wedge-tailed eagle. Simply enormous, she stands with her back to us, head turned, eyeing us with lazy curiosity. She's stunning. 'That's a big bird, Mum,' my son blurts. At six, he's just made a classic Aussie understatement. The wedge-tail boasts a wingspan of over nine feet, stands 40 inches tall, has a beak the length of a curved kitchen knife, and commands two-tonne crushing power in each foot. Not surprisingly, they exude the confidence of undeniable kingship, undisputed lords of the air.

We move on discovering owls, falcons, hawks, kites and eagles. A female black-breasted kite fusses with her nest, a powerful owl winks at us, the boobooks look sweet enough to cuddle and the austere white-bellied sea eagle affords us a stiff glance down its rather impressive beak.

The real stars of the day, however, are the black kites. It's pushing 11am and we're sitting under a thatched hutch, awaiting the start of the educational flight display. A raptor shadow swoops across the open space. My son turns to me, alight with excitement. 'They're coming, Mummy,' he whisper-squeals. His excitement is contagious and I look eagerly toward the far side as Phil enters the arena. On his falconry glove perches a black kite. Introduced as Kris, he is a slim and handsome bird, curious and clearly very intelligent. Above him four of his family show off their aerial prowess. These birds are fast, agile and breathtakingly pretty.

Phil gives us a raptor rundown. Raptors see ten times faster than the human eye, so when we see a fly buzz by in a blur, they see each individual wing beat. The beak holds less strength than a budgie's and is used only for preening, tearing and swallowing. Primary weapons are the talons. Phil explains that if Kris

Australia's smallest owl (23-26cms), the boobook is renowned for acrobatic skill in catching invertebrates, small bats and birds, frogs and rodents

Powerful owls are endangered due to deforestation. The powerful owl is Australia's largest owl and the only one in the world to actually call 'Whoo-hoo'. They are found in Australia's south-east

Black-breasted buzzards are predominantly found in northern and central Australia. They have an obscure habit of kidnapping eggs from other species and raising the chick with their own brood

wanted to he could pierce the glove and straight through Phil's arm as easy as butter. Raptors, however, rarely use the full strength of their talons, exerting only enough pressure as is required – in this case – to stay on the glove. 'Raptors are largely misunderstood,' Phil says, and maintains that the only way to change the opinion of the public is to bring them in contact with the birds. At which point we get a chance to slip on a glove and have Kris perch on our arm. Up close, this bird is exquisitely beautiful. And smart! 'A black kite will take a smouldering branch from a bushfire to light another fire elsewhere,' Phil tells us, 'all to flush out prey. This shows cunning intelligence and has earned them the nickname firebirds. Of course they're not popular with fire fighters.' Also into a bit of piracy, Phil warns that you need to keep an eye on your picnic if kites are around.

But there are serious messages Phil wants to get across. Birds of prey are dying from household poisons. Commonly used anticoagulant rodenticides take days to kill. The infected rodent dies and is found by a carrion eater. These birds are secondarily poisoned. It is a slow and horrific death involving excruciating pain and internal haemorrhaging. For this problem at least, a solution has been found. Coumatetralyl-based poisons, such as Rocumin (readily available from supermarkets), are highly toxic but do not accumulate up the food chain.

Phil then hits us with a horrible truth. Australia is the only country in the world to still legalise culling of our biggest eagle. Persecution of wedge-tailed eagles has a long and bloody history in Australia. From 1928 to 1974 government bounties existed for eagle scalps resulting in the slaughter of over one million birds. Until 1989 they were classed as vermin and on the open season list for private land. In an eight-year period Western Australia and Queensland were responsible for 120,000 eagle deaths between them (15,000 per year). From 1989 they made the protected species list, but are subject to Damages License, meaning license holders (livestock farmers) can shoot them at will. And why? Because the generational belief remains that wedge-tails take lambs

in great quantities. In fact, scientific evidence says otherwise.

CSIRO conducted a ten-year study proving wedge-tails are not responsible for taking lambs (accounting for less than one percent of stock lost, these either dead or mismothered), yet Damage Licenses continue to be issued. And does requiring a license to cull eagles actually make a difference? A spokesperson for the Society for the Preservation of Raptors (Inc) says: At many of our education displays, farmers openly boast of destroying wedge-tailed eagles in large numbers – without a license.

And this is having a devastating effect on the wedge-tail population. Wedge-tails breed bi-yearly raising only one chick. Many chicks don't reach mating maturity until six to seven years old. They're being culled faster than they can breed. Phil works tirelessly to get the message understood: culling must stop if our wedge-tailed eagle is to survive. Deeply affected by this

Spotted harriers are intensely shy and very difficult to locate in the wild. They inhabit inland areas preferring dry plains and scrubby bushland, and are sparsely distributed due to a solitary nature. Mating occurs between July and October resulting in three to four eggs

Found across most of Australia, the little eagle has a palate for young rabbits and utters a soft whistle when calling

Barking owl - a perpetually surprised looking owl, this tropical sweetheart has a call much like a dog's bark and is said to be the source of the Bunyip myth

news, I feel a strong urge to approach the aviary holding the wedge-tail we'd visited earlier and apologise for humanity's stupid cruelty.

Later, wandering the grounds with Phil I ask about the raptor with the haunting cry. 'That's Rusty,' Phil tells me. 'She's a Brahminy kite and while she does sound sad, she's actually warning you off.'

Rusty's story begins tragically. Robbed from her nest as a nestling, Rusty was kept in a budgie cage and fed table scraps that had a devastating effect on her bone growth. At the time of rescue on the Northern Territory/ Queensland border, Rusty had grown so large she had to be cut from the cage. She had cigarette burns down her back and legs and could not stand, extend her wings or even turn around. Flown immediately to Perth, Rusty was transferred to Eagles Heritage and into Phil's care. Due to the 'table scrap' diet she suffers the lifelong and incurable metabolic bone disorder (MBD). Her legs are bowed and initially she had issues with her beak and talons. Phil treated her injuries, fed her an appropriate diet and worked at gaining her trust. Once her flight feathers grew in it took Phil two years of positive reinforcement

Wedge-tailed eagles - mating for life these big birds are of a gentle disposition and communicate with a soft trilling cheep, but due to their size and fierce appearance are badly misunderstood

training to teach her to fly. Rusty became a prominent member of the educational team until retirement. The only hint of her early ordeal is the contact call she makes.

