



# AUSTRALIAN

# Wildlife

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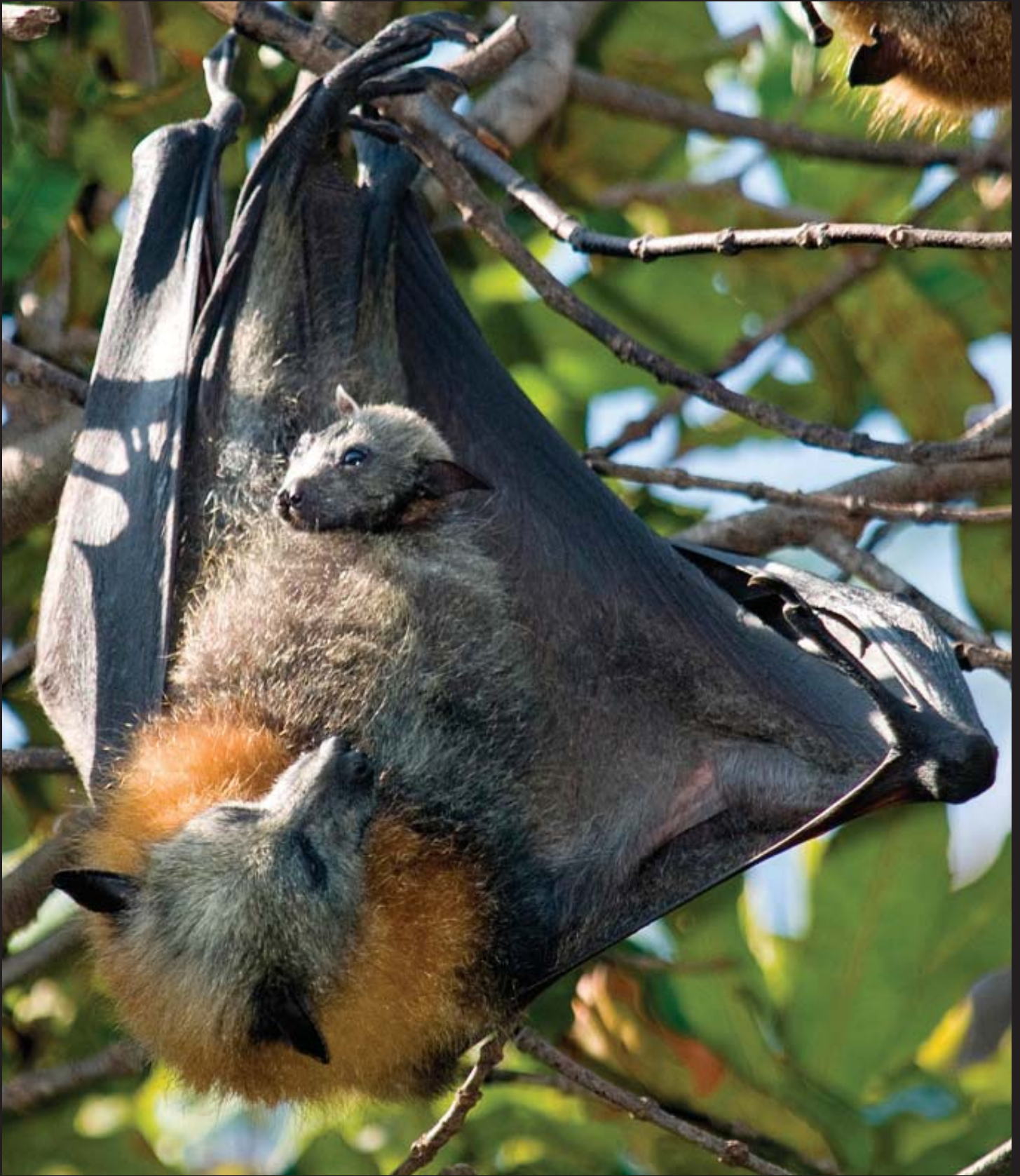


Celebrating a new century of wildlife preservation in Australia

Journal of the Wildlife Preservation Society of Australia Limited

(Founded 1909)





On the front cover is featured a pregnant grey-headed flying-fox.  
This photo was taken a short while later of the same flying-fox with her new baby.



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## Correction

The Nature Conservation Trust of NSW would like to advise that the photo of the frog featured with the article titled "Protecting wildlife sanctuaries on private land" in our Autumn 2010 edition is a photo of a great barred frog, not the endangered giant barred frog as indicated in the caption.

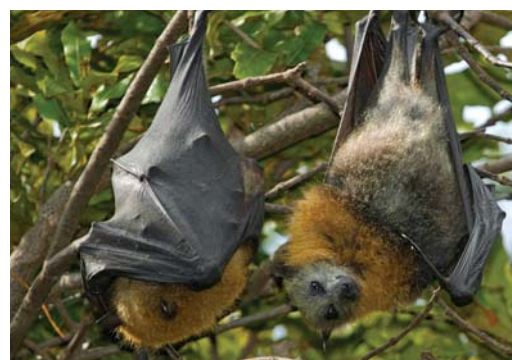


The nationally endangered giant barred frog, one of the many threatened species found on Estuary Creek, a property now protected by the Nature Conservation Trust of NSW.  
Photo by Georgia Beyer



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## Front cover and back cover

A heavily pregnant grey-headed flying-fox and sleepy "friend" in one of the Sydney colonies.

Photo by Nick Edards/Enigmatech. For more photos of flying-foxes visit Nick's website at [www.enigmatech.com.au](http://www.enigmatech.com.au)

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.

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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 2010

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## 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

It was a great honour for me to accept the nomination and be elected as the 18th president of the Wildlife Preservation Society of Australia, the second woman to take up this position. The first woman president was Thistle Harris Stead who was elected in 1949 and remained president until 1952. In 1976 Thistle again became president while Vincent Serventy was overseas.



Since I joined the board of the Wildlife Preservation Society in February 2002 there has been many changes made to keep up with the ever growing diversity of conservation organisations.

In early 2000 Vincent Serventy made the decision to retire as President and my husband Patrick was elected President of the Society in 2002. When Patrick was elected President, he nominated me as the Honorary Secretary for the Society because of my close and ongoing involvement in the administration of the Society's operations.

I also became Editor of publications for the Society. My first goal was to revamp the Society's national *Australian Wildlife* magazine by using computer technology. We reduced the cost of production and expanded the collection of articles and photographs with an increasingly scientific focus on many of the articles.

In 2003 the Council of the Society endorsed a recommendation by me to develop and operate our own website. A web designer was commissioned to establish the site and I researched and supplied the content for the new website. The website is now a 'living' organism of the Society and is constantly remodelled and updated as new technology becomes available. This allows the Wildlife Preservation Society to remain relevant to our modern community needs and expectations, especially with a younger generation of more computer-literate students.

The power of the internet and email has been effectively and directly demonstrated many times to our advantage. One good example was the Society's *Earth 2000 Lecture* series held in the Wesley Centre Sydney in 2000. Dr Jared Diamond from the University of California was invited to attend and to be the guest speaker. An extensive invitation list was well researched and prepared and then circulated via email with a request to pass the invitation on to friends, colleagues and family. We had no idea how many people would turn up and pay the \$15 admission fee

to hear Professor Jared Diamond speak, but were absolutely astounded when nearly 800 people turned up to hear him.

The second example happened in mid-2007. I had got into the habit of having late email conversations with Lance Ferris of Australian Seabird Rescue. Lance asked my help in stopping a mass release of helium balloons that were being used for a celebration by a school in Queensland. Between the two of us we sent out emails to all our contacts asking them to spread the word and lobby the school and the Queensland Government to stop the release of these potentially fatal plastic balloons to our native wildlife, such as sea turtles and dolphins. The school received emails complaining about the release and potential danger to sea creatures – they flooded in from all around the world. So many emails objecting to the mass release of balloons were received that their computer system packed it in. It was very exciting to sit back and watch it happen on the computer screen as the location and sources of the emails were displayed. Needless to say, the proposed mass release of these plastic balloons was cancelled by the school!

In late 2008 I recommended to the Council that we introduce 'online' banking transactions to assist the Society's financial transactions. I told them that this was a necessary step to move the Society into the 21<sup>st</sup> Century as the younger members of the public are very much the 'right now' generation and want to be able to finalise something like becoming a member of the Society immediately and not have to download an application form, fill it in by hand, write a cheque and post it off.

In 2009 the website was updated to allow direct financial transactions online.

The administration of the Society is now fully computerised. The membership records, accounting and database is now kept on computer in an accounting program. Renewal invoices are sent out via email or, if the member has registered on the website,

they are automatically sent out by the system. The photographic library is all kept digitally on computer. The magazine is compiled on the computer, photographs are inserted in the articles digitally and the finished draft is emailed to the printer to be formatted into the layout for the magazine and then printed.

The email system is used regularly to contact other wildlife conservation organisations, politicians, government and Society members. Applicants for the three awards are asked to send their submissions via email. Contributors to the magazine and newsletter make their contributions via email. Wildlife research is now done 'online' via web search engines.

In summary, the biggest achievement in the last ten years has been the modernisation of the whole administration structure of the Society in line with other major conservation and business corporations around the world. This allows the Society the ability to have immediate access to people, information and feedback from everywhere and everyone.

I think the Society is on the cusp of a major turning point.

It is becoming increasingly difficult to run such an organisation on an all volunteer basis. The breadth and scope of our wildlife conservation work is just too vast and the campaigns and issues involved are just too complex to be run by volunteer 'amateurs'.

Corporate governance of a company is very complex, with the obligatory reporting to ASIC and the Australian Tax Office becoming more detailed. It is now very evident that paid, professional staff will have to be an option in the very near future.

It is also now time to find a permanent home for the national office and employ professional staff to put the Wildlife Preservation Society of Australia Limited at the forefront of Australian wildlife conservation and to run the Society as a viable, efficient organisation.

# Know your directors

## Suzanne Medway President

Suzanne was born in Kogarah, Sydney, and educated at Kingsgrove High School and St George TAFE. She holds an Associate Diploma in Business (Office Administration) and is a Justice of the Peace for NSW.

She has had considerable experience at middle and senior management positions in commercial business including Seagram Limited, A & A Insurance, and served as Company Secretary for Australian Defence Industries (a multi-million dollar government defence company) prior to retiring. She has travelled widely and is familiar with most aspects of Australian wildlife conservation.

Suzanne has had prior board experience serving as a director on the boards of the Business Enterprise

Development Agency in Mascot and the Business Enterprise Centre in Southern Sydney.

She also served as Secretary and then Vice-President of the Central Gold Coast Chamber of Commerce and board member of the Brighton Le Sands Chamber of Commerce.

Suzanne has been a member of the Society since 1988 and was elected as Secretary/Executive Director in 2002. Since that time Suzanne has modernised the office administration, created and maintained the website, increased the membership base and raised the standard of the *Australian Wildlife* magazine to a very professional level, along with the new wildlife email newsletter.



Her experience and commitment over the past ten years in particular has prepared her well for her new role as President.

## Honour roll

### Honorary life membership

Honorary life membership is reserved as an honour to be bestowed by the Wildlife Preservation Society of Australia in recognition of an individual's outstanding contribution to the Society and the conservation of Australia's wildlife. It is one of the Society's highest accolades.

The list below acknowledges honorary life members of the Society:

Bernie Clarke  
Suzanne Medway  
Robert B Saunders  
Clive Williams  
Marjorie Woodman

The Society's constitution states: "The Council shall have the power to appoint persons as honorary life members of the association in recognition of their contributions to the association or to conservation provided that the total number of honorary life members at any time shall not exceed ten (10)."

### Life membership

This category of membership is offered by subscription.

In November 1934 the first edition of *Australian Wildlife* was published with the following rates of membership:

Life membership – Women £2/12/6

Life membership – Men £5/5/-

Yearly ordinary membership – Women 2/6

Yearly ordinary membership – Men 5/-

Our late President of Honour, Dr Vincent Serventy AM, was very proud of his life membership which he purchased in the 1940s to contribute to funds being raised to hold wildlife shows in Perth Town Hall.

Today, the current subscription rate for life members is \$1,000.

The following people have become life members of the Society:

Robyn Bartus  
John Bennett  
John Bentley  
Ross Bernie  
Max Blanch  
Joan Brandt  
Stuart W Brooks  
Veronica Camac  
Betty Dahl  
Wilfred Dews

B S Falkiner  
Philip Hammon  
Chris Hood  
G Humphries  
Dr M Hunter  
Gwen Johnson  
A Lenning  
Richard Mason  
Lois May  
Ron McCathie

Patrick W Medway AM  
Michele Mensing  
Ken Metcalfe  
W Russell  
Raymond B Warry  
Romola Jean Wollaston  
Hal Wootten  
Joan Yap



# Flying-foxes

Vanessa Wilson



Grey-headed flying-fox “belly dips” in the Parramatta River to cool and rehydrate itself on a scorching hot Sydney summer day. Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))

## Bats

One quarter of all mammal species in the world are bats, which belong to the order Chiroptera, meaning ‘hand-winged’. Bats can be divided into two suborders:

- Megabats (Megachiroptera), which includes flying-foxes, as well as the lesser known tubenosed bats and blossom bats.
- Microbats (Microchiroptera), which are smaller insectivorous bats.

Megabats differ greatly from microbats (see Table 1); their main similarities are that they are the only winged mammals and are primarily nocturnal.

