

Volume 24

February 2010

# CONSULTING ECOLOGY

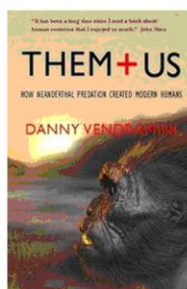


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Newsletter of the Ecological Consultants Association of NSW





**Vol 24 February 2010**

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**Above left:** Book Review (see page 35).  
**Above:** Microbats Roosting in Mangrove Forest (see page 7). *Photo courtesy of Anna McConville*



**Above:** Mexican freetail bats leaving Bracken Cave in Austin, Texas (see page 63). *Photo courtesy of Narawan Williams*

**Below:** *Uperoleia laevigata* (See page 67). *Photo courtesy of Brian Hawkins*



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**Front Cover Photo:** Australian Bustard - During recent fieldwork in central Western Australia, we were treated to not one Australian Bustard, but three; a rare sight for ecologists on the east coast.  
*Photo Courtesy and Copyright of Steven Sass.*

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## Message from the President

*Dr Stephen Ambrose*

*5<sup>th</sup> January 2010*

### A Year in Perspective

In recent years I've used (a small) part of the Christmas/New Year break to reflect on the overall nature of ecological consultancy opportunities of the previous 12 months and, if necessary, how my own business can service those trends. I am sure that many of you do the same.

As part of this year's analysis, I've referred to some of the many ECA Information Emails that we received over the last 12 months, as well as news and comments from other internet sources. One trend that seems to be growing is the number of community groups initiating court challenges against government approvals of seemingly controversial development or activity applications. The community action group is alive and well!

Some of the community challenges that were before the NSW Land and Environment Court in 2009, and which had an ecological basis for the challenge, included:

- Red Gum Forest Action Inc –v- Forests NSW.
- The Rivers SOS Alliance Inc –v- NSW Minister of Planning and Helensburgh Coal Pty Ltd.
- Newcastle and Hunter Valley Speleological Society –v- Upper Hunter Shire Council and Stoneco Pty Ltd.
- Peter Gray and Naomi Hodgson –v- Macquarie Generation.
- Caroon Coal Action Group –v- Coal Mines Australia Pty Ltd and NSW Minister for Mineral Resources.
- Blue Mountains Conservation Society –v- Delta Electricity.
- Nambucca Valley Conservation Association Inc –v- Nambucca Shire Council & Anor.
- Hastings Point Progress Association –v- Tweed Shire Council and Aeklig Pty Ltd.
- Hilltop Residents Action Group –v- NSW Minister of Planning and NSW Department of Sport and Recreation.
- Sweetwater Action Group Inc –v- NSW Minister for Planning and Huntlee Holdings Pty Ltd.
- Gwandalan Summerland Point Action Group –v- NSW Minister for Planning.
- Friends of Currawong –v- NSW Minister of Planning & Ors.

Some of these cases are ongoing, but there have been some major wins for the community (and the environment). For instance, the Hilltop Residents Action Group (HRAG) have, so far, stopped the proposed significant expansion of the Southern Highlands Shooting Range by demonstrating in the NSW Land & Environment Court that the use of high conservation- and recreational- (for bush walkers) value bushland surrounding the shooting range (including parts of the Bargo State Conservation Area) would not be an effective buffer zone for containing the potential effects of stray ammunition on wildlife and people.

So where am I leading this discussion? First, I believe that local community environment groups have become more knowledgeable about environmental and planning laws and thus are more prepared to challenge the legality of some government decisions associated with project approvals.

Secondly, a few proponents of projects seem to be using Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to justify large-scale developments or activities, either wholly or in part, in moderate to high conservation-value habitats. Some of these projects ultimately have potential of causing significant environmental harm, but there are political incentives for their approval because of their potential socio-economic benefits.

Thirdly, local natural history groups and other conservation-minded individuals know their “local patch” extremely well. Some ecological consultants have been “caught out” by not adequately sourcing these people for relevant ecological information and often by conducting inadequate field surveys when assessing potential impacts of development or activity proposals in these patches. This provides ammunition to community groups to legally challenge government approvals of projects that they believe will cause significant harm to their local

environment. While this is not a new phenomenon, it does seem to be more prevalent in the community, and ready exchange of information between community groups, planning of legal challenges, and publicizing of local environmental issues has been aided immensely in recent years through the use of the internet.

Finally, the NSW Parliament has passed special legislation at least twice this year that seemingly over-ride the state’s environmental and planning laws to allow specific events of “state- or regional-significance” to proceed. According to these legislations, NSW environmental and planning laws needed to be addressed by the proponents, but would not prevent the events from taking place.