'Rusty has a human imprint on her psyche,' explains Nancy Tang of the Society for the Preservation of Raptors (Inc). 'She thinks we're all the same species and warns that we're in her space and to move off. She gets aggressive with staff and volunteers because they continually invade her territory to do unthinkable things like clean the aviary, scrub out her bath, give her fresh water and feed her.' Despite her mean temper Phil clearly loves her. 'She's a beautiful bird,' he tells me with a smile that says it all. 'They all are.'

Looking at this wonderful, amiable character, I realise it takes a very special kind of person to do what he does. Phil is fond of saying: It takes a special kind of insanity to be a wildlife rehabilitator, and Nancy Tang elaborates. 'We invest our incomes on incubators, aviaries and big tins of baby animal formula. We don't buy expensive furniture because it's going to get pooped on. We get scratched, bitten and urinated on and happily go back for more. Our houses never look entirely tidy and we generally look slightly disreputable, because given the option to spend $100 on a decent haircut, or new gear for the animals, we choose the animals. If we were rich, we'd be considered eccentric. As it is, we're just a bit weird.'

Weird? No. I think they're unsung heroes, selfless and full of compassion. Without their tireless energy and commitment, our wildlife would be in a world of trouble. To Phil, Kathy, Nancy and all wildlife rehabilitators and volunteers around the country, I say thank you for your time, knowledge, dedication and compassion.

In the end we will conserve only what we love.

We will love only what we understand.

We will understand only what we are taught.

Baba Dioum

Ebony and Evan measuring up against the full wing expansion of a wedge-tailed eagle at the museum hut at Eagles Heritage and Wildlife Centre

Managing grey-headed flying-foxes

Ellen Mannix

The grey-headed flying-fox (*Pteropus poliocephalus*) is an Australian native bat endemic to the forests of south-eastern Australia, from southern Queensland to Victoria. As urban areas continue to expand, the natural habitat of the flying-fox is decreasing, resulting in the decline of the species. This decline has lead to their current status of 'vulnerable'. Habitat loss has also forced these native species into the urbanised environment and farmlands where food is more accessible. Here, they are causing problems such as crop damage and public nuisance. This has resulted in the declining opinion and the local culling of the species.

The flying-fox often roosts in large aggregations at 'camp sites'. Several of these camp sites are transitory and occupied for a limited time during migration, while others may be occupied more permanently. The majority of camp sites are located in the vicinity of water in a range of habitat types, such as riparian forest and mangroves, as well as urban areas and fruit crops. This bat is a highly mobile, migratory species and genetic exchange occurs across the entire species, indicating that there is one single interbreeding population.

These flying-foxes are generalists; they prefer to feed on the fruit, blossoms and nectar from native vegetation. However, they may seek out alternative food resources such as commercially grown fruit crops or introduced plant species in response to diminished resources in their natural habitat. The flying-fox provides imperative ecosystem services such as seed dispersal and is a necessary component of biodiversity. The management of the grey-headed flying-fox is rivalled with conflicting opinions of the various stakeholders, eg land-owners, fruit growers, conservationists, scientists and the general public. There is an urgent need to develop new management strategies to address both conservation and public objectives.

In recent years the grey-headed flying-fox has been continually infiltrating unnatural habitats such as fruit farms and the highly urbanised cities of Melbourne and Sydney. An example of this is the flying-fox colony in Melbourne Botanic Gardens. The flying-fox had been sporadically visiting Melbourne since approximately 1884, and it is presumed the bat has been continuously present in Melbourne since December 1985. This colony has increased in the last few decades. There were approximately 10–15 bats that over-wintered in 1986, and the camp increased to accommodate 20–30,000 individuals in March 2003. This exponential growth seen in Melbourne is similar to the Sydney populations, especially the Sydney Botanic Gardens.

The occasional observations of the flying-fox before the 1980s suggest

that several individuals were originally migrants that travelled in response to food shortages during summer and autumn. Presumably, they then returned to their natural forest habitats in the north without establishing permanent camp sites. The potential transition from migratory to permanent residents within the cities by the flying-fox represents a significant shift in the ecology of the species to use urban habitats outside its typical habitat range. This is a rare example of when urbanisation has resulted in the creation of new habitats. Flying-fox colonies have also sporadically formed around farmers' cropping areas, particularly orchards.

The main factors contributing to these unnatural flying-fox colonies are likely to be man-induced: loss of habitat, increased food availability within the urban landscape and possibly climate change. Habitat loss has been associated with anthropogenic sources, including the large-scale clearing and fragmentation of the natural habitat of the flying-fox. Some have also suggested that man-induced climate change has slightly altered the atmospheric temperature of their natural habitat and has forced the flying-fox into a new geographic range.

Habitat loss and local climate change may have contributed to the initial establishments of these foxes, but do not explain the permanent status and growing size of these colonies. Urban and farmland habitats may have become the preferential habitats because of the year-round reliable food source. Specifically in the urban environment there is an unnaturally diverse mix of vegetation that is likely to ensure a year-round food source. This food supply may be preferential because there is more regularity of flowering and fruiting of food trees. Artificial watering ameliorates the naturally sporadic patterns of flowering and fruiting in response to unpredictable rainfall patterns in their natural habitat.

Figure 1. In pink, the distribution of the grey-headed flying-fox

The relocation of the flying-fox into new habitats is of great concern for

residents, conservationists and the bats themselves. Urban environments pose a series of threats that may be detrimental to the bats leading to their further decline, including power lines, traffic, pollution, and predation from exotic species. In this environment, flying-foxes have also come under prosecution for their noise, smell, droppings and damage to human property and powerlines. Roosting activities can cause considerable damage to property and vegetation, which may be of concern to some groups.