## Flying-foxes

Flying-foxes, otherwise known as fruit bats, are members of the Pteropodidae family. They have the largest body size of all bats, weighing up to one kilogram, with a wing span which may exceed one metre. There are eight known species of flying-fox in Australia, of which only four are relatively widespread on the Australian mainland. These are the black, the spectacled, the grey-headed and the little red flying-foxes. The first three of these have similar habits and lifestyle but are found in different

parts of Australia, their ranges partially overlapping. The little red flying-fox is smaller and gives birth at a different time to the others and tends to follow the flowering of the eucalypts inland, moving to the coast irregularly.

The grey-headed flying-fox (*Pteropus poliocephalus*) is the largest member of the family and is a native species that is endemic to Australia on the eastern seaboard – southern Queensland, New South Wales and Victoria.

The beautiful spectacled flying-fox (*Pteropus conspicillatus*), which is only found in tropical rainforest areas in north-eastern Queensland, is also listed as vulnerable at the national level.

The black flying-fox (*Pteropus alecto*) was previously listed as vulnerable under New South Wales legislation, ranging across most of the coast of northern Australia, but was recently delisted due to increasing numbers in New South Wales. However, many believe that this is likely to be due to a range shift southwards, rather than a range expansion or any actual overall population increase.

The little red flying-fox (*Pteropus scapulatus*) is both more numerous and more nomadic than the other

three species. They roost much closer together in larger numbers and because of this often cause a lot of damage to vegetation where they decide to camp. This is one reason that they are so nomadic – if they were to stay too long in one place, the vegetation would struggle to recover, but if they keep moving regularly, the vegetation gets the chance to bounce back so that it is healthy again for the next time they might visit.

## Flying-fox diet

Although flying-foxes are commonly known as fruit bats, their favourite food is actually the pollen and nectar of eucalypt blossoms, followed by other native hardwood blossoms, such as melaleuca (paperbark) and banksia, and rainforest fruits including lilly pillies and figs. Exotic fruits are generally not preferred, but often lack of preferred food sources will force flying-foxes into orchards and backyard fruit trees, where they face such dangers as shooters and loose netting.

This lack of preferred food sources is caused by two main factors. The first is the natural unreliability of flowering in the eucalypt forests. Nectar and pollen production varies considerably from year to year, with many species



flowering maybe only every three to five years. Because different species flower at different times throughout the year, most flying-foxes have to travel great distances, often hundreds of kilometres, following large flowering events in order to find enough of this high-energy food to eat. The second problem is that many of the flying-foxes' native food sources, as well as already being naturally unreliable, have been cleared. Rainforests and eucalypt forests have largely been cleared for agricultural land, while paperbark swamps have more recently been targeted for the popular canal developments in Queensland. This goes a long way to explaining why many people mistakenly believe that flying-fox numbers are increasing.

Many people are experiencing a higher level of conflict with flying-foxes than they used to. With the increase in popularity of native garden plants, backyard fruit growing, and native street and park trees, flying-foxes are finding a lot more food in urban and residential areas. These food sources tend to be more reliable than those in native bushland because they are regularly watered and well cared for and, with a greater variety of species over a relatively small area, there is always something that is flowering or fruiting. Just like people, flying-foxes like to live close to a regular food and water supply; hence a lot more flying-foxes are now camping in areas where people live, work and play.

### Flying-fox camps

The term *camp* (or *colony*) is generally used to refer to a site where flying-foxes roost, rather than to a group of a particular number of flying-foxes, eg the flying-foxes have a 'permanent' camp at Ku-ring-gai in North Sydney,



Female grey-headed flying-fox stretches in the sun as her young pup takes milk from the nipple under her wing. Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))

which is occupied all year round. However, there are 'annual' camps that the flying-foxes use at the same time every year, and also 'irregular' camps that the flying-foxes may roost in occasionally if there is a nearby food source available at the time.

Flying-fox numbers in a camp increase and decrease throughout the year, depending on the availability of food. The flowering of many species occurs irregularly in different areas and at different times of the year, governed mainly by variations in weather. A camp may contain a few hundred to tens of thousands of flying-foxes (or even more in the case of little red flying-foxes). Sometimes the camp may be empty if food is not available nearby. Some of these camps have been in use for more than 100 years.

Occasionally a smaller group may roost in a location for a short period, but these small groups will usually either attract more flying-foxes to the site, or will move on to join other larger flying-fox camps. Flying-foxes are very sociable and, because they are so focused on finding food in many different locations at night, they use

**Table 1. Summary of general differences between megabats and microbats**

	Megabats	Microbats
<b>No. of species</b>	170 species worldwide 12 Australian species	760 species worldwide 64 Australian species
<b>Size</b>	Large: wingspans about 1metre	Small: wingspans about 25centimetres
<b>Diet</b>	Nectar, pollen and fruit	Insects
<b>Navigation</b>	Sight and Smell	Echolocation*
<b>Roost location</b>	Hang from tree branches	In caves, roof cavities, under bridges, in tree hollows, under bark, etc.
<b>Winter habits</b>	Travel to locations where food is more abundant	Hibernation until insects become more abundant

\* Echolocation involves emitting high-frequency sounds that bounce off objects to allow the bats to find their way around in pitch darkness.



'camps' for social contact (as well as for rest) when they are all together during the day.

Flying-foxes sleep during the day and feed on pollen, nectar and fruit at night. At dusk, flying-foxes depart from their camps to feed on various local food resources. As dawn approaches, some flying-foxes gradually start to return to the camp from which they came, whereas others may fly to another nearby camp to rest for the day. This means that camps have constant turnover of individuals – there are different flying-foxes there every day.

Camps tend to occur in relatively sheltered areas with tall trees, often in gullies and commonly near some form of water. To drink, flying-foxes swoop down to the water, dip their belly fur in, then land in a tree and lick the water from their fur. Belly-dipping normally occurs in still fresh water, but it has also been occasionally observed in estuarine or even salty water. Flying-foxes also lick dew from leaves.

### Pollination

Most people do not realise just how essential flying-foxes are to the health of our native forests. Flying-foxes have adapted to an unreliable food resource by being nomadic. When a species of tree flowers well in a particular part of their range, tens of thousands of flying-foxes will congregate to feed on the blossom. Radio tracking of individual flying-foxes, combined with observations of population fluctuations at colony sites, has confirmed that



This female grey-headed flying-fox is tending her young pup which appears to be at most a week or so old. Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))

individuals move many hundreds of kilometres to prolific flowering.

Flying-foxes are in fact our most effective seed dispersers and pollinators of our rainforests and

native hardwood forests (including native timber plantations). Unlike the birds and insects that are usually given all of the credit for this role, flying-foxes have the advantages of a large body size combined with a fur coat that allows much pollen to stick to and be transported potentially up to 100 kilometres in one night. Flying-foxes can also carry small seeds of rainforest fruits in their gut for up to an hour, by which time they may have flown 30 kilometres away from where the fruit was eaten. Other pollinators, such as birds, bees (including native stingless bees), moths, butterflies, wasps, flies, beetles, other small mammals such as gliders, and the wind, operate over much smaller areas.

By dispersing rainforest seeds over wide areas and across cleared ground, flying-foxes give seeds a chance to grow away from the parent plant, and potentially expand remnant patches of valuable rainforest vegetation. It is estimated that a single flying-fox can



Little red flying-fox. Photo: Lib Ruytenberg





A young black flying-fox (*Pteropus alecto*) roosting in a Sydney colony which is the far southern end of their range. Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))

disperse up to 60,000 seeds in one night.

Through pollination and seed dispersal, flying-foxes help to provide habitat for other flora and fauna species and also help to sustain Australia's hardwood timber, honey and native plant industries. But to be effective in this role, flying-foxes need to be in large numbers.

### Reproduction

It is sad how difficult it is to find an article or news item in the media about flying-foxes that does not use phrases

such as 'bats out of hell', 'disease risk' or 'plague proportions'. This kind of propaganda not only fosters unnecessary hatred of these beautiful, intelligent and social animals that form an essential part of our ecosystem, but it also gives momentum to lies that are circulated as truth.

Plagues occur when environmental conditions allow a localised 'explosion' of numbers of a particular species that has the ability to reproduce at a very rapid rate. For example, a single Australian plague locust can lay 100–200 eggs, and one breeding pair

of mice and their offspring has the potential to produce 500 mice in just 21 weeks. It is simply not possible for a flying-fox plague to occur – their slow rate of reproduction does not allow it.

Mating occurs between March and May and often results in excess noise in the camps as males mark a territory in a tree and defend it from other males. Females become pregnant in autumn (March–April) and, after a gestation period of about six months, give birth in spring (mainly October–November) to a single young (twins are rarely born, but often only one will survive).

As soon as the pup is born it begins to suckle from its mother. Its milk teeth curve backwards so that it can keep a firm hold. The mother protects her young with her wings during the daytime. At night when she flies to search for food the pup clings to its mother, with its mouth around the nipple and its claws in her fur. The pup is not able to maintain its own body temperature until it is 15–17 days old, so it stays close to its mother in the early weeks of its life. When the pup gets heavier and is able to thermoregulate, it is then left behind with a group of other pups in the colony at night while the mother goes out to feed. When the adults start returning to camp early the next morning, the mothers call out to their pups, and the pups call back. The mothers each recognise the voice of their own pup and this helps them to find their little pup among the branches and give it its morning feed. At this stage the pups are still unable to fly, and are dependent on their mother's milk. Unfortunately, these pups commonly become the unseen victims of orchardists that shoot their mothers who are desperately trying to find enough food near the camp that provides adequate nutrition to allow them to produce milk for their young at the same time of year as most orchards are producing fruit.

For this reason, the Queensland government recently banned the killing of flying-foxes as a method of fruit crop protection, but New South Wales has not yet followed suit and is still issuing licences to shoot flying-foxes, even those listed for protection under its own threatened species legislation. This is despite the fact that recent survey results indicate that shooting is, at best, around 60 percent effective as a crop protection





The wet belly of this grey-headed flying-fox means that she's just "belly dipped" in a nearby stream to cool and rehydrate herself.

Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))

measure, while properly installed full-exclusion netting is 100 percent effective. The added advantage of installing such netting is that fruit damage by other animals, such as birds and possums, is also prevented at the same time. Financially, netting is a very good investment; many fruit growers have now recognised this and have netted their crops, but others will need financial assistance in order to get started. The Wildlife Preservation Society fully supports government subsidies for orchard netting.

If the flying-fox pups survive the fruit-growing season, they begin to practice flying within the camp at night around December, and by January are flying out with the adults to feed.

### Threats

There are currently estimated to be less than 450,000 grey-headed flying-foxes in Australia. The species suffered a population decline of around 30 percent over the ten years between 1989 and 1999, which contributed to its listing as a threatened species under both federal and some state legislation. Scientists believe that at the current

rate of decline, grey-headed flying-foxes may be functionally extinct (as an effective pollinator and seed disperser) within 50 years and totally extinct within 70 years. It is believed that the main factor contributing to this decline is habitat loss (including loss of both roosting habitat and food trees), although shooting, electrocution, entanglements and severe heat events are also major contributors.

Predators known to eat flying-foxes include carpet pythons, goannas, sea-eagles and the powerful owl. Currawongs and ravens are known to attack flying-foxes found on their own in the daytime. These predators do not significantly reduce the overall flying-fox population. The most likely victims are the young, sick or old. Predators contribute to the health of a population by removing the least fit individuals.

Flying-foxes do not cope very well in extreme temperatures. Their ability to fly long distances means they can usually avoid the extremes of summer and winter by migrating. Although flying-foxes do have behavioural

mechanisms for cooling themselves down, severe heat events (eg where temperatures reach over 40°C for more than one day in a row) have been known to result in thousands of flying-foxes dying of heat stress. This can be exacerbated if circumstances (such as scarce food or forced relocation) have forced flying-foxes to camp in a site that may have less than adequate shelter. At the other end of the scale, black flying-foxes that used to be found primarily in northern Australia, but are now shifting southwards, are used to warmer temperatures. As far south as Sydney, individuals have been sighted with frostbitten ears, and some seem to have died from these cooler temperatures.

Parasites and diseases tend to affect flying-foxes more greatly when the population is under stress (by lack of food, camp disturbance, etc). The Australian bat lyssavirus is one disease that is fatal to them, though it is quite uncommon. But when the immune system is low, flying-foxes are more susceptible, so that parasites that have adapted to living in the flying-fox

population without causing undue illness suddenly start to make their hosts sick. Some of these issues have slightly more complex reasons for occurring, such as the tick poisoning in Queensland that you can read about in Steve Amesbury's article '*With wings on their fingers*' on page 15.

Flying-foxes have a very short intestine and absorb their mostly liquid diet very rapidly. The average time from mouth to anus (doing a poo) is about twenty minutes, although some material takes up to an hour to digest. This is important for seed dispersal because the small seeds contained in the faeces (poo) fall and germinate in new areas where they grow into new trees and vines.

In the past, some fruit-growers have used electric grids to electrocute flying-foxes attempting to eat their fruit – these are now illegal. Now electrocution is mainly caused by overhead powerlines, killing flying-foxes if they touch two wires at the same time. If the animal happens to be a mother carrying a pup, the pup often survives the shock only to die a slow death of dehydration.

Entanglements are another problem that is happening more and more as starving flying-foxes searching for food come closer to humans. In rural and industrial areas, barbed wire is common, and where it is installed in close proximity to flying-fox food trees is where the most flying-foxes get entangled in it. The wing of a flying-fox is essentially like a large, elongated hand with a thin, stretchy webbing that joins the fingers. If a small amount of damage occurs to the webbing, then it can heal, but if large holes are torn or if severe damage occurs to the bones or ligaments that support the wings, then it is very unlikely that the animal will ever fly again – which is a death sentence for a flying-fox. Other animals, such as gliders, suffer horrific injuries from barbed wire. Studies show that 86 percent of wildlife entanglements occur on the top strand of wire, so if not all of the barbed wire can be replaced with wildlife-friendly fencing (see [www.wildlifefriendlyfencing.com](http://www.wildlifefriendlyfencing.com)), then even replacing just the top strand with plain wire would make a lot of difference.