The first piece of legislation was the *Homebush Motor Racing (Sydney 400) Act 2008*, which gave approval for the V8 Supercar Race to be held in Sydney Olympic Park on 4-6 December 2009. Although there was considerable community concern that this event was occurring in Sydney Olympic Park, there were no legal community challenges because the proponents demonstrated that there would be no significant impact of the race on nearby areas of high conservation value (e.g. Homebush Bay Wetlands) as a result of the event being confined to the Urban Precinct of the Park and an adequate environmental management plan.

The second piece of legislation was the *Motor Sports (World Rally Championship) Act 2009*, which gave approval for the Repco World Car Rally Event to be held every second year, between 2009 and at least 2017, in the Northern Rivers Area. Although much of the rally circuit was on public roads (e.g. sections of highway) and private roads on farmland properties, sections of the circuit passed through or along the boundaries of several national parks and state conservation areas. Community groups mounted a legal challenge in

the Australian Federal Court to this event on the grounds that it required approval from the Federal Minister for the Environment under the terms of the *Environment Protection and Biodiversity Conservation Act 1999*. The Federal Court dismissed the challenge on legal technicalities, rather than on the merits of the conservation arguments, and because of the lateness of the court challenge (the court hearing was only five days prior to the start of the rally event).

I personally believe that the ECA has a moral obligation to discourage the NSW Parliament or other Australian parliaments from passing future special-event legislation that weaken environmental and planning laws. This is an issue that I would like the ECA Council to explore in the coming year in consultation with the general membership.

### **2009/10 ECA Council**

The current ECA Council was elected by members at the last annual general meeting (4 September 2009). The elections marked the retirement of three active former council officers: Stefan Rose, Nick Skelton and Tom Grant, all of whom contributed significantly to the running of the ECA while on Council. Although it is unfair to single out one person, I will, on this occasion, single out Stefan for special mention because of the many active years he spent on the ECA Council, some of that time as 1<sup>st</sup> Vice President. Stefan brought a lot of wisdom to the table of the ECA Council, both from a philosophical and practical perspective, and is responsible largely for modernization of the ECA's website. I hope that Stefan, Nick and Tom consider nominating for a position on the ECA Council in the future (after a well-earned rest) because I believe all three still have a lot to offer.

Rebecca Hayes, Brendan Smith and Rhidian Harrington are new faces on the ECA Council. All three have already made significant contributions

to Council decisions over the last 4 months, as well as assuming major roles on council sub-committees: Rebecca is a member of the Accreditation Investigatory Sub-committee, and Brendan and Rhidian are members of the 2010 ECA Conference Organising Sub-committee. It is great to have "new blood" on the ECA Council, especially experienced ecological consultants, adding a mix of fresh ideas and energy to the melting pot of ECA management.

I would also like to thank the other members of Council who agreed to return for yet another year of decision-making and management. These are: Martin Denny, Judith Rawling, Ray Williams, Alison Hunt, Michael Murray, Mark Couston, Paul Burcher, Deryk Engel, Toby Lambert and Liz Norris. The rapid development of the ECA into a significant voice for professionals in the ecological industry in NSW over the last few years has been largely due to the time and effort that these people have put into running the organization. They draft ECA policies, write ECA position letters to government ministers and their departments and to local councils, organize workshops and conferences, attend meetings on behalf of the ECA membership, seek advice (e.g. legal advice) on behalf of the membership, look for (and implement) good professional deals for members, administer the ECA's finances, vet membership applications, and ensure that the ECA's day-to-day administration is on track. They are even called upon at short notice to write articles for *Consulting Ecology* if there is a shortage of material close to the publication deadline. Seldom do they let the side down!

### **Accreditation of Ecological Consultants**

Those who attended the ECA's 2009 annual general meeting voted overwhelmingly in favour of the ECA Council investigating the possibility of setting up a professional accreditation scheme for ECA members. The brief of the investigation is to investigate the feasibility of the ECA introducing

and administering an accreditation scheme, the legal implications of implementing such a scheme, and to propose potential models of accreditation for consideration by the ECA membership.

The ECA Council established a sub-committee at its October 2009 meeting to start the ball rolling. Members of the sub-committee are Martin Denny, Rebecca Hayes, Alison Hunt and Mark Couston. The sub-committee will report on the progress of its investigation at the February 2010 ECA Council meeting. The longer-term aim is to provide a discussion paper and a set of proposals for consideration by the general membership of the ECA at its 2010 annual general meeting.

If you have strong views on accreditation which you would like the Accreditation Sub-committee to take into consideration, then they should be sent in writing to Amy Rowles (ECA Administration Assistant) at [admin@ecansw.org.au](mailto:admin@ecansw.org.au).

### **ECA Workshops 2010**

The “Fauna Use of Tree Hollows” Workshop will be held at the Kioloa Field Station from 12-14 February 2010.

During this workshop, Dr Brad Law will be demonstrating the use of tree hollows by microchiropteran bats. The use of tree hollows by nocturnal birds and mammals will be demonstrated by Dr Rod Kavanagh, whereas I will be discussing the importance of tree hollows for diurnal bird species. Ray and Narawan Williams will be discussing nest box designs and their use by native animals. Narawan will also be demonstrating approved methods for climbing trees to inspect hollows. A herpetologist will also be demonstrating the value of tree hollows for amphibians and reptiles.