The flying-fox also causes severe damage to fruit and orchard crops in response to limited native food resources. The bats use farmlands as 'irregular' campsites, usually visiting only momentarily. Farmers have been known to shoot at the bats to scare or cull them. There are also recent concerns the flying-foxes may cause harm to public and livestock health. Three diseases, the Hendra virus, Menangle virus and Australian bat lyssavirus, have all been recently found in flying-foxes. There is limited research on both the Hendra and Menagle viruses; however, there is evidence to suggest that ABL can be transmitted from infected flying-foxes to humans via bites.

Flying-foxes have become a source of declining opinion due to the damage they supposedly cause to the public and farmers. There is a general public perception of these bats as 'disease-carrying vermin', that are 'smelly' and 'noisy'. These poor attitudes have led to a general public disregard to the flying-fox. This is likely to contribute to their further decline because of culling and lack of funding for the research and management to protect the species.

The grey-headed flying fox is currently classified as 'vulnerable' according to the NSW *Threatened Species Conservation Act 2001*. There are several local management plans for specific camps, such as the *Ku-ring-gai Flying-fox Reserve Management Plan, 1999* and the *Parramatta River Grey–headed Flying-fox Camp Management Plan, 2008*. However, the main plan (TSCA 2001) is derived from the Scientific Committee's judgment under the NSW Threatened Species Conservation Act. It focuses on the following points to be of importance in managing the grey-headed flying-fox:

- To improve public and land-holder attitudes toward the flying-fox through liaison with community and providing educational resources.
- A Grey-headed Flying-fox National Recovery Team has been put in place to undertake an annual review of the national threat abatement program.
- Monitoring of crop damage and developing guidelines to assist land-owners to deal with the foxes.
- Rehabilitation of habitat:
  - sustaining the vegetation of the camps critical to the survival of the flying-fox;
  - protection of common foraging and roosting habitats through local government zoning or buffer zones between residents and roost sites; and
  - increasing the extent and viability of foraging habitat for flying-foxes that is productive during winter and spring (generally times of food shortage), including habitat restoration/rehabilitation works.
- More research on:
  - developing and promoting incentives to reduce killing of flying-foxes in commercial fruit crops;
  - developing methods for rapid estimates of flying-fox damage on commercial crops, allowing the long-term monitoring of industry-wide levels and patterns of flying-fox damage;
  - reviewing and improving methods used to assess population size of grey-headed flying-foxes;

- reducing the impacts of urban hazards, eg electrocution and entanglement by powerlines; and
- further improving knowledge of life-history traits of the grey-headed flying-fox.

- Habitat assessment:
  - identify the commercial fruit industries that are impacted by grey-headed flying-foxes, to provide an information base for use by the various stakeholders;
  - set priorities for protecting foraging habitat critical to the survival of flying-fox and generate maps of priority foraging habitat; and
  - establish and maintain a range-wide database of the grey-headed flying-fox camps for distribution to land management/planning authorities, researchers and interested public.

There have also been successful trials to remove the bats from the Royal Botanic Gardens in Melbourne. This model is currently being projected onto the Sydney Botanic Gardens.

Within the financial and time constraints I agree this is a good plan in theory.

The most obvious limitation is that the plan is New South Wales specific. Because the flying-fox is a migratory species that ignores state borders, a federal approach should be taken. Considering the plan does mention a 'national recovery team' this may not be a big problem, but objectives of this plan are not necessarily nationwide. The other major problem with the current plan is that this was published in 2001, and there has not been anything official since. The plan needs to be updated.

The recovery team mentioned in the plan is also limited in that their meeting once a year is not enough. I also feel that there is not enough media attention on the protection and education of this species as there is still an obvious dislike for this species amongst the public. The 'guidelines' for farmers to work alongside with the flying-fox is not a valid proposal. As these farmers are looking at these animals as destroying their livelihood, it is necessary to provide the farmers with a viable option to keep their crops intact without hurting the bats. The plan lacks

a sufficient option in regard to habitat loss, and only suggests improving the little habitat left. The research part is sufficient, however it ignores that all research needs to be coordinated on a national level.

To be effective, management strategies will need to find a way to balance the concerns of the public, conservationists and farmers. It is necessary to devise programs that prevent significant losses to the horticulture industry, minimise nuisance problems and health concerns at urban camps, while at the same time arresting population decline by protecting and enhancing important habitat areas and phasing out culling and/or shooting.

The major factor hindering the conservation of the flying-fox is the public perception of them as over-abundant, smelly, noisy pests that damage human property. Community support is essential to carry out the management plan. Even though it is mentioned in the current plan, more extensive measures have to be taken and the community as a whole has to be involved to protect the native species from further decline. Currently the flying-fox is still being shot at, and its habitat is being further removed which is contributing to its further decline. Education of the declining native species and the ecosystem and biodiversity services it provides must be developed to counteract these views and actions. Education will help dispel the myths, prevent their demonisation and, most importantly, act as a cornerstone to their conservation.

As flying foxes are nomadic species, an education program and/or awareness should be infiltrated along the whole of eastern Australia. This will assist in reducing the conflicts and promote tolerance of the flying-foxes to eventually help to protect the species. The media can be used to endear people to the qualities of the flying-fox, newspapers or news programs such as *60 Minutes*, *Four Corners* or the *7pm Project* are watched nation-wide. Flyers/brochures and posters are another cheap alternative to project awareness, especially in areas with flying-fox problems. Another method to re-educate people on the benefits of flying-foxes is to use the school system. Conservationists could do talks in schools, with real live bats. This will hopefully teach the children about the benefits and need for this animal in our ecosystems. Potentially, this will have a relay effect where the information will go back to their families and so forth.

As urbanisation is encroaching into the flying-foxes' habitat, it is more appropriate in the long term to create alternative camp sites to relocate the

flying-foxes, otherwise their problems are just being moved to another property. A long-term approach of cooperative research is necessary for more information what drives this species to choose certain camps over others. It is essential that all local governments start planning by identifying suitable prospective flying-fox camp sites and making other areas potentially suitable, lest flying-foxes will make the decision themselves and decide to camp in undesirable places.