In residential areas, the more common entanglement problem is backyard fruit tree netting. If white knitted

netting is installed correctly and pulled taut over a frame, then both wildlife and fruit can be kept safe. But unfortunately, many people are unaware that the cheap black monofilament netting that they buy from the local shop with few (if any) instructions is essentially a death trap for not only flying-foxes, but also other wildlife such as birds, possums, lizards and snakes. The trap works by providing an attractive lure (the fruit or the insects attracted to the fruit), with a type of net that cannot be easily seen but does easily entangle anything that tries to get to the tree, the monofilament strands painfully cutting into the skin of the animal as it struggles to get out. These animals often die of dehydration, or if they are rescued in time, may still die from the severe wounds that can result from their struggles. And of course during

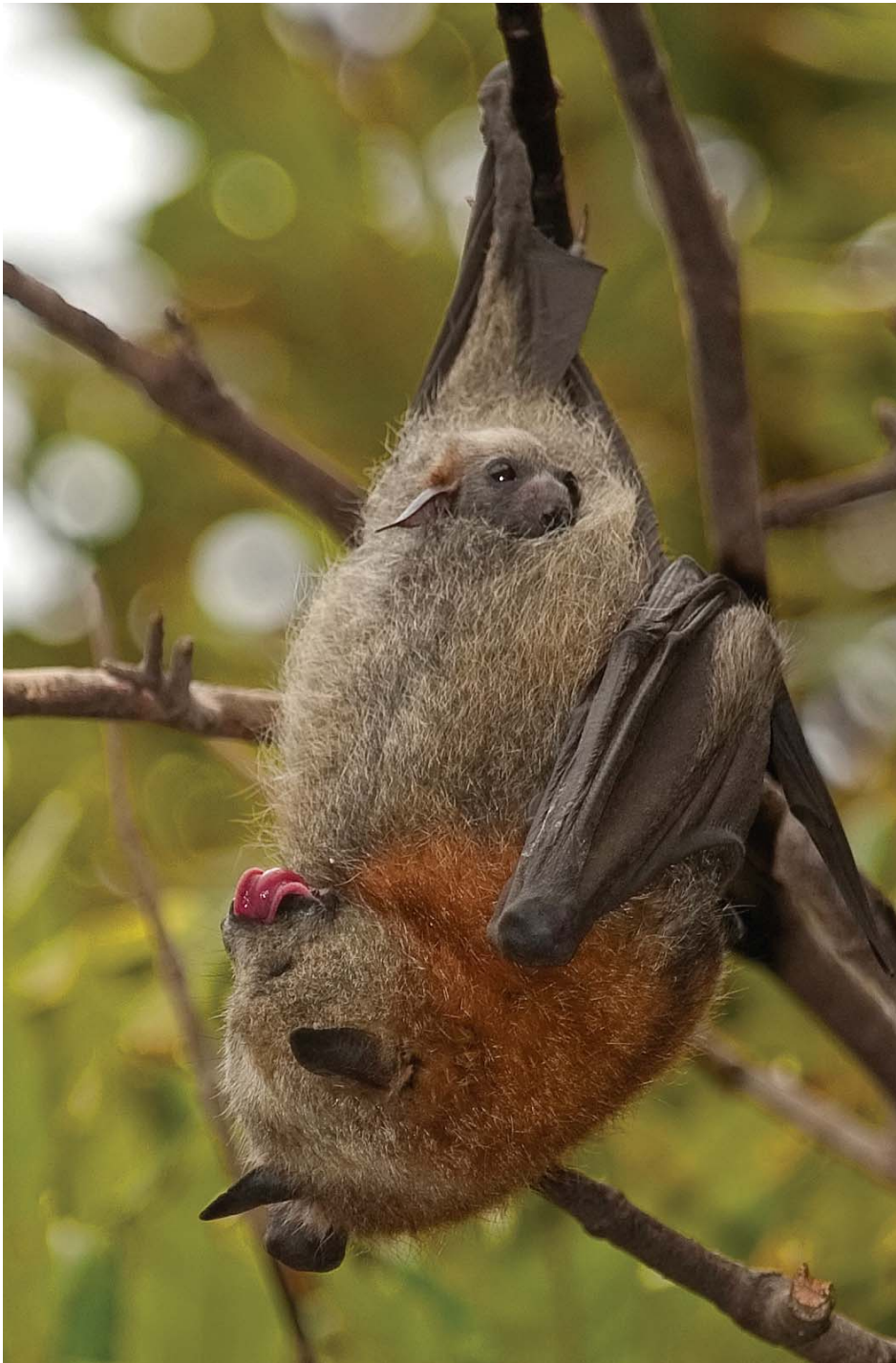
summer there is always the possibility that these are mothers with young pups waiting for them back at the camp.

With the increasing tendency for flying-foxes to find reliable food and water near people, there is increasing pressure from humans who sadly do not want to share their lives with flying-foxes. Camps can be noisy (particularly when the bats are mating or disturbed) and do have a distinctive smell that is not to everyone's taste. For this reason, many people object to camps being set up near their homes. Other people don't like flying-foxes because of the mess they make when feeding, or simply because they have been taught through folklore, media propaganda and rumours that flying-foxes are scary, diseased, ugly animals. If only they knew



Spectacled flying-fox and baby. Photo: Halley Design





Grey-headed flying fox giving birth. Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))

the truth! Unfortunately, too many people know very little about bats, and what they think they know is often misinformed. There is intense pressure on governments to relocate 'problem' flying-fox camps, but flying-fox advocates fear that there are so few 'acceptable' places for them to go, that they may end up being chased all over the countryside to no avail. Relocations are rarely successful, and often end up causing bigger problems than they solve. However, in the past, where governments resist communities wishing to move the bats on, colonies have occasionally been illegally disturbed, physically

attacked, or even bulldozed by communities taking matters into their own hands. It is so important that people are taught how to live with and appreciate flying-foxes.

### Living with flying-foxes

Regardless of what many people would have you believe, it is possible for people and flying-foxes to live harmoniously side-by-side, if only the people are willing. The first step is to learn more about flying-foxes – facts not rumours. The more you understand about an animal, the more you can come to appreciate it. And whatever you learn, teach it to

others – because the more everyone understands what the cause of these issues really are, the closer we will get to finding real solutions.

If you live near a flying-fox camp and the noise is bothering you during the day, first of all look at why they are noisy. Are people disturbing them? Maybe some community education is needed to help the flying-foxes get undisturbed sleep (and hence reduce disturbance to the community). Is it mating season? Maybe you could plan some extra day trips during the season to avoid being around the noise. Or you could even get yourself some binoculars and find a good vantage point to watch the camp. You may actually find enjoyment in watching their social antics, and may even find that the noise doesn't bother you so much anymore (people learn to ignore and even enjoy many bird noises – why not flying-foxes?). But if all else fails, maybe soundproofing your home might be the way to go.

If flying-foxes are visiting your yard at night to feed in your trees, be proud that your garden is providing much-needed food for a species that is so important to our unique Australian environment. However, if they are feeding on the fruit of coconuts, we recommend removing these palms, as the unripe fruits are toxic to the bats. If the flying-foxes (or other wildlife) are feeding on your fruit trees, you can either place paper bags over the low-hanging fruit that you wish to eat, or, if you don't want to share, place a sturdy frame over the whole tree and stretch a white knitted bird net (or wire mesh) over the frame and secure it to the ground to exclude animals from accessing the tree without entangling them.

If the noise of flying-foxes feeding at night is keeping you awake, remember that they will only be there for as long as that particular tree is flowering or fruiting and then they will move on to another food source. Ear plugs can be effective to get through that short period. Or if you have trees close by that are being visited more regularly by flying-foxes, you might also want to consider investing in soundproofing. Alternatively, if the tree is particularly close to your bedroom window, maybe pruning some branches back away from the window would help to reduce the noise.

Flying-foxes have a very fast metabolism. Food travels through their gut completely in about 20–60 minutes. For this reason, most of the mess is made by flying-foxes at night where they feed. If you have flying-foxes feeding around your home at night, we suggest bringing in your washing before going to bed and parking your car in a carport or garage, or using a car cover. If you do get ‘mess’ on your car, it should lift off with a wet rag. Although there is no known risk of disease transmission through flying-fox urine or faeces, in cases where flying-foxes leave behind a mess on your property, basic hygiene and cleaning practices are recommended, eg washing any outdoor food preparation surfaces with an appropriate cleaning solution, and cleaning with water any walking surfaces that may present a slip hazard.

Like all other animals, including humans, bats can be hosts to viruses and parasites. However, there are only two diseases known to be carried by flying-foxes that have ever been contracted by humans:

- **Australian bat lyssavirus (ABL)** is a rabies-like virus that has been identified in flying-foxes and microbats. Only two people have ever contracted the disease – one from a flying-fox and one from a microbat. Research indicates that less than one percent of wild flying-foxes carry the virus which is transmitted by a bite or severe scratch from an infected bat. The virus is fatal to both flying-foxes and humans, so it is important to never handle bats unless you are appropriately trained and have up-to-date rabies vaccinations. However, it is important to remember that this is not an easy disease to contract – it requires blood–saliva contact. Since we started using rabies vaccinations (including post-exposure shots) against this disease, not a single person has contracted it.
- **Hendra virus** (previously equine morbilli virus) has been detected in flying-foxes in the form of a respiratory disease (similar to a cold or influenza virus). This disease can also be contracted by horses, where the virus becomes dangerous and often fatal to

the horse. In recent years there have been a few human deaths associated with the handling of horses infected with this disease. But as people are becoming more aware of the disease, more precautions are being taken in the handling of sick horses. There is a belief that the Hendra virus is transmitted to horses through flying-foxes urinating in horse feed – although conclusive evidence for this or any other method of transmission of the disease to horses is yet to be established. No human has ever caught the Hendra virus from a flying-fox.

- **Histoplasmosis**, a respiratory illness, may be contracted by breathing in the fungal spores found in some bird and microbat cave roosts, where there is high humidity and these organisms breed in the guano (droppings). Avoid breathing dust in caves where microbats or swifts roost. This disease has nothing to do with flying-foxes.

If you find a bat that is sick or injured, do not touch it, but contact your local wildlife rescue organisation immediately. If the bat is on the ground, place a washing basket or similar over it and wait with it until the rescuer arrives, taking care to shield it from the sun and following any other instructions given to you by the rescuer.

Flying-foxes that are found anywhere within human reach almost certainly will have something wrong with them and will be in need of rescue,

examination and probably care. Be aware that bats are not able to flap their wings and fly off the ground like birds. They need to gain some height before they can get wind under their wings in order to take off. People that have been in the vicinity when a bat has crash-landed near them may have mistakenly thought that the bat was trying to attack them: the bat crawls along the ground towards the nearest tall object, (in this case the person) and then attempts to climb up it. On rare occasions, bats (usually juveniles that have not yet perfected their flying skills) have crash-landed directly into people. On the off-chance that this ever happens to you, the best way to avoid being injured is to stay still and let the flying-fox get its bearings and maybe climb a little higher so that it can take off again. After such a traumatic experience it will certainly want to be getting out of there as quickly as possible. Trying to shake off or otherwise manhandle a frightened bat is a sure-fire way of getting scratched or bitten, or both.

If bitten or scratched by a bat, wash the wound thoroughly with soap and water for five minutes and apply an antiseptic solution. See a doctor as soon as possible to care for the wound and to assess whether you might require a post-exposure rabies vaccination (these are the same shots given to people who are bitten by monkeys overseas). People such as vets, wildlife researchers, educators or carers who handle bats should be up-to-date with their pre-exposure rabies vaccinations in order to protect themselves against ABL.

## What can you do to conserve the flying-fox?

The two most important things you can do to help conserve the flying-fox and help reduce their apparent need for taking refuge in urban and suburban areas (where food is reliable but conflict is common) are:

- Support all efforts to protect and regenerate large areas of forests, woodlands and mangroves, including a mosaic of diet species, across the landscape in order to provide food and shelter throughout the year.
- Tell others the truth about flying-foxes to help dispel the common myths and to encourage appreciation of these wonderful animals and teach people how to live harmoniously with them.





This was "Gabe" after feeding (complete with dummy). His markings clearly show why they are called "spectacled" flying-foxes

## With wings on their fingers

Steve Amesbury

**Lynne and Steve Amesbury are wildlife carers with the Native Animal Network Association on the New South Wales south coast. They are both passionate about bats and, after watching a video about the plight of the spectacled flying-fox in north Queensland, volunteered to help.**

To the uninitiated, bats are slightly scary creatures of the night that are little understood. But to a small cadre of carers they are some of Australia's most intelligent and endearing mammals – none more so than the spectacled flying-fox (*Pteropus conspicillatus*), native to tropical Queensland. These bats are at the centre of events in a small town in north Queensland, which is a microcosm of the ecological drama being played out across the globe. This species has been listed

federally as threatened since 2002, but the problems started well before then. According to the federal Department of the Environment, Water, Heritage and the Arts, there has been a significant decline in the spectacled flying-fox population over the past twenty years.