Many thanks to Ray Williams and Amy Rowles for their respective roles in organizing this

workshop. Initial registration responses have been encouraging and it is likely to be a very popular workshop.

At least one other workshop, “Identification of Rainforest Plants”, will be held in 2010. This workshop is being organized by Liz Norris and will be run by Gwen Harden. The timing of the workshop is dependent on Gwen’s availability this year, and members will be notified of a date and venue as soon as possible.

### **ECA Conference 2010**

**Conference Organising Committee:** Stephen Ambrose, Paul Burcher, Deryk Engel, Rhidian Harrington and Brendan Smith.

The theme of this year’s conference is “Assessment of Indirect Impacts”. If you have any ideas for conference presentations on this topic, then please email them to Amy Rowles [admin@ecansw.com.au](mailto:admin@ecansw.com.au) and she will forward them onto the organizing committee.

After a highly successful conference in Newcastle last September, this year’s conference will be held in Sydney in line with an earlier ECA Council decision to hold every alternate conference in Sydney. The exact location of the conference has yet to be decided, but is most likely to be at the Australian Museum or at the Rydalmere Campus of the University of Western Sydney.

A number of ECA members have requested that future conferences and annual general meetings be brought forward from September to sometime during the winter months. The valid argument here is that many consultants are especially busy with field work in spring/early summer and have difficulty finding the time to attend the conference. The ECA Council is currently investigating the possibility of doing this, but there are a number of other constraints that influence the timing of our conference. First, the

annual general meeting has to be held within three months of the end of the financial year (30 June 2010). Secondly, there are several ecological or other special-interest conferences in winter that many ECA members would also like to attend. Thirdly, we are limited by the availability of suitable conference venues. Finally, it usually takes a good six months to organize the conference program, advertise and administer the conference, and to organize subsidiary activities (e.g. books stalls). In summary, we will try our best to organize a winter conference this year, but there is no guarantee, so stay tuned for an update!

Last but not least, I hope you all had a great start to 2010, and I look forward to catching up with many of you throughout the year, especially at ECA events!

## PHOTO COMPETITION

*Congratulations! to Steven Sass* of Envirokey for winning the last photo competition with his photograph of the Australian Bustard, featured on the front cover.

Thank you to everyone who entered our photo competition. All entries have been included in the ECA Photo Gallery on the back cover.

*Email your favourite flora or fauna photo to [admin@ecansw.org.au](mailto:admin@ecansw.org.au) to enter a competition and have your photo on the cover of the next ECA newsletter. Win your choice of one year free membership or free entry into the next ECA annual conference. The winner will be selected by the ECA council. Runners up will be printed in the photo gallery.*

### **ECA 2009 Annual Conference: Ecology at the Rural / Urban Interface – 4<sup>th</sup> September 2009, Newcastle**

*Toby Lambert*

*RPS Harper Somers O'Sullivan*

*ECA Council Member*

As with every year, it was great to see a large and diverse attendance at the ECA Annual Conference. With a good mix of ecological consultants from around NSW and Australia, research scientists, academics and Government representatives, I hope that you agree that it was well worth attending. The Annual Conference is being given greater recognition by all of these groups and is seen as a great professional and personal development day.

Feedback was nearly entirely positive on the location, venue and important things like the view and food!

A particular thank you goes to all those who presented at the conference, of course without which the day would not have been so informative and diverse in views and topics. From Dr Michelle Leishman's issues raised in relation to the impacts Climate Change is already having on approaches to vegetation management and conservation, to our President Dr Stephen Ambrose's discussion on the impacts of highway widening on threatened woodland birds, all did a great job of keeping us awake and informed (or should that be alert and alarmed!).

Everyone learned something extra about the integral relationship between various fire management approaches and the resulting impacts that this can have on natural resource management. Thanks to our Victorian colleagues Duncan Maughan and Dr Alan York for informative takes on these topics, which many of



us need to consider on a regular basis in our line of work.

Management issues in relation to Endangered Ecological Communities were presented by Dr Linda Broadhurst and Greg Elks, with Linda raising some pertinent issues that we all could integrate into our way of thinking and Greg highlighting the contradictions of EEC management in a local government framework.

A presentation on BioBanking and Accreditation was always bound to stir up opinions and we were not disappointed in that regard, thanks to our ex-President Danny Wotherspoon! We gained a great insight into the substantial efforts that community advocacy groups invest in keeping everyone honest and achieving great conservation outcomes for future generations, thanks to Michael Osbourne.

David Russell gave everyone a greater understanding of the practicalities of the Native Vegetation Act 2003 and unravelled some of its mysteries with a sometimes rare honesty from Government representatives. Peggy O'Donnell opened people's eyes to the ingenuity required in developing more successful aquatic survey methodologies and some of the amusing issues encountered when trailblazing!