These selected suitable areas or reserves should be vegetated with their preferable native food source with a mixture of trees and plants. A focus should be made on trees or plants that flower year-round to curtail a need for migration. Another idea to attract the grey-headed flying-fox away from fruit farms during spring is to plant key spring species in these areas. These reserves should include 'buffer zones' between the public (housing) and the reserve. A buffer zone of at least 50 metres between the colonies to the houses may be appropriate. This is so that humans are not negatively impacted by the smell and noise and to limit the conflict between the bats and humans. These sites should also not be in close proximity to the areas they are causing problems in, such as farms or urban environments. Potentially this could have worse effects, because it would lure flying-foxes into the unsuitable area.

To drive these bats from their original locations to a more preferred site, the Melbourne Botanic Gardens model in 2003 could be executed. Approximately 30,000 flying-foxes were persuaded to leave the heritage-listed gardens using a variety of noise aversion techniques over a two-week period. When the flying-foxes left the Royal Botanic Gardens in Melbourne, they eventually settled in another location outside Melbourne, where they were welcomed. Throughout the relocation, there were no reports of any death or injury to a flying-fox as a result of the disturbance activities. Even though flying-foxes are most likely to join existing camps that are already familiar to them as part of their network of migratory stop-overs, there are still ways to persuade them to new locations with appropriate food sources.

According to Tidemann (1999), it may be possible to train flying-foxes to avoid or bring them towards certain areas based on particular signals or aversion agents. The effects could be long-term because of their life span, surviving well into their teens and far-reaching because of their mobility. It therefore may be possible to redirect flying-foxes to more desirable locations or artificial habitats. The benefits of flying-fox seed dispersal abilities may be able to be used to enhance environmental reconstruction in degraded areas. Obviously this idea still needs to be thoroughly researched and trialled.

Until more habitats can be made, there are a few short-term options to mediate the current problems. Exclusion netting could be installed to prevent flying-fox damage to fruit crops. These nets are very costly, so I would suggest that the expense of the nets be compensated with funding, or even a percentage, say 30 percent. The reason for compensation is to encourage use of these nets instead of reverting to killing these bats via gunshot.

Recommendations

The 'national recovery team' mentioned in the current plan should have more responsibilities in coordinating all research and progress on creating new preferable, artificial camps. The team should be formed representative of all stakeholders: landowners, farmers, the public, conservationists, scientists and government agencies. They should also be in contact with all the various stakeholders with the main objective of successfully managing the species. The team should work year round aiming to continually improve the recovery of the species.

The primary limitation for any management plan is funding constraints. I would suggest that the national recovery team lobby for funds and communicate with conservationists and scientists to find out what their needs and the areas of research that need financial support are. The committee will advise government and non-government funding agencies (eg Australian Research Council, National Heritage Trust, public trusts, private endowments, etc) of priorities that need investment, such as research, awareness, compensation and habitat restoration/creation.

The relocation of the flying-fox is a long-term project that will need research, time, financial support and community support. I would recommend a nationwide approach or a 'landscape approach' to deal with the situation. Because the grey-headed flying-fox is a migratory species that ignores state borders it is necessary to devise a cooperative management scheme. This approach will coordinate research, education projects and management trials. It may be necessary to use a variety of options to suit different circumstances.

Editor's note: *Ellen Mannix is 22 years old and has been a volunteer with Wires since March. She attends the University of Technology of Sydney. This article is based on an assignment in year 3 of her degree. Ellen has completed her degree in environmental science and forensics and is now doing honours in bird ecology.*

Eastern quolls

Bringing back an extinct species

The eastern quoll is extinct on mainland Australia, and a local organisation is working to bring it back. Australian Ecosystems Foundation Inc. (AEFI) supports a breeding program at Secret Creek Sanctuary in Lithgow, New South Wales, which has the largest breeding population of eastern quolls on the mainland. This population is becoming increasingly important as the species continues to disappear throughout its remaining range. Tasmania has been the last stronghold for this quoll for many years, but there is now evidence of a ten-year decline in population numbers. A submission has just been made to list the species as threatened in this last island refuge.

Eastern quolls (*Dasyurus viverrinus*) are beautiful animals, with light to chocolate brown coats covered in white spots, providing them with perfect camouflage as they move through the bush with great speed and agility. This quoll is a medium-sized marsupial predator, growing up to the size of a small domestic cat, and is capable of hunting animals the size of a rabbit. However, they are predominantly insectivorous eating a variety of small prey, as well as vegetation and fruit. They were once widely found from northern New South Wales, down to Victoria and South Australia, but the last confirmed sighting on the mainland was in the Sydney suburb of Vaucluse in 1963. Quolls are part of the Dasyuridae family and related to the Tasmanian devil and the now extinct Tasmanian tiger.

Trevor Evans, a founding member of AEFI and Australian Geographic 2010 Conservationist of the Year, has been breeding the quolls at Secret Creek Sanctuary since 2003. AEFI is part of the Mainland Eastern Quoll Management Group, a group dedicated to preserving the species on mainland Australia. The quolls are exchanged within other private sanctuaries in New South Wales and Victoria, and each year new quolls are brought up from Tasmania to ensure good levels of genetic diversity in the captive population.

Dr Kellie Leigh, an endangered carnivore specialist, has recently joined the AEFI team to help develop a project to reintroduce them into the wild.

Australian Ecosystems Foundation Inc. (AEFI) is a nationally registered, award-winning not-for-profit organisation and is celebrating its tenth anniversary this year. If you would like to support their project to

Black eastern quoll babies, the rarest native carnivores on mainland Australia

Eastern quolls from the breeding program at Secret Creek Sanctuary, near the Blue Mountains

secure the future of this endearing, spotted marsupial carnivore please contact them at info@ausecosystems.org.au. All donations of $2 or over are tax deductible.