Already threatened by the loss of habitat, electrocution and shooting, the introduction of an invasive plant species has pushed this unique Australian species to the brink. Clearing of the natural environment has allowed

the wild tobacco plant (*Solanum mauritianum*) to gain a foothold. Since 1990, with the natural foods of the flying-fox (mostly rainforest fruits and flowers) in shorter supply, the bats have developed a preference for the fruit of the wild tobacco plant. This has brought them out of their tree-top haunts down to areas where they seldom ventured previously. The wild tobacco plant only grows to about two metres, where the infamous paralysis ticks (*Ixodes holocyclus*) lie in wait for their next host. The spectacled flying-fox has no defence against the paralysis tick. It is thought that this is so because they seldom shared the same space.

In 1990 hundreds of paralysed flying-foxes were found dying, on the ground. The 'Tick Season' lasts from around October to December and coincides with the time that these flying-foxes give birth and rear their young. So many of these paralysed bats had juveniles with them, or had young in the canopy waiting to be fed. Either way, the prognosis was not good for the adults or their dependent young.

In the same year this phenomenon was first observed by a young physiotherapist, Jenny Maclean, who decided to set up the Tolga Bat Hospital, six kilometres from Atherton, to help the stricken flying-foxes in the nearby Tolga bat colony. Twenty years later, the Tolga Bat Hospital is as active as ever – albeit much better equipped for the task.

For the last twenty years a handful of volunteers, led by Jenny Maclean, have been fighting a relentless battle against the odds to save the spectacled flying-fox from tick paralysis. In addition to habitat destruction, netting and barbed wire, this new threat is killing thousands of flying-foxes annually. As a result, the Tolga Bat Hospital is dealing with up to sixty bats a day for four months of each year. Some members of WPSA, led by Mike Agee, will remember visiting the hospital a few years ago.

While they are set up to deal with almost any situation and any species of bat, it is the devastation caused by the paralysis tick which remains their focus, especially between October and December each year. The 2009–10 season was no exception. It was in early October that Jenny asked if Lynne and I could come sooner than planned, as the season had started early.

By early October there were already over twenty adult flying-foxes in care, and around the same number of orphaned





This paralysed bat was found on the ground under the bat camp. The paralysis tick can clearly be seen near the ear. Photo: Steve Amesbury



This adult female was found on the ground by Lynne and Steve. This mother and her baby were successfully released. Photo: Steve Amesbury



Lynne replacing water bottles in one of the recovery cages. Photo: Steve Amesbury

young. At first they came in dribs and drabs. On some days one or two would come in, on other days, none. But by the end of the month they were coming in large numbers, sometimes over fifty in one day.

This was the first time volunteering at the hospital for Lynne and me, and we soon found that the days start early for volunteers. By 5.30 am, we were up and getting ready for our first duties of the day. These included feeding the many pups in care and cleaning out the outside bat aviaries. There are a number of aviaries on the property, including a massive flight aviary. Early in the season, there may be just one aviary in use. By mid-November, they were all occupied.

Each day a group of trained, vaccinated bat carers venture into the nearby colony to search for tick-affected bats. At times they have to push through thick undergrowth, often collecting a few ticks themselves in the process. Each day's search can last for hours. Affected bats are often lying paralysed on the ground and are seldom easy to see. Other times they are hanging in the trees. At times they are agonisingly just out of reach, even with the help of ladders and a catching pole.

Some bats are beyond saving. When a qualified person is in the search party, these unfortunate animals are euthanized, putting a quick end to their suffering. We witnessed this, and can attest that each animal was treated with kindness and respect. It was quite emotional.

The bats are bundled up and returned to base. The daily search party brings



Wherever possible, babies are reunited with their mothers. Photo: Steve Amesbury



every bat that is found (dead or alive) back to the hospital to be scanned, examined and counted. The dead ones are buried to maintain hygiene. At the hospital, Jenny gives each animal individual care. An experienced carer checks their breathing, heart-rate and tests their swallowing reflex. Ticks are removed and the bats are given a tick antitoxin that was developed for dogs. They are then treated for dehydration and placed in specially designed adjustable cages that allow the bats to gradually support their own weight as they recover. When we were there, the leading carer was a registered nurse, so the bats were getting first-class care!

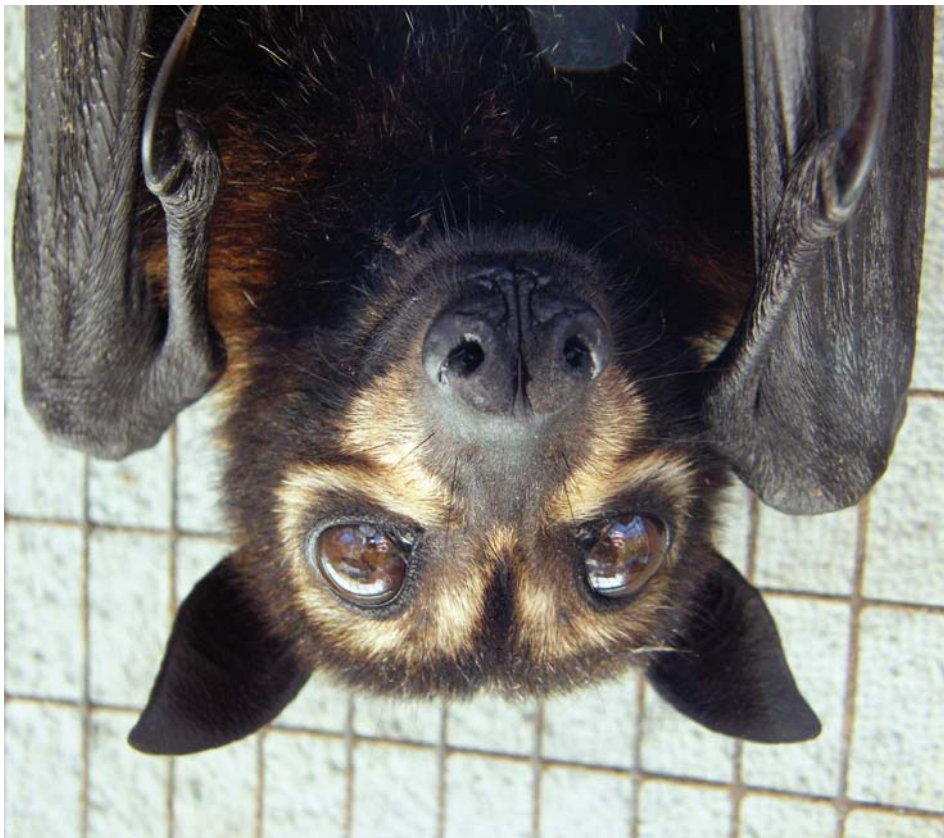
While Jenny sees to the adults, the pups that have been brought in are taken to the nursery for assessment – usually by Jenny’s long-time friend, volunteer Ashleigh Johnson. The pups in themselves are a huge undertaking. With around 100 babies in care and just five or six volunteers, the feeding could sometimes take up to four hours – by which time it was time to start the next session!

Over the last few years most of the bats have been microchipped when they are released, so every bat that comes in is scanned. In October, we recovered one bat that had been released two years earlier.

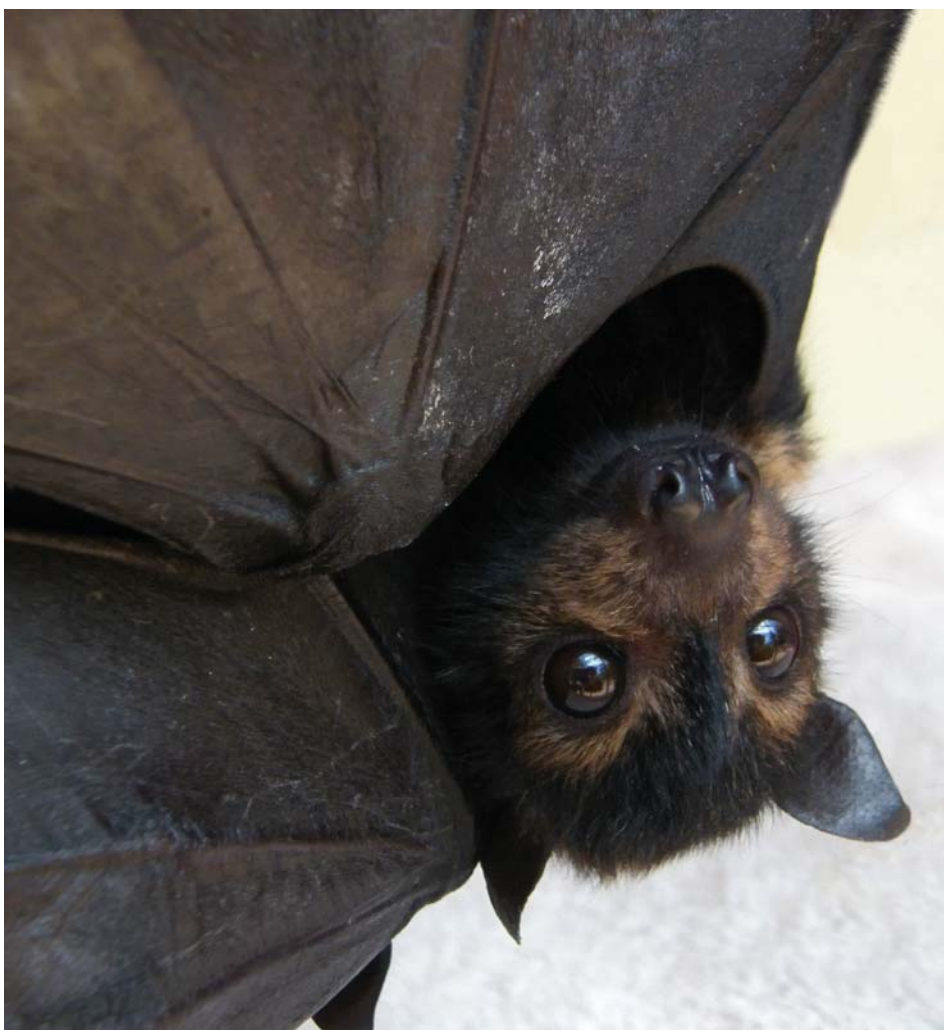
In a busy year, this one single facility will take in, treat and release over 600 flying-foxes, and many of the tick-affected bats can be released after a few weeks in care. However, the orphaned and abandoned babies cannot be released until they are independent, which is often not until March or April. After they are released, they are support-fed at a facility near the colony through until June.

For the next three months, bats injured by barbed wire and fruit-tree netting continue to come into care. Jenny also ramps up her other activities, including involvement in several scientific studies, local community programs, school and community education programs and the Wildlife Friendly Fencing project. Then in September–October it all starts again. At this stage there is no end in sight to this ongoing tragedy.

Lynne and I have visited many wildlife rehabilitation facilities over the years, all of which are doing amazing work. But for the sheer volume, effort and length of operation, we have seen nothing that matches the Tolga Bat Hospital. Like all such organisations,



After just a few days in captivity, these bats show amazing tolerance for the carers as we move around them, feeding, cleaning and taking photos. Photo: Steve Amesbury



A juvenile spectacled flying-fox hanging around between feeds. At this age, they are on milk – as they would be in the wild. Photo: Steve Amesbury



they depend on the generosity of the public and have to apply for grants for special projects. But more than anything else, they rely on volunteers. People from just about every continent have come to help. Every bat that comes into care gets individual and first-class care. To maintain this standard is not easy, but it is one area in which Jenny Maclean does not compromise.

The logistics are complex – buying, storing and preparing the food each day for this many bats is an effort in itself (not to mention a significant cost). Each cage is scrubbed clean every day. All cloths and towels are washed daily – sometimes requiring five laundry runs (using an industrial-sized washing machine). The visitor centre remains open during this busy season, so that visitors can see the hospital in operation at its peak.

Despite this impossible situation, the hard work and long hours, many volunteers come back for more. Some have been helping out for over ten years. But at peak times there is often a shortage, and it is amazing what difference just one or two extra people can make. While vaccinated carers are in high demand, the hospital also needs others to help with the cleaning, feeding and other duties. The volunteers all work as a team and develop lasting friendships in the process.

To find out about different ways in which you can contribute, go to their website at [www.tolgabathospital.org](http://www.tolgabathospital.org)



Tolga Bat Hospital founder Jenny Maclean with one of her beloved Kelpies.  
Photo: Ashleigh Johnson



Lynne (a vaccinated carer) feeding an orphaned flying-fox, while the previous one hangs on. String on the foot is used for identification so each one gets the right food (and medication if needed). ID is important when you have a hundred or more bats waiting in line to be fed. Photo: Steve Amesbury



Baby flying foxes are wrapped for feeding. In the wild, young bats are wrapped in their mother's wings. It may be anthropomorphic – but who could resist a face like that? Photo: Steve Amesbury

## From Steve Amesbury and Storm Stanford

Flying-fox carers and researchers are alarmed by a worrying trend amongst grey-headed flying-foxes. Throughout New South Wales, bats are coming into care weak and significantly under-weight. In a species already in trouble, this is of concern, especially at the start of winter.


Dr Kerryn Parry Jones has been conducting research on the bats at the Royal Botanic Gardens in Sydney for years. She comments: "Grey-headed flying-foxes caught at the Royal Botanic Gardens are in poor condition: the lactating females in particular are emaciated and this, plus reports of starving animals coming in to various rehabilitation groups within the Sydney region, indicates the presence of one of the worse food shortages in Sydney in the last 24 years. At this time of year, grey-headed flying-foxes traditionally move to where their food sources are most plentiful. This year, these bats are facing competition from the black flying-fox (*Pteropus Alecto*).