Thanks to those who made it to the AGM, there were some important resolutions reached in relation to issues including pursuing an accreditation system for ecological consultants in NSW under the banner of the ECA. The new ECA Council was also identified, including many new members willing to put their hand up to assist our development as a group of professional.

A final and most important thanks to those on the Conference Committee who I worked with, who invested significant personal and professional time into putting the conference together, including Michael Murray, Stefan Rose, Ray

Williams, Alison Hunt and to those who couldn't help themselves including the Prez and Amy Rowles and the entire ECA Council for input and advice when required. Also thanks to the session chair volunteers for introducing the speakers.

The ECA Council sees the Annual Conference as an integral part of our yearly calendar and thanks everyone for their support, interest and attendance. We always appreciate your feedback and will take on board comments to keep on improving the conferences as much as possible in relation to issues such as timing, topics and locations etc. Please contact a Councillor if you have any suggestions in this regard.

Most importantly I hope you came away from the day having learnt something that you could put into practice, thought about the implications of issues such as Climate change, caught up with old friends and enjoyed your time in Newcastle. The ECA Conference dinner at Newcastle Customs House the night before was also thoroughly enjoyed by all and I would encourage all to make time to attend these dinners in the future!



**Plate 1: Presentation being given at the conference. Photo courtesy of Toby Lambert.**

**Please Note:**

**The ECA Administration Postal  
Address has changed to  
Amy Rowles (ECA Administration)  
39 Platt Street  
Waratah, NSW 2298**



# EUROKY

**Euroky: ability of an organism to adapt to changes in the environment**

*If you have any interesting observations or useful hints and information that you would like to share in the euroky column, please forward them to the newsletter editor or administration assistant to be included in the next edition.*

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## **Mangroves a Hotspot for Threatened Microbats in the Hunter!**

Anna McConville

Masters of Philosophy (Env Sc) Candidate

*"The Ecology of the East Coast Freetail Bat (Mormopterus norfolkensis)"*

The University of Newcastle

annamac\_80@hotmail.com

Old stands of mangroves in the Hunter Estuary have been recently found to support a high abundance of microbats, including the discovery of maternity colonies of a number of threatened species listed under NSW TSC Act. A total of three threatened bat species listed under TSC Act 1995 have been captured from the mangroves to date including *Scoteanax rueppellii* (Greater Broad-nosed Bat), *Mormopterus norfolkensis* (East Coast Freetail Bat) and *Myotis adversus* (Large-footed Myotis). Additionally, seven other microbat species have been recorded from the site.

Particularly exciting is the use of mangroves as maternity colonies for *Scoteanax rueppellii* and *Mormopterus norfolkensis*, which are two threatened species that are not often captured. Radio-tracking of these bats by The University of Newcastle and Dr Brad Law from Industry and Investment NSW has revealed that whilst they are



**Plate 1. Mangrove Forest**

roosting and occasionally foraging in the mangroves, they also regularly travel distances of up to 8km to the western Newcastle LGA to forage. These stands of old mangroves contain numerous hollows and appear to be an important resource for microbats in the Newcastle and Hunter Region. Of particular note is that captures of *Mormopterus norfolkensis* was in the hundreds, yet it is rarely captured in traditional surveys.



So next time you are thinking of mangroves, think bats!

**Plate 2 and 3. *Mormopterus norfolkensis* roost trees.**



## **Interesting Ventures of a Wildlife Rescuer / Carer in Port Stephens.**

*Anne Williams  
NATF Wildlife Carer*

### **The Hunt for a Mysterious Reptile**

Early one morning we got an urgent call from an English lady that there was an injured “big lizard” by the side of the road coming into Medowie. We were sure that it was going to be just a Blue-tongue lizard or a Bearded dragon which would be a ‘big lizard’ compared to what they have in Britain. She said she had put a piece of cardboard over it to keep the sun off it. But as her mobile phone kept cutting off we could not find out which road into Medowie she was travelling on, but she did mention road-works. We did not know of any road-works going on around Medowie that week, so we went south, then west and then finally north and west and at last we found road works.

We had brought with us a reasonably large bag and a large towel to throw over the big lizard to help handle it. As we drove along Medowie road we spotted a extremely large 6 foot goanna standing on the side of the road with a huge flattened cardboard carton near it. I very carefully walked towards it thinking “I wish we had brought a large catching net with us”!

It still didn’t move as I approached. I then noticed a lot of flies buzzing around it and it was covered in ants as well. It was dead as a doornail, and had been for days. In the warm weather it had enlarged, so that it was standing up in a very alive looking pose. When we saw the size of it we were very surprised that the woman had been brave enough to get that close to put the cardboard over ‘the live goanna’.