Editor's note:

Australian Ecosystems Foundation won our Society's Community Wildlife Conservation Award in 2008. This organisation believes passionately in an ecosystems approach to the conservation of wildlife. AEFI has both acquired land and received land donated by some of its members. It has planted trees and set out to manage protected habitats, thereby assuring the survival of endangered species. AEFI also conducts and supports research and works in conjunction with university departments. It maintains its own endangered species captive breeding programs. At its property, Secret Creek Sanctuary, AEFI provides educational opportunities for visitors to learn about a range of Australian wildlife. Its committee is made up of volunteers from a range of backgrounds, including business executives, scientists, tourist operators and indigenous representatives.

Welcome to our newest board member - Chris Chan

Chris is a Creative Consultant with over 10 years experience in the visual communication of brands, products and services for consumers and corporations. He has been involved in the development of online presences for organisations including Uniden, Hewlett Packard, Tellus Holdings, CSM energy, International Conferences & Events and Allowance Inc.

Chris graduated from University Technology Sydney with a Bachelor in Design (Visual Communication) and also holds a Diploma in Marketing.

Chris has been working closely with the WPSA in designing a new brand identity, creating a stronger online presence and building an online membership with electronic payment functionality. He is excited to join the WPSA board and looks forward to the challenges ahead.

Mountain pygmy-possum

Saving the mountain pygmy-possum, using evidence from the fossil record

The not-for-profit Australian Ecosystems Foundation Inc. (AEFI) is part of a collaborative effort to save the mountain pygmy-possum. This tiny marsupial has been a part of our ecosystems for 24 million years and was thought to be extinct until it was re-discovered near a ski lodge in the Snowy Mountains in 1966. The possums are found only above the snowline and are facing the threat of extinction due to habitat loss, climate change, and predation by foxes and feral cats.

This exciting conservation cause is bringing a range of experts and agencies together and is being undertaken with the Foundation for National Parks and Wildlife, researchers from the University of NSW, the University of Sydney and the Office of Environment and Heritage (OEH). It has also attracted support from Australian Geographic and Paddy Pallin.

Australian Ecosystems Foundation will be hosting a state-of-the-art new breeding and research facility for the possums. Secret Creek Sanctuary in Lithgow is the highest wildlife sanctuary on mainland Australia and is well-suited to house the possums. Mountain pygmy-possums are Australia's only hibernating alpine marsupial; they require enduring cold temperatures over winter to go into torpor, a type of hibernation where they curl up under the snow and lower their body temperatures, sleeping through the colder months. Temperature probes placed in rock mounds at Secret Creek have shown that the area is cold enough, for long enough, to support the possum's hibernation and therefore a successful breeding program.

Historically, mountain pygmy-possums did not have such a restricted distribution, they were found at lower altitudes and in different habitats. A critical part of this conservation effort is to carry out research to see what temperatures the possums can adapt to, in the hope that they can be reintroduced back into warmer climates and different habitats. Given their snowy habitat is fast disappearing, this is their best bet for survival into the future.

The project involves some of Australia's key biodiversity researchers, including Professor Mike Archer AM from the University of NSW and Dr Linda Broome of Office of Environment and Heritage. As well as providing the project site, Trevor Evans of the Australian Ecosystems Foundation is providing expert advice on animal husbandry and the design of the new breeding facility.

This project is currently running a fundraising appeal to secure costs for the breeding facility - if you can help support the efforts to save this extraordinary little possum please contact info@ausecosystems.org.au to make a donation. All donations of $2 or over are tax deductible.

Above: Mountain pygmy-possum, our only hibernating alpine marsupial, small enough to fit in the palm of your hand

Determining brush-tailed phascogale (*Phascogale tapoatafa*) presence in a disturbed landscape

Maggie Triska, The University of Western Australia

The brush-tailed phascogale (hereafter phascogale) is an arboreal, nocturnal, sexually dimorphic mammal. Phascogales are carnivorous and feed mainly on invertebrates located underneath tree bark and branches. They are semelparous, with males reaching sexual maturity within a year and dying after the breeding season in winter (July–August). Females survive for two to three breeding seasons and nest in tree hollows. Young remain in the nest for approximately four months until summer (December–January) before establishing their own home ranges. They are solitary and have defined home ranges; females exhibit intrasexual territoriality, whereas males display no tendencies to avoid either sex when establishing home ranges. Additionally, phascogales have a conservation status of near threatened and they inhabit dry sclerophyll forests and open woodlands with little understorey. They are known to occur in low densities within the study area, northern jarrah forest, from reliable sightings and nest-box surveys.

Rare species are often patchily distributed across landscapes making them difficult to detect and particularly susceptible to changes in the environment causing increased fragmentation. Fragmentation in the landscape may then increase the isolation of the rare species resulting in a greater sensitivity to the disturbance than common species. Restoration techniques are sometimes used after disturbances to decrease the negative impacts of the disturbance on the ecosystem. Although, often how these restored habitats are utilised by rare species is unclear, as is reliable detection of rare species responses to disturbance.

The northern jarrah forest in southwestern Australia has a history of disturbance and is currently mined for bauxite, which involves the clearing and restoration of forest patches equaling approximately 600 hectares of dry sclerophyll forest each year. The effects of mining and restoration are of particular concern to the phascogale, which depends on slow forming, mature habitat features such as tree hollows and thick bark. These features are absent from restored forests and the mined-restored matrix contains an increase in young forest patches. The absence of mature habitat features may limit breeding, nesting, and foraging opportunities,

change predator-avoidance behaviour, or hinder movement through the landscape, by fauna species such as the rare phascogale and consequently exacerbate their rarity. Additionally, phascogales are challenging to detect and monitor, due to their rarity, life-history strategy (male die-off) and arboreal, solitary and elusive habits. To increase the likelihood of detection of this rare species, we deployed a non-invasive sampling technique, tracking tunnels, which allowed us to cover a large area of the landscapes under study for an extended sampling period and was thus a more economical, in comparison to more labour, cost and time-consuming methods (ie, trapping).

In this pilot study we used tracking tunnels to determine the presence/absence of phascogales across two partly mined landscapes - Alcoa's Huntly and Willowdale mining leases. A total of 87 tracking tunnels were placed in mature unmined forest trees over four months during autumn and winter in the mosaic of intact forest and post-mining restored forest. Only one phascogale was detected within the Huntly Mine area from 6,355 tracking tunnel nights, suggesting that phascogales are largely absent or present in very low densities.