It is believed that recent rain anomalies in north-west of their range have led the black flying-foxes to descend in large numbers on the food sources on which their grey-headed relatives normally depend. This has seen an unusual dispersal of *P. poliocephalus* into areas where they have seldom, if ever, been recorded. Adult female grey-headed flying-foxes may give birth to just one baby each year. In times of food shortage they are known to abort the foetus. Even the ones who make it to full-term will struggle to survive unless there is a change to the current food shortage before that time. This situation is being closely monitored by bat researchers and conservationists."



# The numbat - a disappearing woodland treasure

Sharon Wormleaton



Captivating, alluring, endearing, and unique: these are all words easily associated with the numbat, but unfortunately, so is the term endangered. Its status as Western Australia's mammal emblem has facilitated some degree of notoriety in Western Australia, but the numbat is sadly unfamiliar to many other Australians. So what is a numbat, where does it live and what is being done to ensure its survival for future generations to enjoy?





Numbat in hollow log

### A distinctive character

Australia is home to many unique and beautiful animals and the numbat (*Myrmecobius fasciatus*) is no exception. It is a small, termite-eating marsupial, 500–700 grams in weight, that exists in the wild in the south-west corner of Australia. It belongs to the monotypic family Myrmecobiidae, one of the three families within the superfamily Dasyuroidea, which comprises most carnivorous marsupials, including quolls, the Tasmanian devil (*Sarcophilus harrisi*) and the extinct thylacine (*Thylacinus cynocephalus*). Most other living carnivorous marsupials belong to the family Dasyuridae, with whom the numbat has closest phylogenetic affinity. While it is morphologically closest to the dasyurids, the numbat exhibits many distinguishing characteristics that make it difficult to mistake for any other Australian marsupial.

The numbat is easily recognisable by its coarse, reddish-brown fur and prominent white stripes that cross the lower back and rump. The stripes number between four and eleven, and are an effective means of camouflage enabling the numbat to blend into its surroundings. The stripe pattern is subtly different for each individual numbat, even though males, females and juveniles seem similar in

appearance. It has a long, bushy tail which is quite possibly its most striking feature, making it readily noticeable. The tail is often carried erect with the hair fluffed out to give a characteristic 'bottle-brush' appearance; it measures approximately 200 millimetres in length and is almost as long as the combined head-body length of 270 millimetres.

The numbat has a pointed snout and large ears that stand high on the head. The head also has a dark eye-stripe that runs from the nose to the ear on either side of the snout, accentuated

by a white eyebrow above and a white stripe immediately below. It has a long, thin tongue, approximately 100 millimetres in length, used to capture and consume termites. It also has 50–52 teeth, more than any other Australian land mammal. While the dasyurids have sharp teeth to kill and consume their prey, the numbat's teeth are poorly developed, do not usually protrude above the level of the gums and are not used for eating.

The female numbat does not have a pouch, a characteristic commonly seen in marsupials. Instead she has four



Numbat habitat - Tutanning Nature Reserve





Numbat young

teats to which the young attach their mouths, and long belly hairs to provide warmth and protection for the young. The young are conceived in January and born in late January to early February after a brief gestation period of fourteen days. From then they are carried on the female's belly for approximately six months before they become too heavy to carry and are deposited in a nesting chamber at the end of a burrow.

This usually occurs in late July to early August, and the young remain in the burrow until late September when they start to emerge and gradually obtain their independence.

One final difference, and quite possibly the most defining, is the numbat's diurnal behaviour. While most other marsupials are predominantly nocturnal in nature, the numbat is active during the day and seeks

shelter at night. The numbat's diurnal behaviour is a result of the constraint imposed by its highly specialised diet. It can only forage when termites are active and near the ground surface, as its claws are not strong enough to penetrate concrete-like termite mounds. In winter this is from mid-morning to mid-afternoon, while in summer it forages in the morning and late afternoon and is inactive during the middle of the day when the hot midday temperatures drive termites deeper underground. The numbat uses its well-developed sense of smell to locate the shallow underground feeding galleries of termites, where it then digs shallow excavations and flicks its saliva-coated tongue into these so that termites adhere to the tongue. It also exposes termites by searching around in bark and leaf litter and by scratching bark from logs and stumps.

### Woodland havens

Prior to European settlement, numbats existed in semi-arid and arid regions across much of southern Australia, from south-west Western Australia through South Australia and southern Northern Territory to western New South Wales. By the 1980s they were restricted to just two reserves in south-



Male numbat with scent gland stain





Female numbat carrying young

west Western Australia, Dryandra Woodland near Narrogin and Perup Nature Reserve near Manjimup. At that stage these two populations comprised as few as 300 individuals and there were serious concerns the numbat was on the verge of extinction. The devastating reduction in population size and distribution has been attributed to the introduction of the European red fox (*Vulpes vulpes*), land clearing and changed fire regimes. The red fox was introduced into Victoria in the 19th century and its spread across Australia left a trail of destruction causing local extinctions of the numbat as well as many other Australian native species. This, combined with the demise of traditional Aboriginal methods of burning, saw an end to the numbat in South Australia, New South Wales and

the Northern Territory. Before European settlement, Aborigines frequently burnt small areas of vegetation to allow regeneration and reduce the incidence of large bush fires. European settlement saw the demise of these methods, thus allowing large, widespread bush fires to cause extensive damage to numbat habitat. To add to the catastrophe, land clearing in Western Australia's wheat belt led to the removal of a large proportion of numbat habitat. It resulted in the substantial destruction of shelter sites and the resources needed for subterranean termites, the single most important habitat requirement for numbats.

Since the 1980s, numbat populations have been re-established in several locations within their former range. Batalling Forest, Boyagin Nature

Reserve, Tutanning Nature Reserve, Dragon Rocks Nature Reserve, Cocanarup Timber Reserve and Stirling Range National Park are conservation areas in south-west Western Australia where successful reintroductions have occurred. Two fenced populations have also been established at Yookamurra Sanctuary in South Australia and Scotia Sanctuary in New South Wales. Current habitat for numbats in the south-west includes eucalypt forests and woodlands that have an open understorey, such as those dominated by jarrah (*Eucalyptus marginata*), wandoo (*E. wandoo*) and marri (*Corymbia calophylla*). They also inhabit brown mallet (*E. astringens*) plantations in Dryandra Woodland, remnants from forestry industry days when the bark was harvested to produce water-soluble tannins used in the production of quality leather. Numbats appear to have a preference for areas heavily littered with hollow logs and stumps. They inhabit territories of approximately 25–50 hectares and each territory typically contains numerous hollow logs and burrows which are used as refuges from predators and for resting, and the female also uses burrows to deposit her young.

### **Saving the numbat from extinction**

The numbat was adopted as Western Australia's mammal emblem in 1973, a status that increased its public profile. Given that in the early 1980s as few as 300 individuals existed in the wild, this was quite possibly the numbat's saving grace, as concern from within the community resulted in much needed recovery efforts. Since that time, numbat numbers have fluctuated and its IUCN Red List conservation status has changed from Endangered to Vulnerable and back to Endangered again in 2005. There are estimated to be less than 1,000 mature individuals existing in the wild at present, and there is evidence of a long-term population decline at Dryandra, one of the two original populations. This is of considerable concern as the Dryandra population is the most genetically diverse and thus the most valuable. The decline has been attributed to an increase in the feral cat (*Felis catus*) population – most likely the result of a decrease in the fox population due to regular fox baiting.

Numbat recovery efforts are largely managed by the Department of Environment and Conservation, and to date have included an intensive



research program; fox control using 1080 poison baits as part of the Western Shield program; management of existing habitat and populations, including translocation of numbats between conservation areas; and a breeding program at Perth Zoo to produce groups of captive-bred numbats for release into the wild. These recovery efforts have seen an appreciable increase in numbers and the successful re-establishment of several numbat populations in former habitat. Unfortunately numbats are easy prey for feral cats, and despite all these efforts they will most likely remain at risk of extinction until the feral cat problem is addressed.

Current recovery efforts include captive breeding for release; regular fox control at all Western Australian numbat sites under the Western Shield program; translocation of both wild and captive-bred numbats to the current translocation site at Cocanarup Timber Reserve near Ravensthorpe; periodic monitoring of numbats fitted with radio-tracking collars in both Dryandra Woodland and Cocanarup; an annual driving survey in Dryandra, and an annual radio-tracking project in Dryandra. The radio-tracking project was initiated in 2006 and requires a family of numbats (mother and up to four young) to be caught and fitted with radio-tracking collars. Four fixed radio-tracking towers are then erected in the mother's home range and simultaneous directional bearings are taken on each collared numbat at 20-minute intervals between 6.00 am and 7.00 pm each day over a two-week period. The data is entered into a computer program to provide a map of each individual numbat's movements throughout each day. The information collected provides new insights into the development of numbat behaviour, and the longer-term monitoring of the young animals provides important information on their dispersal and survival. Driving surveys are another key aspect of the project. As many numbats as possible are found, caught and fitted with radio-tracking collars so they can be periodically monitored throughout their lives to gain further information on breeding and survival. Some of these collared numbats are re-caught at later stages and moved to new locations such as Cocanarup, while others are re-caught to supplement the captive breeding program at Perth Zoo.

The radio-tracking project is managed by Dr Tony Friend, a Principal Research



Numbat having body condition checked

Scientist with the Department of Environment and Conservation, who has been instrumental in numbat recovery efforts over the last thirty years and has extensive knowledge in regard to this remarkable little marsupial. The project also requires the involvement of numerous enthusiastic volunteers who operate the radio-tracking towers and assist with the driving surveys throughout each day. I have been fortunate enough to be involved with the project on two occasions, and found it to be both an educational and rewarding experience. Unfortunately recovery measures such as the radio-tracking project are currently underfunded. Prior to 2009, funding was readily available through Federal Government grants, but single species recovery has fallen out of favour at the government level, and landscape-based environmental rehabilitation has become fashionable focusing more on habitat quality and threatening processes.

While recovery measures have improved its chance of survival, the numbat still remains at risk of extinction. The feral cat problem is the major cause for concern at present; and feral cats not only pose a threat to numbat populations but numerous other Australian species as well, far too many to list here. As far as developed nations go, Australia has the worst record of mammal extinctions and near-extinctions. While it has been some time since species such as the thylacine, crescent nailtail wallaby (*Onychogalea lunata*), lesser bilby (*Macrotis leucura*) and desert bandicoot

(*Perameles eremiana*) disappeared from Australia, we are not immune from such a catastrophe occurring again. In 2009, Australia quite possibly saw its first mammal extinction in over fifty years with the disappearance of the Christmas Island pipistrelle (*Pipistrellus murrayi*), so there is still plenty to be done to prevent further extinction of unique and remarkable animals such as the numbat.

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**Editor's note:** Sharon is a regular participant in volunteer conservation projects. She has a keen interest in raising awareness and being involved in the conservation efforts for one of Australia's lesser known marsupials, the numbat.





A pod of dolphins paid us a surprise visit as we cruised back towards Adventure Bay.  
Photo: Sabine Borgis

# Bruny Island: a wildlife adventure

**Sabine Borgis, ecologist and regular volunteer with Conservation Volunteers Australia around Hobart**

Choosing a birthday present for our loved ones can be challenging, especially for the older ones who no longer wish to clutter their lives with material things. The question of what to give my parents for their birthdays led to a spontaneous idea that not only solved this dilemma but proved an enjoyable experience for all of us, including my uncle visiting from Germany at the time. A couple of friends had recommended a cruise offered by Robert Pennicott's Bruny Island Cruises along the east coast of South Bruny Island, Tasmania. This company has won several awards for its ecotourism operation, as well as being actively involved in the protection of Tasmania's coastal and marine ecosystems.

On a sunny morning last February we drove south from Hobart and made the ferry crossing on the *Mirambeena* from Kettering to Roberts Point on North Bruny Island. Via The Neck, the isthmus that connects North and

South Bruny islands, we drove to the small holiday township of Adventure Bay, past Captain Cook's landing place. When I saw the great number of people waiting at the office and café, I thought that the tour boat must be a rather large one to accommodate all of us. Once we were taken to the pier about 200 metres down the road, it transpired though that we would be divided up into smaller groups and taken out on three boats seating about fifty people each. Everyone was supplied with long, red spray jackets to keep us warm and dry, and ginger tablets to ward off sea sickness, and of course there had to be a life jacket demonstration. Not having had much sea-going experience, I soon learnt just how bumpy the ride could be when a small vessel with a powerful outboard motor hits the swell of the Tasman Sea, and later the Southern Ocean, at high speed. As we neared points of interest, the skipper slowed the boat and we drifted to take in the sights.

Our first stop was off Penguin Island, where there was once a whaling station. Then we rounded Fluted Cape and headed south along the eastern shore of the island. Already it felt as if we were in a place so remote and unspoilt that time seemed meaningless and we, insignificant. Here, deeply weathered dolerite cliffs up to 279 metres tall tower over the crystal-clear ocean. The rocks are decorated with red and orange lichen and white guano left by countless generations of seabirds perching on the rock ledges. Fast-growing bull kelp is thrashed about by the waves, lapping the foot of the cliff face. It is hard to imagine how these rocks were formed during the Jurassic by magma trapped deeply below the continental shelf and by cooling slowly, forming characteristic hexagonal columns not unlike basalt. Much of the overlying sedimentary rocks have been weathered away. As we continued south along the coast, we saw many spectacular examples of the result of





Towering cliffs at Fluted Cape, South Bruny Island. Photo: Sabine Borgis

millions of years of weathering of the dolerite by the elements: sea caves, a blow hole that expels the water and air pushed in by the swell at regular intervals and in spectacular fashion, and needle-like stacks protruding from the water. We sped through the narrow passage between such a stack and the cliffs and some passengers found this so exhilarating that the skipper turned the boat around and we went through once again. So, the thrill-seekers got their money's worth.