\*\*\*\*\*

## **Suburban Flying-fox Breeding Site**

Another interesting call came from a teacher living near the centre of Maitland, N.S.W. She has lived in her two-storey heritage house on a triple block for the last 12 years. The garden is full of very large old trees including a large native fig, a jacaranda, a silky oak and a pepper tree. There are also four very tall palm trees where a colony of around forty Flying-foxes have been observed roosting on and off during the previous years. She explained that this year however there were around one hundred bats.

We visited her garden a couple of days later and while just looking at the fig tree, estimated about 700 bats including Grey-headed and Little Red Flying-foxes. Previously there had apparently only been Grey-headed Flying-foxes. We returned a couple of nights later to watch them fly out at dusk and counted approximately 2,000 bats – one third Grey-headed and the rest Little Red Flying-foxes.

About three weeks later the Little Reds had left the roost site and only approximately 300 Grey-headed Flying-foxes remained. These appeared to be mothers with young, whereas when we counted the fly-out previously there were males, females and young animals.

We found this event to be very interesting and will follow up on this site regularly to keep track of this satellite group in the middle of suburbia.



## *In Memory*

### **VALE EMMA GEORGINA DENNY**

Emma Denny, the 34-year-old daughter of Martin and Elizabeth (Liz) Denny, passed away in December 2009 after a life-long battle with chronic kidney disease.

Emma lived life to the fullest, despite long periods in hospital, and was a passionate and competent ornithologist and herpetologist, and an active and committed animal-carer with WIRES (Wildlife Information and Rescue Service).

Emma's funeral service was held at St Peter's Anglican Church at Watson Bay on 23 December 2009. At the service, Martin mentioned that Emma's passion for bird-watching and caring for sick and injured birds was so great, that from now on there will be part of her in every bird he sees. What a beautiful thought.

Martin is a Past-President of the ECA and is currently the 1<sup>st</sup> Vice-President. Liz is a former ECA Councillor. I will never forget an occasion in 2005 when both Martin and Liz asked me to consider nomination for Presidency of the ECA. At the time I declined politely on the grounds that my wife, Michele, was unwell and was spending long periods in hospital. I felt that I could not devote enough time to the position (if elected) because of the care that I wanted to give to Michele. I was amazed at the instant empathy exhibited by Martin and Liz upon explaining my situation. Little did I know at the time that their daughter was also unwell and required regular hospital care. Such is their humility, Martin and Liz never explained their empathy. That year, Elizabeth Ashby was voted in as ECA President, a position that she held competently for 20 months.

On behalf of all of the rest of ECA Membership, I would like to express our sincerest condolences to Martin and Liz for the untimely loss of their daughter. May each bird remind everyone of us about Emma's special life.

### **Postscript**

The ECA Council has agreed to donate \$500 of the ECA's funds to the Renal Research Trust Fund at St Vincent's Hospital, Sydney in memory of Emma, and as a tribute to Martin's and Liz's countless hours of volunteer work in helping to run the ECA over the last 11 years. Many ECA Councillors have also pledged to make a donation to this trust fund.

If you wish to make a similar donation, then a cheque or money order made out to "St Vincent's Hospital" can be sent to the following address:

ATTENTION: MR BILL ATTIWELL  
Fundraising Department,  
St Vincent's Hospital,  
Level 3,  
deLacy Building,  
Reply Paid 66643  
Darlinghurst NSW 1300

It is important to indicate in the covering letter that the donation is for the Renal Research Trust Fund in memory of former patient Emma Georgina Denny.

*Stephen Ambrose*  
*2 January 2010*

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### **DR SURREY WILFRID LAURENCE JACOBS 1946-2009**

Dr Surrey Jacobs was never happier than when he was waist-deep in water, collecting an interesting waterlily or standing in red dust collecting and photographing an inland spinifex grass.

He was an outstanding Australian botanist, well-known in botanical circles around the world for his research on grasses, chenopods and waterplants. Locally, he was also well-respected



by those involved in understanding and managing plants in wetlands and grasslands. Fieldwork was a major part of his life and work: he would not have achieved his deep understanding of plants without the extensive fieldwork that he did in all parts of Australia.

Growing up in Sydney, Surrey dreamt of becoming a farmer, and he studied Agricultural Science at the University of Sydney as the first step in that direction. However, he developed more interest in plants themselves, and moved sideways into an ecological project for his PhD, on *"Ecological studies on the genera Triodia and Plectrachne in Australia"*, after doing a systematics Honours project on these grasses. He joined the NSW Royal Botanical Gardens staff as a systematic botanist in 1971 and has worked there ever since, being promoted to the highest level in the NSW Research Scientist scale – Senior Principal Research Scientist.



**Surrey Jacobs.** Photo courtesy of Jaime Plaza  
(Royal Botanic Gardens and Domain Trust)

Besides his extensive systematics studies, he supervised several postgraduate students on conservation and agricultural-oriented projects. He was also at ease conversing with and working with anyone with a common interest in plants: whether it was a phylogenetic botanist or wetland manager or property owner.