Example of a trapping grid, in unmined forest, used for surveying reptiles and small mammals

Unfortunately, there were insufficient detections to estimate their detection probability and site occupancy, and hence make inferences about the status of phascogales within mined and restored landscapes.

Unmined jarrah forest around the Huntly Mine lease in south western Western Australia where brush-tailed phascogale surveys were completed.

Maggie Triska

Tracking tunnel mounted on a marri (*Corymbia calophylla*) used to survey for brush-tailed phascogales within the jarrah forest

Our results suggest that phascogales occur in very low densities in the northern jarrah forest, which reflects recent studies and historic accounts of a large distribution with sparse individuals. However, our research implies that phascogales are almost completely absent with a naïve occupancy estimate of approximately one percent (1 of 87 sites occupied). This occupancy benchmark provides insight into the rarity of phascogales in the region and future studies may assess the reason for the low occupancy within a forest ecosystem, which is likely linked to disturbance.

Mining is currently a prevalent disturbance in the northern jarrah forest and it alters the landscape even when restoration techniques are employed. Mining, in addition to other anthropogenic disturbances, including logging, prescribed burning, and invasive species, such as predators, further modify the ecosystem by decreasing the existence of slow forming vegetation features, changing vegetation structure and composition, or increasing predation risk. Natural disturbances, such as droughts, may also reduce native fauna movement and alter behaviour by reducing food availability. Overall, the low density of phascogales observed is likely reflective of a rare species increasing in rarity due to multiple interacting disturbances.

Summary

This study reinforces previous surveys and observations that phascogales are rare in the northern jarrah forest. The area has a history of disturbance, and the current large scale fragmentation and altered vegetation structure caused by mining is additive with other disturbances present, perhaps further isolating fauna populations. Further research is required to understand the impacts of mining on phascogales.

Acknowledgments

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Editor's note: *Maggie Triska was awarded a WPSA University Grant in 2011 for her project.*

University Grants 2012

The Wildlife Preservation Society of Australia University Research Grants are scholarships offered to honours or postgraduate students at Australian universities.

Each year, ten grants of $1,000 are awarded. The following articles are contributed by the 2012 winners.

Decision-making for conserving Australia's freshwater biodiversity under climate change and land-use change

Chrystal Mantyka-Pringle,
ARC Centre of Excellence for Environmental Decisions & Centre for Spatial Environmental Research,
The University of Queensland,School of Geography, Planning and Environmental Management

Australia is highly vulnerable to the effects of climate change. Average surface temperatures have increased 0.9°C since 1950 and significant changes in rainfall patterns have also occurred; increasing over the north-west, and declining in the south-west and along the eastern coast. Based on the Fourth Assessment Report published by the Intergovernmental Panel on Climate Change (IPCC) in 2007, temperatures are predicted to exceed another 1°C by 2030 and annual rainfall is predicted to decrease by 2-5 percent, not including the far northern tropics. Much of Australia's natural environment is climate-sensitive and at risk of a potential decline in biodiversity due to climate change impacts such as increasing temperatures, more severe droughts, riverine flooding, storm tides and sea-level rise. When combined with other threats such as land clearing, urbanisation and changes in hydrology, there is growing evidence to suggest that climate change will negatively interact with other stressors and synergistically contribute to the degradation of biological diversity at the species, genetic and habitat level. It is therefore one of Australia's primary challenges to identify strategies for mitigation and adaptation to climate change to maintain essential ecosystem services, heritage values, aesthetic values, recreational and educational values, national identity, and tourism in a changing climate.

Bower bird, Queensland

In my PhD I will develop a framework and recommendations for making robust decisions to conserve biodiversity in terrestrial and freshwater systems in the face of both climate and land-use change. Climate and land-use change are both key threatening processes for biodiversity, but when they occur together their effects are likely to be much more devastating. Despite this, almost nothing is known about what decisions need to be made to mitigate the combined effects of land use and climate change to conserve biodiversity. This research will combine decision analysis with quantitative ecological models to identify priority actions to conserve biodiversity threatened by climate and land-use change in Queensland and worldwide.

Crimson spotted rainbow fish (*Melanotaenia duboulayi*), Queensland

Chrystal documenting the quality of riparian vegetation for river health

Wallaby stranded during the Brisbane floods

This will address critical questions arising in the development of policy for climate change adaptation, especially in respect to maintaining environmental values and ecosystem function.

I was the first to find that current climate and climate change are both important factors determining the negative effects of habitat loss on species density and/or diversity. Habitat loss and fragmentation effects were greatest in areas with high maximum temperatures and lowest in areas where average rainfall has increased over time. This baseline study was then used to inform a predictive model to calculate the probability of a negative habitat loss effect on species richness, of mammals and birds across the world caused by future climate and land-use change.

I built a Bayesian belief network model as a decision support tool for southeast Queensland (SEQ), Australia, to analyse how climate interacts with land use on water quality and predict how macro-invertebrate and native freshwater fish species will respond to future changes. I predicted important impacts from both land use and climate change and highlighted the importance of understanding how climate change and land-use change interact at multiple spatial scales. I also demonstrated the key role riparian vegetation restoration can play as an adaptation tool to mitigate the negative effects of climate change and land-use change impacts on freshwater ecosystems.

I will evaluate which management actions are the most cost-effective for conserving and maximising freshwater biodiversity within SEQ in the face of climate and land-use change. I will now combine expert knowledge with empirical data and rank management actions according to decisions that will most likely lead to desired outcomes. These results will aid in decision-making for the conservation of freshwater biodiversity because existing management strategies in SEQ may no longer be appropriate under changed climatic conditions and future development.

I would like to thank the Wildlife Preservation Society of Australia for providing me with this grant money, which will contribute towards attending the 2012 Ecological Society of America Conference in Portland, Oregon, where I will accept an Applied Ecology Student Award.