Everywhere, cormorants and gulls perching on the rocks watched us idly below; they seemed unconcerned by our presence. After all, these excursion boats have already passed by thousands of times. Out on the water, we met with Australian gannets and a flock of short-tailed shearwaters skimming the surface. Our skipper and commentator made some humorous but thought-provoking comments about the practice of 'muttonbirding' and the taste of this 'greasy delicacy'. I do not think it was intended to offend Tasmania's remaining Aboriginal population, but rather a critical comment on the continuation of this practice now that the shearwater population is experiencing a decline. Later, he pointed out two shy albatrosses to us. Seen from a distance across the water, they seemed deceptively small, although these are among the smaller albatross species.

Looking over the treetops on the island, dead trees protrude noticeably from the canopy. They are reminders of the catastrophic bushfires around Hobart in 1967, when burning embers were blown across D'Entrecasteaux Channel onto the island, igniting the bush. We were also told how once there was a bush tramway constructed across the island by the early timber getters. These days, log trucks roll on and off the ferry with much less effort, though continued logging of native forest on Bruny Island is a contentious issue.

We then skimmed and bumped our way towards Tasman Head on the southernmost tip of South Bruny Island. This is where the Tasman Sea meets the mighty Great Southern Ocean, and it is easy to feel that just by the size of the waves. Hungry by now and tested, my stomach began to complain, but our deckie, who was always keeping a watchful eye on our faces, swiftly whisked me to the back of the boat and told me to stare at the horizon. Then we came to the colony of Australian fur seals. If you could not see them, you could certainly smell them! The pungent stench tipped my stomach over the edge ... well, no need for me to elaborate. Overboard it went, thank goodness. Nonetheless, to see these seals and so many of them, basking in the sun only four or five metres away was quite an experience. I was surprised to see some of them so high up on the rocks because they look so awkward when they push themselves forward with their flippers, sliding on their bellies. Once in the water, though, they are fast swimmers. The skipper pointed out a seal that looked as if it had been 'ringbarked' around its neck - the result of a plastic bag. It was lucky to survive. A little further on we saw another seal, still with a plastic bag attached. The educational message in that was clear enough to those aboard.

We rounded The Friars, a group of tiny islands off the southern tip, and admired Bridge Rock, a small rocky



A colony of Australian fur seals at The Friars, South Bruny Island. Photo: Sabine Borgis





Black-faced shags perching on rock shelves, South Bruny Island. Photo: Sabine Borgis

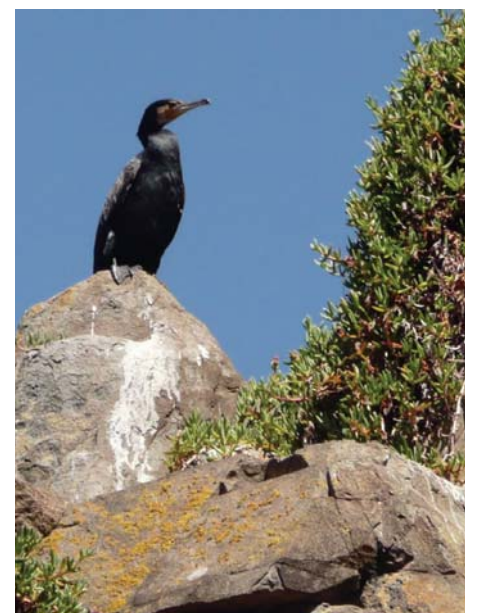
island with a large passage eroded through it. As we sped back towards Adventure Bay, I stood at the back of the boat and faithfully stared at the horizon, bracing my offended stomach, breathing through the first symptoms of hypothermia. It wouldn't be far now before I could recuperate. But to our surprise, we were in for another treat: about halfway back, a pod of dolphins surrounded our boat. They seemed to take delight in surfing the bow and stern waves and swimming around the boat at breathtaking speed as we cruised around in circles for a few minutes. The skipper called up one of the other boats that was not far behind us and it came soon to join in the spectacle. I had never seen dolphins so close in the wild, and this feeling of awe and privilege more than compensated for my physical discomfort.

Back at Adventure Bay we waddled ashore like a troop of fairy penguins, and then took a stroll along the beach to regain our land legs and

have a late lunch. This had been an extraordinary and profound experience for me and my family, and I hope for the other passengers too. Although this 'aquatic safari' took a fair chunk out of my savings, I felt it had been well worth it. The crew not only did their best to look after our personal welfare but it was obvious that they feel passionately about giving people an opportunity to experience this spectacular wilderness with minimal negative impact on it and the wildlife it is home to. The commentary was captivating - both informative and humorous and often thought-provoking; one would not have thought that they repeat it day after day. The opportunity to take this trip helps fill an increasing need to experience the real world at a time when we are bombarded by 'virtual reality' that disconnects us from our natural environment. The understanding gained will hopefully help to preserve it for future generations of wildlife and humans alike.

For more information on the cruise, go to [www.brunycruises.com.au](http://www.brunycruises.com.au)

**Editor's note:** Sabine is a member of WPSA and helps with editing *Australian Wildlife*.



This little black cormorant kept watch as we cruised into a small bay. Photo: Sabine Borgis



# The role of cracking clay soils as refugia for arid-zone biodiversity

Helen Wauby



Large expanse of cracking clays. Photo: H. Waudby

As the sun sinks below the horizon, the sky turns a violet colour and slowly fades to darkness. I am preparing to release a small, furred individual caught the previous night. I gently place the calico catch bag on the ground and reach in to remove him. The rodent sitting on my hand sniffs the air, twitches its whiskers, and starts grooming. Eventually, it will scamper off into the evening and enter a crack in the ground. Forrest's mouse (*Leggadina forresti*) is just one of the species that I frequently catch as part of my research on cracking clay soils in arid South Australia. Although the arid and semi-arid rangelands constitute most of the Australian continent, relatively little is understood about the ecology of the wild fauna of these regions or the threats they face. A plethora of endemic and threatened species inhabit the arid zone. However, this region has also experienced some of the highest extinction rates in Australia; wildlife that persists faces an array of potentially threatening processes, including grazing by livestock (the most

widespread commercial industry in the rangelands).

Cracking clay soils occur in parts of the arid zone. The cracks form when clay minerals in the soil are inundated with water (eg during rainfall events), causing them to expand. As evaporation occurs, the soils shrink (hence the name 'shrink-swell soils') and cracks form.

The resulting cracking can be extensive and may provide shelter from harsh desert conditions for small mammals, reptiles, animals, and plants. Correspondingly, some researchers have suggested that cracking clay soils act as refuge sites for nationally threatened species, such as plains rats (*Pseudomys australis*), during their 'bust' years (Brandle *et al.*, 1999). In fact, cracking clay soils may support a range of species.

Little information is available on the value of cracking clays for arid-zone flora and fauna. Along with my supervisor, Dr Sophie (Topa) Petit, I am investigating several aspects of

cracking clay ecology: (1) the shelter properties of cracks, including their role in temperature and humidity control; (2) the effect of grazing on cracking clays and differences in biodiversity of plants and animals between grazed and less-grazed sites; (3) the role of cracking clay soils in supporting arid-zone food webs; and (4) use of cracking clays by small vertebrates.

Approximately one year is left of field research; then, it will be time for dedicated data analyses. Some interesting findings have been made already. In particular, it seems that cracks provide a relatively stable microclimate compared to outside conditions. When the ground is searing hot (I have recorded temperatures close to 70°C during summer), the temperature inside a crack can be many degrees cooler. Several notable species have been caught, including plains rats (Vulnerable under the *EPBC Act 1999*), Woomera sliders (*Lerista elongata*) (only recorded at a few locations in South Australia), gibber dragons





Typical gibber landscape with gilgai patches. Photo: H. Waudby



Native hollyhock. Photo: H. Waudby

(*Ctenophorous gibba*) (endemic to the gibber country of the Lake Eyre Basin), and Bolam's mice (*Pseudomys bolami*). However, most mammal captures are of fat-tailed (*Sminthopsis crassicaudata*) and stripe-faced (*S. macroura*) dunnarts, and Forrest's mice. Eyrean earless dragons (*Tympanocryptis tetraporophora*) and gibber dragons are the most commonly captured reptile species. Many of the mammal and some of the reptile species I have captured have been observed using cracks.

The flowering and fruiting patterns of plants at my study sites are fascinating; not surprisingly, their reproductive phenology appears to be influenced substantially by rainfall events. Species that seem to be especially common after rain in the cooler months are hoary sunrays (*Leucochrysum molle*) and slender sunrays (*Rhodanthe*



Forrest's mouse. Photo: H. Waudby





Checking pitfall traps. Photo: H. Waudby

*stricta*). Bindyi (*Sclerolaena* spp.) are present at all of the study sites and I usually return to Adelaide with their spines lodged in my fingers. Australian hollyhock (*Malva preissiana*) is another striking plant that emerges at some of my sites after rainfall. This colourful forb produces large flowers streaked with lilac. Because of the patchy nature of rainfall in the arid zone, I have installed two weather stations in order to record rainfall events that would not necessarily be reflected in Bureau of Meteorology data.

I have had a number of interesting experiences while conducting this research. Some have been more challenging than others, including bogging my 4WD to the axle after attempting to drive on flooded roads. Watching my vehicle be retrieved from the sticky clay by a local station



Random storms. Photo: H. Waudby



Stripe-faced dunnart. Photo: H. Waudby



Gilgai filled with water. Photo: H. Waudby





Gibber dragon. Photo: H. Waudby

manager was most embarrassing. Several months later, I watched in resignation as another station owner pulled my vehicle from a bog. Despite assurances that he had been bogged in that same location previously, my pride took another battering. Indeed, random thunder and lightning storms frequently make my field work somewhat precarious (at least in my mind). More than once, volunteers and I have had to dash for the car as lightning started to strike in the distance. The memory of being caught in the middle of a dust storm so thick that the sun could only filter through

also remains with me. However, I am always reminded of the beauty of the Australian desert when I check my traps and find a tiny planigale (*Planigale* sp.) or a curl snake (*Suta suta*) staring back at me, or when I drive over the rise of a particular hill along the dog fence and see the brilliant blue horizon hovering over the orange gibber.

Sincere thanks to the Wildlife Preservation Society of Australia for supporting this research and that of so many other researchers. Thank you also to our other sponsors, including the Hermon Slade Foundation, Holsworth

Wildlife Research Endowment, The Nature Conservancy and the Thomas Foundation, the Ecological Society of Australia, Australian Federation of University Women, Nature Foundation of South Australia, Royal Geographical Society of South Australia, Australian Geographic Society, and S. Kidman & Co. I am indebted to Colin, Jill, Laura, Anna, and Bridie Greenfield and Allan McArdle for allowing me to work on Billa Kalina Station and for their continued patience and assistance. I promise that the bogged cars and questions will stop ... soon. My deepest gratitude to all of the volunteers who have assisted me both in the field and in Adelaide; your efforts and good humour have made my research that much easier. Finally, sincere thanks must go to my supervisor, Dr Topa Petit, whose input into this research has been (and continues to be) substantial.

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#### Editor's note:

Helen won a Wildlife Preservation Society of Australia University grant for her Phd project in 2008 and 2009.



Hoary sunray. Photo: H. Waudby





Platypus in situ

# Australian wildlife comes to life for the blind and vision-impaired

Betty C Lynch OAM

Healesville Sanctuary with its wide range of bushland sounds and smells provides a very stimulating experience for blind and vision-impaired visitors. The Sanctuary's beautiful bush setting of 30 hectares supports tall elegant eucalypts, golden wattles, green ferns and a variety of grasses. It cares exclusively for 200 different species of Australian animals, birds and reptiles. Most of our wildlife are shy, private creatures subject to stress when handled; many are nocturnal, others aquatic, so that vision-impaired people have no way of knowing what they are really like. With encouragement from Geoff Williams and Noelle McCracken who were at the time, respectively, Director and Public Relations Manager of the Healesville Sanctuary, I instigated the Animal Insights Program.

The aim of the program was to produce a series of interpretive life-size bronze sculptures of some of Australia's indigenous creatures for the enjoyment of the blind and vision-impaired. These visitors would be encouraged to touch each statue to gain an accurate picture of size, shape and other unique characteristics of some of Australia's native wildlife. I told Geoff and Noelle that I would raise funds for one sculpture to promote the idea and when in place, I was sure others would then follow.

Our first choice was a platypus.

The platypus is synonymous with Healesville Sanctuary and thus an obvious choice for the initial sculpture. The platypus and various types of echidna are the only mammals in the world today that lay eggs and milk-feed their young.

Platypus, like other cautious native mammals, are timid. Geoff Williams and Melody Serena have handled nearly two thousand platypus during their research at the Australian Platypus Conservancy, Victoria. They note that

if handled correctly they probably show less stress than many other mammals. However, Williams states that platypus do have a different stress mechanism than other mammals; consequently, they have to be handled with appropriate care.

The platypus (*Ornithorhynchus anatinus*) is a unique Australian. Platypus are hard to see in their habitat of freshwater streams and rivers, fossicking for worms, insects and yabbies in the early morning and evening. The female creates an elaborate burrow in the river bank that measures up to 20 metres long, where she lays two eggs. Platypus have both mammalian and reptilian characteristics. It is said that the platypus is a living fossil, surviving from the time when mammals first evolved from their reptilian ancestors.