Surrey maintained his initial interest in grasses, but also researched the classification, naming and relationships of chenopods (saltbushes and similar species in drier parts of Australia), waterplants and weeds. His greatest impact was probably in waterplants, which were relatively poorly understood before he started his research. He received the T. Wayne Miller Distinguished Service Award from the international Aquatic Plant Management Society in 2009, only the third recipient of that award. Surrey has also received a Public Service Medal in the 2010 Australia Day Honours list, in recognition of his outstanding career.

Surrey was one of the Botanic Gardens' most productive botanists. He authored over 120 scientific publications, often in collaboration with colleagues here and overseas, and these form a major contribution to our knowledge of the world's plant diversity. He named over 80 previously unnamed Australian plant genera and species. He was involved in several major international collaborative projects in the last decade or so, and some results remain to be published by his collaborators.

He was also very conscious of the need to make research results available to the wider community. So, for example, he often advised on wetland plant management, and provided forensic advice on plants connected with police investigations. He was author or co-author of over 60 extension-oriented publications, including a range of semi-popular books and booklets such as *"Waterplants of NSW"*, *"Waterplants in Australia"*, *"Grasses of NSW"*, *"Australian Agricultural Botany"*

and *"Burnum Burnum's Wild Things"*. Many of these were written with Geoff Sainty, another local waterplant expert, and another excellent photographer of plants. Both thought nothing of standing in water or lying on a wet bank, ignoring leeches and other bitey things in pursuit of a good close-up of a flower, but both drew the line in the last few years at wading in tropical regions: considering the crocs were getting too big and too numerous.

The state of Surrey's office and his usually rather casual dress misled some people initially, but they soon learned that he was extremely organised in his work, and both practical and knowledgeable. He had an enquiring mind and a good memory, and he was thorough – all good traits for anyone, but particularly important for a systematics botanist.

He demonstrated time and again his commonsense approach to innumerable matters, and showed generosity and patience in imparting his knowledge to others, in fields as varied as photography, laboratories, statistical analysis, and fieldwork. He was a very thorough, careful worker in the field – and he had a reputation amongst his colleagues as an excellent camp-cook. He was a mentor and advisor to many younger staff and students, and was also an excellent listener for those with personal issues.

Surrey was the second child and only son of Wilfrid Jacobs, an industrial chemist at the Federal Match Company in Sydney (ultimately Works Manager there), and Viola née Sundstrom. His grandfather Ernest Godfried Jacobs taught botany at Sydney Technical College early last century and provided a botanical model for Surrey and also his older sister Janice (now retired), who had a long botanical career in the School of Biological Sciences at the University of Sydney. His younger sister Wendy Innes has kept a link with plants in running a family nursery and blueberry business.

Surrey met his future wife Betty Luscombe while tutoring at the university during his PhD period. Betty graduated as a science teacher, and they married in 1971. She became the first Education Officer at the Royal Botanic Gardens Sydney soon after Surrey joined the staff as a botanist, but left some years later to have their two children, Ellen and Geoffrey.

Surrey was very lucky in his choice of life partner: he couldn't have achieved nearly so much without the support of Betty. In particular, they have been very welcoming hosts to many botanical visitors from all parts of the world.

Botany may have been Surrey's passion, but he was also a very loving family man, despite what his family may have thought sometimes, given his many field trips and long days at work. He named previously unknown species of grasses and waterplants after Betty, Ellen, Geoff, and Ellen's sons Alex and Luke Fussell.

Surrey relaxed by collecting model trains and cars, and making jams of many kinds, mostly given away to friends and colleagues. He was the jam-maker, but the jams were labelled as *"Mrs Jacobs' Jams and Jellies"* – as Surrey said, *"Dr Jacobs' Jams and Jellies"* didn't have quite the right ring.

He sublimated his agricultural interests by breeding chooks at the back of their suburban quarter-acre block: bantams, silkies, Light Sussex (also known as Surreys), Speckled Sussex and others. Family and friends were regularly supplied with fresh eggs of various sizes.

Surrey was a larger than life character in many ways, but he was also a self-deprecating man, who did not seem to realise what he had achieved. He once said that he had been in awe of his predecessor Dr Joyce Vickery for her extensive research on grasses. His successors will be equally in awe of Surrey. He has a permanent memorial in his botanical publications and in the plant species named by him and after him.

His going leaves a great hole in botanical expertise, both nationally and internationally, especially in waterplants, grasses, chenopods and weeds. His broad interests in "plant matters" led to him being involved in many wetlands and catchment advisory committees in NSW and elsewhere.

The National Herbarium will be publishing a special issue of the systematics journal *Telopea* in Surrey's honour next year. It will include scientific papers by about 30 of his colleagues - a fitting acknowledgement of an Australian botanist who has made an outstanding contribution to knowledge of the systematics, phylogeny and ecology of the world's waterplants, grasses and chenopods.