Reptile responses to variable fire regimes in southeast Queensland

Diana Virkki,
Griffith School of Environment,
Griffith University

Fire plays an important ecological role in ecosystems globally. However, natural fire regimes have been anthropogenically altered in many landscapes and are likely causing negative impacts on native biodiversity. There is a need for a more integrated understanding of the mechanisms driving the responses of species to fire management practices, particularly in response to the timing and scale of fires within the landscape. Determining the effects of fire on reptiles is particularly important due to their general ground-dwelling habits, and reliance on specific microhabitat structures such as leaf litter, fallen dead wood and shrub cover. Understanding faunal responses to variable fire regimes that inform the application of mosaic (patchy) burning strategies is therefore vital for maintaining faunal biodiversity. Research investigating faunal responses to fire is particularly lacking in southeast Queensland and is therefore an important focal region for this study.

Thanks to the funding awarded by the Wildlife Preservation Society of Australia, I will be able to enhance my PhD research through the inclusion of a rapid assessment survey of reptile responses to fire at a landscape scale. This specific component aims to increase our understanding of reptile responses to spatio-temporally variable fire events in order to determine whether faunal biodiversity is maintained through the application of these fire regimes. An underlying objective driving this research is to empower ecologists and forest managers to develop burning regimes that will conserve and enhance wildlife within the landscape. The focus of this component of my project will answer the following research questions:

1. How does variable fire history affect habitat heterogeneity, and how does this influence the reptile assemblages within these habitats at the landscape scale?

2. Does the spatio-temporal variability in fire management practices increase reptile biodiversity, and are such biodiversity patterns nested at a landscape scale?

Eastern stone gecko - *Diplodactylus vittatus*

In this study, three forests will be utilised, including a long-term fire experiment site and two forests that represent a mosaic of differing fire regimes and sites have been identified as unique fire history units based on total number of fires, mean fire interval and time since the last fire. The first round of reptile surveys were undertaken between February and April 2012 at each of the 74 survey plots that were representative of the fire mosaic chronosequence. I am also undertaking vegetation/habitat surveys and am in the process of undertaking a spatio-temporal analysis of landscape fire heterogeneity which will aim to quantify the heterogeneity of fire patterns across the landscape. Initial results reveal a number of correlations between reptiles and fire variables. The best models that describe both reptile abundance and richness in fire mosaic units include: total number of fires; fire interval; and the total number of fires + fire interval. Relationships between reptiles and fire parameters across mosaic units did not hold at the experimental site, where very frequent and infrequent fire had little influence on reptile abundance and richness. This potentially contradicts the Intermediate Disturbance Hypothesis but requires further data to assess patterns in reptile community structure and other environmental parameters that may also be driving reptile responses. The initial results also appear confounded by the timing of surveys that were staggered over time in response to extreme rainfall events and difficulties with site access during wet periods. Consequently, repeat reptile surveys will be undertaken in September 2012 when completing remaining vegetation surveys.

Understanding the role of fire in managing brush-tailed mulgara (*Dasycercus blythi*) populations in central Australia

Jenny Molyneux

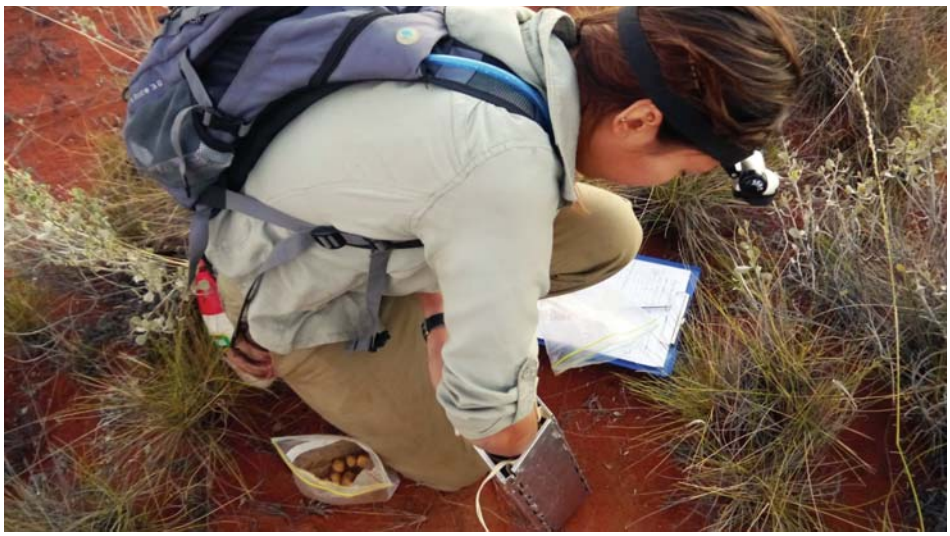
Arid Australia has experienced some of the most globally significant extinctions and declines in small to medium-sized mammals within the last century. The main causes of species decline is thought to include the predation by introduced predators, degradation of habitat from introduced herbivores and changes in landscape-scale fire regimes.

Since European settlement, introduced predators have dominated the arid zone landscape resulting in the decline of many native species, particularly large predators such as the western quoll. With complete removal of feral predators unlikely in the near future, the importance of conserving and promoting growth in surviving native predator populations becomes increasingly essential. Furthermore, with climate change predicted to further increase fire regularity and intensity of fires in many areas, threats to vulnerable and endangered native species are likely to escalate. The brush-tailed mulgara (*Dasycercus blythi*) is one of the largest arid zone native predators still surviving in central Australia, however its distribution has decreased dramatically in recent years with populations becoming isolated in areas of scattered suitable habitat. A greater understanding of the effect of changes now occurring in the landscape is urgently needed to halt the decline of this and other vulnerable species. This project will increase this understanding by assessing the effect of current fire management techniques on the spatial ecology of mulgara within Newhaven Sanctuary, Northern Territory.