In the Autumn 2009 edition of *Australian Wildlife* Dr Melody Serena, Conservation Biologist with the Australian Platypus Conservancy, alerted us to the disastrous effects of plastic in her article titled "Plastic Problem for Platypus".

Selecting a sculptor was straightforward. I had admired the *Boy on the Dolphin*



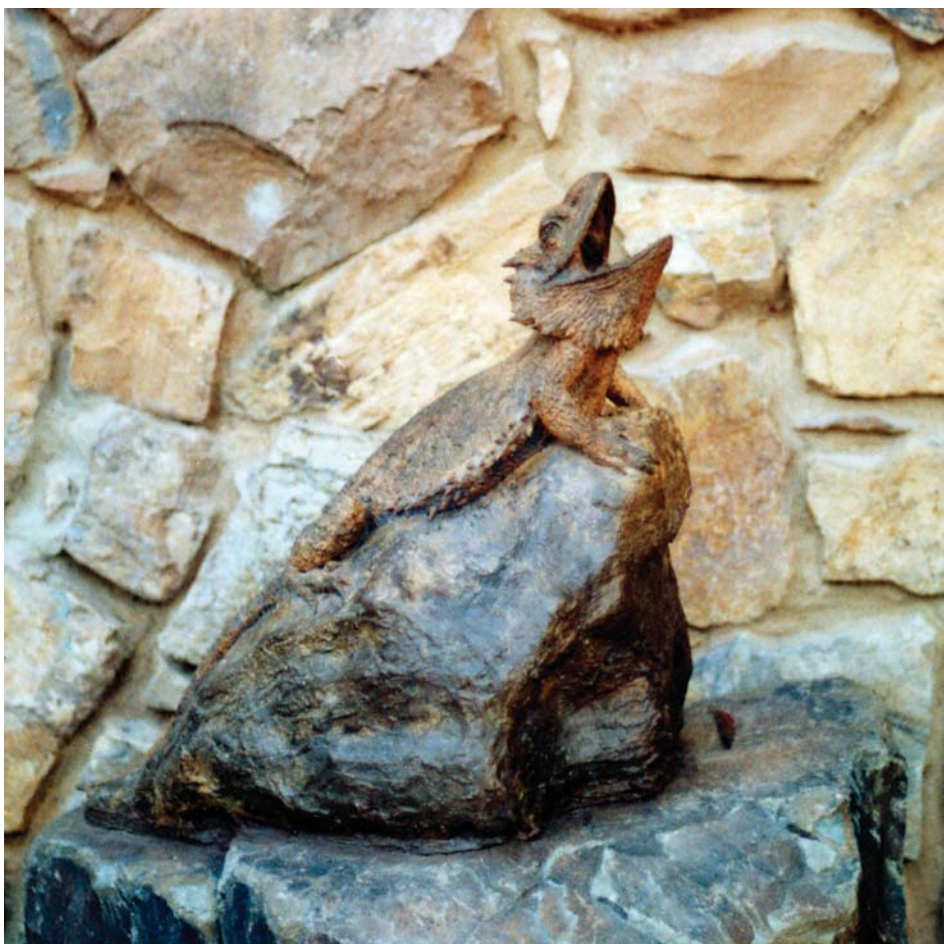
almost daily as I walked through the front entrance of the Royal Children's Hospital at Parkville, the *Stork Carrying a Baby* at the Royal Women's Hospital at Carlton, *The Horse Statue* at the Adam Lindsay Gordon Memorial in the main street of Ballarat, Victoria, and the *Pegasus* displayed at the Shell Company, Melbourne. In all these pieces I noted that the sculptor's precision and eye for detail would ensure a perfect tactile experience.

I contacted the artist, Raymond Ewers, who was a gentle man, and arranged a meeting with him, Geoff Williams and myself at my home. Interesting times ahead, I thought!

Platypus research scientist, Melody Serena was summoned to Raymond's studio to view the artist's model. "The lower bill shield is missing, otherwise perfect," she said. It was quickly rectified!

A discussion with Peter Morley, owner of the Meridian Sculpture Founders, then followed. Peter came to Australia from England to set up the first foundry in Australia. He is very well-respected throughout Australia for his professionalism and artistry. In England, he was responsible for casting works for Henry Moore, Barbara Hepworth and Elizabeth Fink. Perfect, we thought, and it was.

The platypus sculpture was strategically placed along the walkway leading to the platypus exhibit.



Bearded dragon in situ

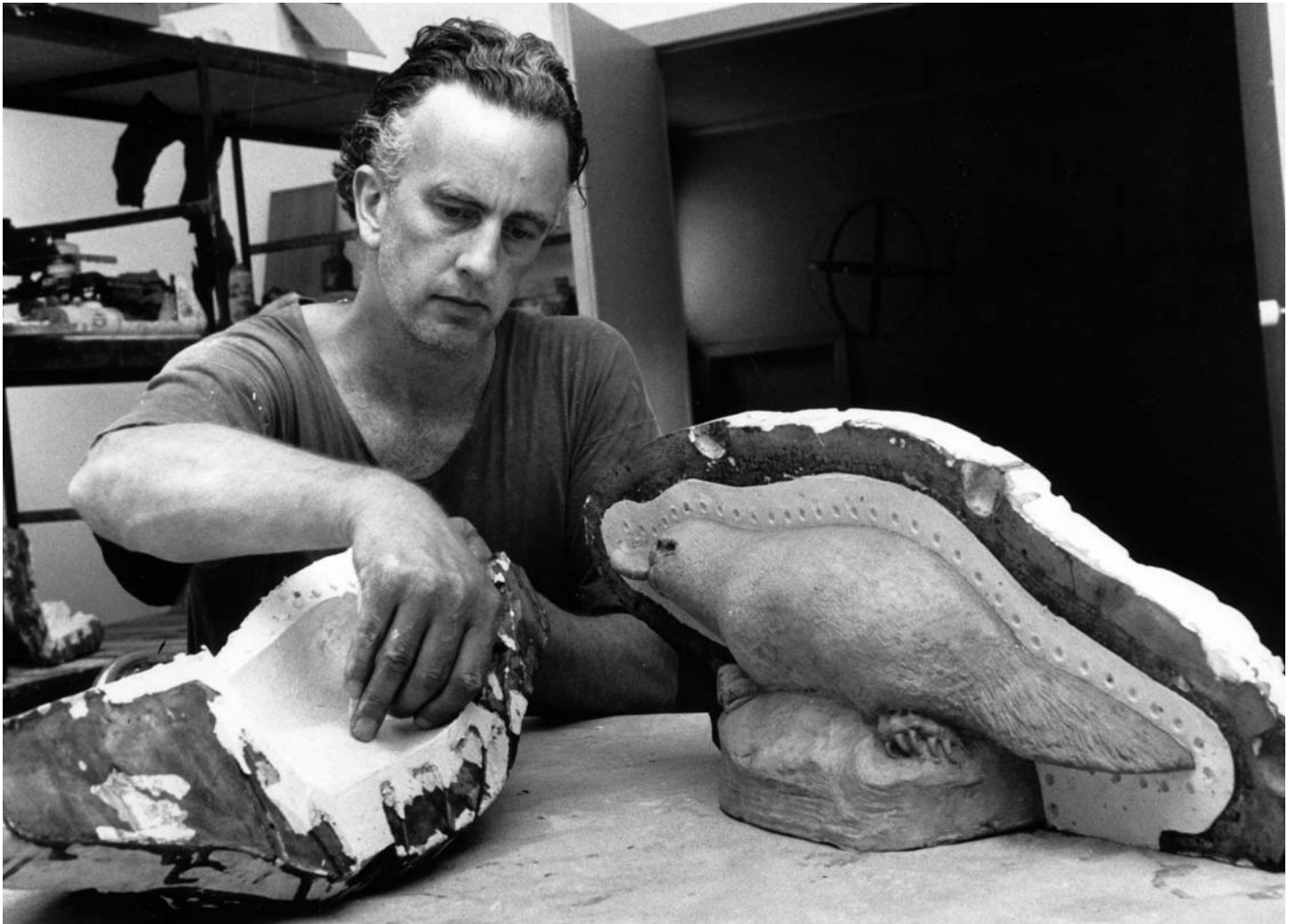
Alongside, there is a brass plaque with the words in Braille, "The platypus closes its eyes under water. It locates its prey using an electrosensory system in its leathery bill."

At the foundry the artist's model goes through several critical stages, each one demanding skilled craftsmen, precise timing and controlled



Raymond Ewers, sculptor, taken in his studio with a clay model





Robert Sinclair, foundry manager, mould-making at Meridian Sculpture Founders. Photo: Michael Silver

temperature. I have simplified these complicated processes into five stages:

- Stage 1** Mould made from original artist's model.
  - Stage 2** A hollow wax casting made from original mould, invested with refractory material is placed in kiln – wax is completely burnt (lost wax process). Time in the kiln varies from cast to cast depending on size, three to seven days, temperature of kiln no more than 520° C.
  - Stage 3** Bronze poured into mould – replacing the wax. The temperature is 1060° C to 1080° C.
  - Stage 4** Bronze cooled and outer mould removed. Time taken approximately 24 hours.
  - Stage 5** Rough casting is hand-finished and painted with various chemicals to obtain different colours – a slow process.
- Total time taken for *Platypus* 30 hours approx.

Total time taken for *Bearded Dragon* 40 hours approx. (as I was to find out later).

Total time taken for *Koala and Joey* 80 hours approx.

All of these works were cast in one piece. Larger works have to be cast in

a number of parts, and then welded together so that size and time taken cause costs to rise accordingly.

Walking around the sanctuary grounds with Geoff I mentioned a small cash surplus. Geoff said he wanted a bearded dragon for the next



Pouring the bronze in Meridian Sculpture Founders





Artist's model of the *Koala and Joey* in Raymond Ewer's studio

sculpture and installed within a year! I told him that I didn't think I could manage that and there was no further discussion. Nevertheless, I had always admired this docile reptile.

**The bearded dragon (*Pagona parbata*) is ubiquitous in Australia, preferring hot dry climates. It is active during the day and often seen sunning itself on logs, fence posts and unfortunately on roads. An interesting character, when confronted by an enemy it stands its ground, looks very fierce by raising its spike-encrusted skin around the neck, which is usually flat. It has a long tail which when broken, does not grow back, unlike the lizard's.**

It was time to raise more funds. Although my idea of making Christmas bow ties to raise money was exciting, I do not know how to sew! When asked to lend a hand, my friends Margaret, Heather, Lesley and Denise all said, "Yes, I will". I had no idea how extraordinarily difficult it was going to be to organise the production and marketing of approximately 1,000 bow ties. In addition, the restricted timeframe made it hectic. It involved meeting many people, who provided me with lots of funny experiences. Any man wearing a bow tie was targeted, no matter where we were: in supermarkets, on the plane, train or tram, in the street, at dinner.

The late Les Tanner wrote in *The Age* newspaper that he was unable to find

a bow tie for his brother-in-law. I telephoned him about my fundraising venture and he replied, "Come into *The Age*". He purchased several.

The fundraising campaign was so successful that on just one day about 25 good-looking young men were spotted waltzing around Melbourne's CBD wearing **our** Valentine Day bow ties.

Bow ties were not the only means of raising funds. My cousin John sent a cheque for \$1,000 asking that he be excused from future fundraising events featuring Sunday morning's French breakfast and swim.

After this very successful fundraising campaign the sculpture of the bearded dragon was made and installed guarding the sanctuary's Reptile House, making a wonderful touch-and-feel experience for those special visitors. I was asked by an acquaintance, "How did you raise all the money? "Blood, sweat and bow ties," I replied.

I had now achieved my three objectives, namely:

1. Two beautifully and realistically portrayed sculptures of the platypus and bearded dragon were now proudly displayed.



*Koala and Joey* in situ



2. My supportive friends were still chatting to me!
3. A family had planned to follow with a bronze sculpture of an eastern quoll (*Dasyurus viverrinus*).

Some time later, I was enjoying a day at the beach with friends, including the late Dr Margaret Chattaway, a scientist, who in later life had become vision-impaired. She was cognisant of my program and its aims. Out of the blue she remarked, "Betty, you must do a koala", and she continued, "I will give you a start of \$1,000" – I shuddered and thought, "Oh, no," but said, "Thank you, you are most generous".

Much to their amazement Raymond Ewers and Peter Morley were contacted, each one saying: "I thought you were going to retire!"

The koala (*Phascolarctos cinereus*) is known with affection throughout the world. It is not a bear but a marsupial. The koala baby is only 25 mm at birth and quickly wriggles its way into the mother's pouch, where it remains for six months. For a further six months it views its surroundings from the mother's back and by twelve months is weaned. The young koala (joey) does not reach maturity until two years of age, at which time the female will give birth again.

Koalas nap for about 19 hours a day, spending the rest of the time nibbling young eucalyptus leaves, the composition of which is approximately 50 percent water and five percent sugars and starches. As the water requirement is adequately met, ground travel is only necessary when moving from one habitat patch to another. Nature has provided the koala with a protective skin on its bottom, thus ensuring a comfortable lifestyle. In captivity its life span is approximately thirteen years.

Although not endangered at this time, its habitat is being drastically reduced by land clearing and removal of eucalypts, causing overcrowding and consequent malnutrition. Feral animals, dogs and roads further lead to the koala's demise.