He is survived by his wife Betty, children Ellen and Geoff, and grandchildren Alex and Luke.

*Karen L. Wilson  
Special Botanist  
National Herbarium of NSW*

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## **VALE CHARLES BIRCH 1918 – 2009**

### **A man of science and religion**

*By Malcolm Brown  
Taken from the Sydney Morning Herald (23<sup>rd</sup>  
December, 2009)*

#### **1918-2009, Charles Birch**

Charles Birch started out as an agricultural scientist, switched to biology and ecology and soon confronted questions that were to occupy him for the rest of his life: where humankind was really going, preoccupied as it was with its eternal conflicts and relentless pursuit of wealth. The world could not sustain this forever and he believed progress could only be made when spiritual values were married to the empirical world he probed as a scientist.

These were fundamental questions, he believed, which had to be asked in a century which saw 2 billion people on the planet and 6 billion, and counting, at the end of it, where resources obviously were finite, the global ecology was being rapidly depleted and the harmony that Christianity preached appeared further from reach than ever.

Birch's quest for answers took him into academia. For 25 years he was Challis Professor of Biology at the University of Sydney and had visiting professorships in Sao Paulo, Brazil, Minnesota and California. His strong advocacy of social responsibility for the World Council of Churches earned him the Templeton Prize in 1990 for science and religion.

Louis Charles Birch was born in Melbourne on February 8, 1918, the son of Harry Birch, a New Zealand-born bank manager with the ES&A Bank, and his Irish-born wife, Nora. He had a twin brother, Sidney, and an older brother, Hugh. Birch attended Scotch College, Melbourne, and graduated in agriculture at the University of Melbourne in 1939.

From there he went to the Waite Agricultural Research Institute at the University of Adelaide, working for six years under the supervision of Dr Herbert Andrewartha, who had a great influence on him, teaching him "to think" and to discover "the social responsibility of the scientist", as Birch expressed it. "In view of the enormous transformation of the modern world as a result of science and technology, the scientist is responsible for much that has happened both good and bad. This understanding is based on the premise that science is not value free."

In 1941, Birch took a master of science degree at the University of Adelaide then National Service, working on projects such as preserving the stockpile of wheat, which could not be exported and was in danger of rotting. His brother Hugh



went off to pilot flying boats for the RAAF over the English Channel but Charles, though knowing Hitler had to be stopped, had a strong aversion for war, making him virtually a pacifist.

At war's end, drawn to teaching and students, he decided on a change of direction and took the opportunity of a research fellowship at the University of Chicago in 1946 to study biology. He had also had his interest in religion enriched by his association with the Student Christian Movement, which moved him away from the rather rigid evangelical outlook of Anglican Melbourne to a more questioning, liberal view of the faith.

In 1947 he studied animal population dynamics at Oxford University and in 1948 joined the staff of the University of Sydney as a senior lecturer in zoology. Serving also as vice-master of the university's Wesley College, he progressed through the academic ranks to his appointment as Challis Professor of Biology in 1958.

When the renowned anthropologist Margaret Mead told the World Council of Churches it should have a program on science, technology and the future, Birch was invited to become part of it. He remained in the program for 20 years. For 13 years he was the council's vice-moderator, church and society. Birch met many of the world's great thinkers in population and genetics, including Paul Ehrlich. For years he was prominent in the Zero Population Growth movement, which attracted widespread support in Australia.

When the Vietnam War started in earnest in 1965, Birch was at the forefront of opposition, addressing huge meetings on the front lawn of Sydney University. He risked arrest through his membership of Committee on Conscience, which supported and gave free legal advice to conscientious objectors. "When that became public I received hundreds of telegrams of

support from trade unions throughout Australia," he said later.

For 10 years Birch was active in the Wayside Chapel, which had been developed by the Reverend Ted Noffs into a community forum for people who were normally at the fringes of society. He participated in Friday night discussion groups and on Sunday nights at Question Time. Birch, answering a question on world overpopulation, said that one solution would be for each person to try to eat another. One of the fringe-dwellers called out: "Well, I'll have you!" Noffs's enlightened policies were seen to work. A crisis centre at the chapel was manned not by detached professionals but by people who had been through crises themselves.

Birch's Templeton Prize was one of a host of awards. He enjoyed fellowship of the Australian Academy of Science, the Club of Rome and the American Association for the Advancement of Science. He had nine books and 150 papers published, the former including *The Distribution and Abundance of Animals* with H.G. Andrewartha (1954), *Nature and God* (1965); *Genetics and the Quality of Life* (1975); *The Liberation of Life: From Cell to the Community* (1981); *On Purpose* (1984); *Regaining Compassion: for Humanity and Nature* (1993) and his last book, *Science & Soul*, published last year.