Several previous studies have shown that a reduction of vegetation cover caused by large-scale wildfires reduces habitat suitability and increases predation pressure on mulgara. Moreover, while there is some evidence indicating mulgaras avoid recently burnt areas, other studies have found individuals continued to utilise burnt patches directly after fire, even though suitable unburnt habitat was available nearby. These discrepancies in the literature invoke questions to whether the proximity of unburnt patches increases the ability of mulgara to survive in areas even after fire. With increasing numbers of land managers utilising small mosaic patch burning to manage areas inhabited by mulgara, it is becoming increasingly essential to determine how these new fire regimes affect mulgara populations and alter their ability to persist in the landscape.

This study will utilise new GPS technology to determine mulgara habitat use at a finer scale than previously found with VHF transmitters. Knowledge of fine-scale habitat use in areas of different fire history will enable us to understand the relationship between fire type, fire frequency and habitat suitability for mulgaras. This will allow land managers to implement better fire management strategies aimed at maximising suitable habitat for the species.

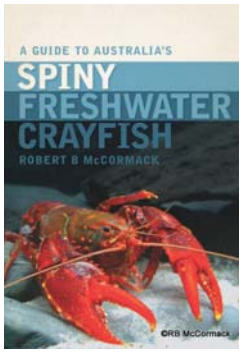
This project will increase our understanding of the ecology of brush-tailed mulgara and help to inform land managers on the effect of active fire management on population success. It will further aid in developing more sustainable land management techniques for the benefit of mulgara populations and aid in the conservation of populations across the arid zone. In addition, this project will also help to refine and improve monitoring techniques utilised in the management and research of other cryptic species. With many species within the arid zone considered difficult to monitor, this information will have potential benefits to a broader spectrum of species facing similar decline within the region.



Volunteers checking Elliot traps. Photo: P Moore

Above: Jenny and her first mulgara caught for the year. Photo: P Moore

Book Reviews

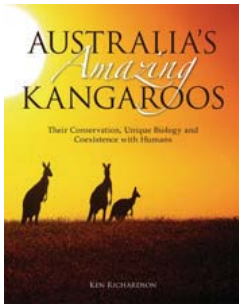


A Guide to Australia's Freshwater Crayfish - Robert B. McCormack

This book provides the most up to date information collected over the last seven years on the spiny freshwater crayfish, their identification, biology and distributions. Many of these species are in desperate need of protection and conservation management and we hope you will share our concern and add your voice to help protect and conserve them for all eternity.

Publisher: CSIRO Publishing

RRP: $59.95

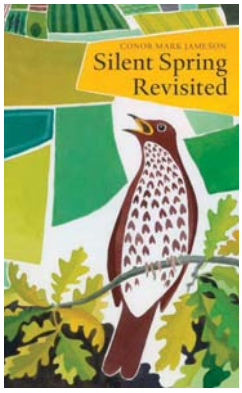


Australia's Amazing Kangaroos; Their Conservation, Unique Biology and Coexistence wth Humans - Ken Richardson

This book provides an authoritative source of information on kangaroos and their relatives. Topics include: species characteristics and biology, adaptations and function, and conservation. The book also discusses culling and the commercial kangaroo harvest, as well as national attitudes to kangaroos and their value for tourism. Illustrated in full colour, *Australia's Amazing Kangaroos* will give readers insight into the world of this intriguing marsupial – an animal that has pride of place on the Australian Coat of Arms.

Publisher: CSIRO Publishing

RRP: $49.95

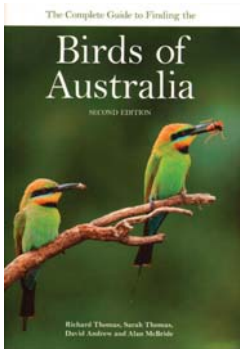


Silent Spring Revisited - Conor Mark Jameson

This book is essential reading for all contemporary environmentalists as there are lessons from the past which inform our response to today's challenges.

Publisher: Bloomsbury

RRP: $35

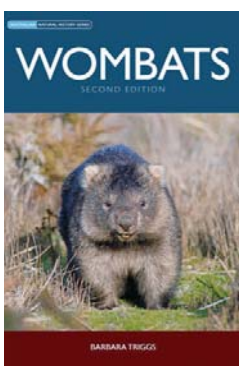


The Complete Guide to Finding the Birds of Australia: Second Edition - Richard Thomas, Sarah Thomas, David Andrew and Alan McBride

In its day, the first guide was ground-breaking and trend-setting and this 2nd edition follows almost precisely the same contents as the first. It guides the reader anti-clockwise around Australia, beginning in Victoria and ending in South Australia but adds an extra section for islands and external territories and, for Australian birders, a section on rarity hotspots.

Publisher: CSIRO Publishing

RRP: $49.95



Wombats: Second Edition - Barbara Triggs

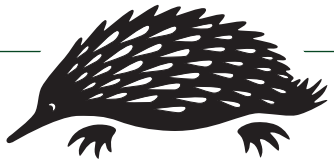
I know there are lots of wombat lovers in our membership who will love this book that gives a full account of how wombats live and the many hazards they face. Completely revised, this new edition has over 100 illustrations, including 23 colour plates and drawings by Peter Schouten.

Dealing mainly with the bare-nosed wombat, *Vombatus ursinus*, it also includes information on the southern hairy-nosed wombat, *Lasiorhinus latifrons*, as well as the northern hairy-nosed wombat, *Lasiorhinus krefftii*, which is one of the world's most endangered animals. The book also gives practical advice on rearing orphan wombats.

Publisher: CSIRO Publishing

RRP: $39.95

Membership Form



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"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.

SUZANNE L. MEDWAY
President

Photographing wildlife in Sydney

Hasitha Tudugalle

Black cormorant at the Royal Botanical Gardens. A twig was stuck between its beak, which seemed to make him uncomfortable

Sacred white ibis at the Royal Botanical Gardens. The ibis is a very common bird in Sydney. This one was enjoying the sun on top of a tree. This was the closest I could get to with my 150 mm zoom lens

Possum. This photograph was taken just outside the Botanical Gardens in Woolloomooloo. I had never seen a possum before I came to Australia. I was surprised to see it wide awake at that time of the day, about 2.30 pm. I was about a metre away, had my 40-150 mm zoom lens and so I started clicking away. He was just so adorable, curiously looking at me to see what I was doing