Victorian species of eucalyptus favoured by koalas are (John Patrick pers.comm., 2010):

Blakely's red gum *E. blakelyi*  
 Southern mahogany *E. botryoides*  
 River red gum *E. camaldulensis*  
 Blue gum *E. globulus*  
 Long-leaved box *E. goniocalyx*  
 Spotted gum *Corymbia maculata*  
 Yellow box *E. melliodora*  
 Messmate stringybark *E. obliqua*  
 Swamp gum *E. ovata*  
 Narrow-leaved peppermint *E. radiata*  
 Mountain ash *E. regnans*  
 Candlebark *E. rubida*  
 Forest red gum *E. tereticornis*  
 Manna gum *E. viminalis* -  
 (not endangered - Environment Australia 2000)

The cost of the sculpture of the koala and joey was to be three times that of the platypus. To raise funds this time I thought of one big night with a wildlife art exhibition and celebrity auction.

The night was a huge success due to the valuable expertise and support of Roger McIlroy, at the time Managing Director of Christies Australia. Noelle McCracken volunteered to take over the wildlife art section, and small businesses and individuals gave interesting and unusual items for sale; many of these folk I had not met before. The Zoological Gardens provided the venue, and delicious food and drinks were generously contributed by A. V. S. Catering.

The former Governor, The Hon. Richard McGarvie AC, welcomed everybody and Faye Urquhart from Healesville Sanctuary competently took the cash. That night we achieved our target. Hooray, I cheered silently.

There are now seven bronze sculptures proudly displayed in appropriate locations at the Healesville Sanctuary – platypus, bearded dragon, koala and joey, eastern quoll, emu, kangaroo and a pair of kookaburras.

These sculptures are not only being enjoyed by the blind and vision-impaired but greatly appreciated as works of art by all visitors to the sanctuary.

*I respect and admire all those dedicated people who care for the sanctuary's wildlife: the vet who has to make difficult decisions daily between life and death, the keepers who treat their charges with love and attention, and the director and his team who coordinate the entire operation.*

As far as we are aware, this program was unique in Australia and around the world.

We hope that these realistically portrayed bronze sculptures will assist in promoting a greater awareness of the needs of the blind and vision-impaired.

#### Editor's note:

I first met Betty at an Order of Australia Association function in Brisbane. In conversation with Betty, I was fascinated to learn to she was awarded the Medal of the Order of Australia in 1989 for her volunteer work, and she then went on to describe her volunteer project to provide a series of interpretive life-size bronze sculptures of some of Australia's indigenous creatures for the enjoyment of the blind and vision-impaired. I was particularly delighted when she described making all those bow ties.

*Betty Lynch is a member of the Wildlife Preservation Society of Australia.*



Healesville Sanctuary



# WPSA Merchandise

Many of our members have expressed interest in purchasing gift merchandise for friends and family (or even themselves)! This is a great way to support the Wildlife Preservation Society of Australia, so we have responded below with a mail order system. Simply send your cheque or credit card details (with expiry date) and we will post your order out to you. All prices include GST and 20% member's discount. All proceeds go towards our conservation projects.



## Polo Shirts - \$25

(Navy with white logo / White with navy logo)



## Kids T'Shirts - \$10

(Navy with white logo / White with navy logo)



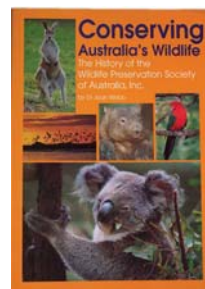
## Cap - \$10

(Navy with white logo)



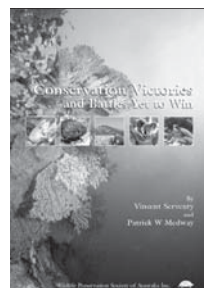
## Drink Bottle Bag - \$10

(Navy with white logo)



## Conserving Australia's Wildlife

By Dr Joan Webb - \$15



## Conservation Victories and Battles Yet to Win

By Vincent Serventy and Patrick W Medway - \$20

Product	Quantity	Size	Cost per item	Total
Polo shirts	_____	M,L	\$25	_____
Children's T-shirts	_____	4-6,8,10	\$10	_____
Caps	_____	n/a	\$10	_____
Drink Bottle Bag	_____	n/a	\$10	_____
Conserving Australia	_____	n/a	\$15	_____

Add \$2.50 per item postage and handling within Australia:

Add \$20 per item postage and handling for Overseas orders:

Please allow 14 days for delivery **TOTAL:** \_\_\_\_\_

## Delivery Details

Name: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Address: \_\_\_\_\_

**Payment Details** (please tick) ☐ Cheque ☐ Money order ☐ Mastercard ☐ Visa ☐ Bankcard

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

Name on Card: \_\_\_\_\_ Expiry: \_\_\_\_\_

Signature: \_\_\_\_\_

## Send this order by MAIL:

Wildlife Preservation  
Society of Australia  
PO Box 42,  
Brighton Le Sands NSW 2216  
or for CREDIT CARD  
payments by fax to:  
02 9599 0000  
Email: info@wpsa.org.au



# Membership Form



**WILDLIFE PRESERVATION SOCIETY OF AUSTRALIA LIMITED**

P0 Box 42 Brighton Le Sands NSW 2216

## Membership

**Become a member of the Wildlife Preservation Society of Australia Limited**

Simply fill out this form.

Name: .....

Address: .....

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

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

Email: .....

**Membership category (please tick)**

- ☐ Individual: \$50
- ☐ Family: \$65
- ☐ Concession (pensioner/student/child): \$45
- ☐ E-mag (emailed as PDF, no hardcopy will be sent): \$25
- ☐ Associate (library, school, conservation groups): \$80
- ☐ Corporate: \$120
- ☐ Life: \$1,000

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

**Three year membership (please tick)**

- ☐ Individual: \$135
- ☐ Family: \$175
- ☐ Concession (pensioner/student/child): \$120
- ☐ E-mag (emailed as PDF, no hardcopy will be sent): \$68
- ☐ Associate (library, school, conservation groups): \$215
- ☐ Corporate: \$325

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

### Payment details (please tick)

- ☐ Cheque      ☐ Money Order      ☐ Mastercard      ☐ Visa      ☐ Bankcard

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

Amount \$.....

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

Donation \$.....

Signature:.....

**Total**      \$.....

**Mail to the:** Wildlife Preservation Society of Australia Limited

**PO Box 42, Brighton Le Sands NSW 2216.**

**Email: [info@wpsa.org.au](mailto:info@wpsa.org.au) Website: [www.wpsa.org.au](http://www.wpsa.org.au)**

## Consider - A Bequest

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

If you would like to make a bequest to the Wildlife Preservation Society of Australia Limited, add the following codicil to your Will:

I bequeath the sum of \$ ..... to the Wildlife Preservation Society of Australia Limited for its general purposes and declare that the receipt of the Treasurer for the time being of the Wildlife Preservation Society of Australia Limited 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.

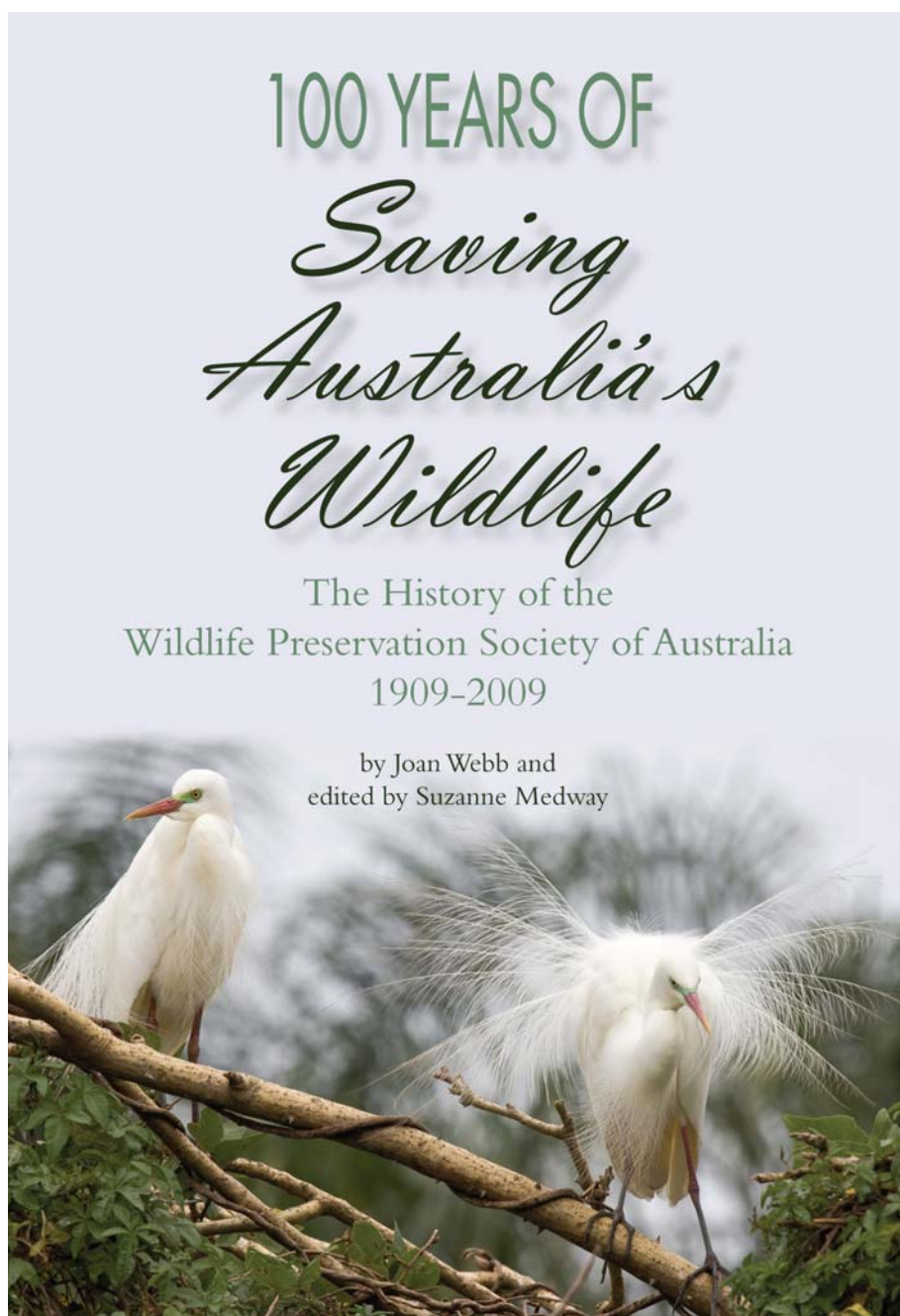
**SUZANNE L. MEDWAY**  
President



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# 100 Years of Saving Australia's Wildlife

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**\$29.99 plus \$5 postage and handling**

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## Delivery Details

Name: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Address: \_\_\_\_\_

**Payment Details** (please tick) ☐ Cheque ☐ Money order ☐ Mastercard ☐ Visa ☐ Bankcard

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

Name on Card: \_\_\_\_\_ Expiry: \_\_\_\_\_

Signature: \_\_\_\_\_

## Send this order by MAIL:

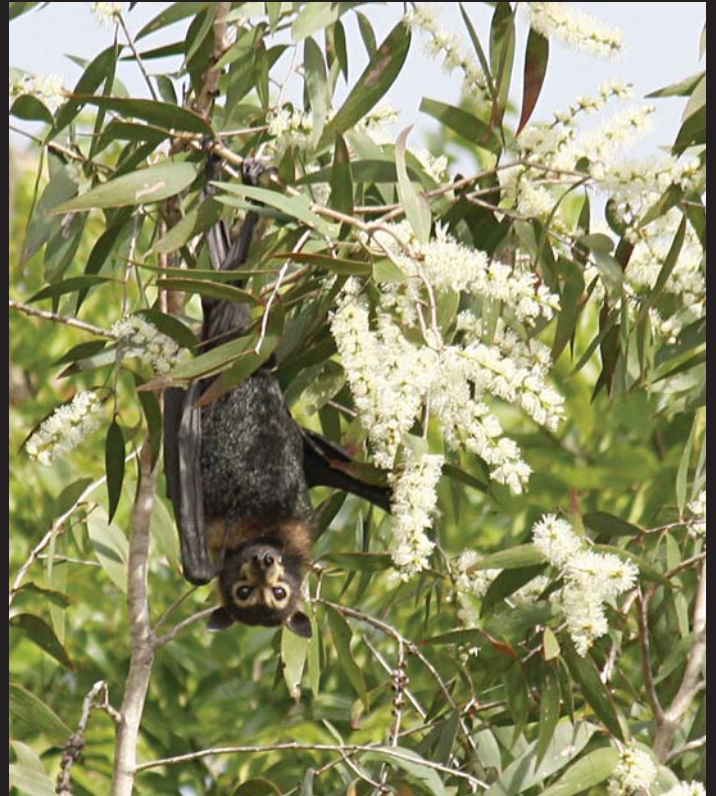
Wildlife Preservation  
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or for CREDIT CARD  
payments by fax to:  
02 9599 0000  
Email: [info@wpsa.org.au](mailto:info@wpsa.org.au)



# Flying-foxes in their natural habitat by Nick Edards & Halley Design



Pregnant grey-headed flying-fox enjoys the spring sun in a Sydney flying-fox camp. Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))



Spectacled flying-fox (*Pteropus conspicillatus*). Photo: Halley Design



Little red flying-fox. Photo: Halley Design



Although still dependant on its' mother for nutrition, this young grey-headed flying-fox is starting to take a lot of interest in its' surroundings. Photo: Nick Edards ([www.enigmatech.com.au](http://www.enigmatech.com.au))