An underlying theme of these books was process thought, as understood by A.N. Whitehead, Charles Hartshorne and John Cobb. He was to the end a quiet, wistful, far-sighted man whose ideas and outlook are likely to be even more relevant as the decades progress.

Charles Birch never married. He is survived by his twin, Sidney, and sister-in-law, Jenny. A private funeral was held yesterday and a memorial service is being planned for early in the new year.

# *Aquatic and Riparian Ecology*

*Newsletter Theme: Each edition of Consulting Ecology will include a collection of articles on a similar topic, creating a newsletter theme.*

*The theme for August 2010 is TREE HOLLOW'S. If you have knowledge and expertise in this area we encourage you to contribute to the next edition of Consulting Ecology. The theme is intended to cover a range of topics, ranging from the effect of hollows on the health of a tree, the process of hollow formation to fauna use of hollows.*

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## **Tides of Change: Factors to Consider in Assessing Development or Activity Impacts on Waterbirds and Their Habitats**

*Dr Stephen Ambrose  
Ambrose Ecological Services Pty Ltd  
ECA President*

*Dr Stephen Ambrose has over 30 years experience as a professional ornithologist and is the Principal Ecologist of Ambrose Ecological Services Pty Ltd. He was motivated to write this article after encountering a significant number of consultancy reports which inadequately assessed the impacts of proposed developments and activities on the status of waterbirds and their habitats.*

### **1. PREAMBLE**

Ecological consultants are sometimes asked to assess the ecological values of wetlands and predict the impacts of proposed activities or

developments on them. One of many measures of the conservation importance of a wetland is an assessment of its value as habitat for waterbirds, i.e. waterfowl (ducks and swans), gallinules (crakes, rails and bitterns), herons, egrets & allies, cormorants and pelicans, terns and gulls, and migratory, nomadic and resident shorebirds.

Everyone knows that the use of wetlands by waterbirds varies considerably throughout the year and between years. For instance, most migratory shorebirds are usually present in Australia from late August/early September to late March/early April, with only some first-year (immature) birds over-wintering here. Moreover, some wetlands may be important refuges for waterbirds in drought or flood years, but not at other times.

Ecological consultants seldom have the luxury of being able to conduct seasonal and yearly surveys of wetlands when assessing potential impacts of a development or activity on the status of waterbird populations. Therefore, we rely on the results of other studies (research projects, wildlife databases, reports of other consultants, first-hand knowledge of the local community, etc.) and our own knowledge of the habitat requirements of each species to determine the value of the wetlands as waterbird habitat. Sadly, this desk-top information is often not comprehensive enough for consultants to conduct a waterbird impact assessment either confidently or accurately.

If wetlands or nearby habitats are under the influence of a tidal cycle, then the abundances and types of waterbird species on the wetland will be influenced by that cycle. For instance, low tides may result in exposed mud- or sand-flats in the wetland or nearby areas, and thus attract large numbers of shorebirds that forage on benthic invertebrates. If some mud- or sand-flats are still exposed at high tide, then shorebirds may congregate there in denser numbers to roost, but will disperse to other areas if all suitable roosting sites are inundated by the tidal waters. However, high tides may suit other species, e.g. diving ducks, cormorants and pelicans which prefer deeper waters for foraging.

There may even be a 24hr (circadian) cycle of abundance of waterbird populations on wetlands that are not under a tidal influence. For instance, a wetland may not be particularly resourceful foraging habitat for some waterfowl species, but provides valuable roosting habitat at night because of the protection it provides from potential predators and other disturbances. In my experience, this is seldom considered by ecological consultants when evaluating the value of wetlands as waterbird habitat.

## **2. CASE STUDY: THE WATERBIRD REFUGE, BICENTENNIAL PARK, HOMEBUSH BAY**

### **2.1 Background**

The wetlands in Sydney Olympic and Bicentennial Parks that are part of the Homebush Bay Wetlands (Ermington Bay/Mudflats, Meadowbank Foreshore, Yarralla Bay, Majors Bay, Haslems Creek, Mason Park and Lower Duck River) are among some of the most important coastal wetlands in NSW. The saltmarsh communities are the second largest in the Sydney area, after Towra Point Nature Reserve in Botany Bay and are important as waterbird habitat. They are particularly important as an essential link to remaining wetlands in the Sydney area and as part of the NSW coastal

corridor used by waterbird species. The saltmarsh, intertidal wetlands and freshwater swamps provide a unique combination of habitats which are of special significance to wader species, of which about two-thirds are migratory shorebirds that are protected under international migratory shorebird agreements and the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act).

The wetlands within the Newington Nature Reserve and Bicentennial Park, the Northern Water Feature and the tiny wetland at Mason Park (immediately south of Sydney Olympic Park) are linked by a wetland corridor of tidal mudflats (the Waterbird Refuge, Homebush Bay and nearby areas of Parramatta River) and mangrove forests (e.g. Badu Mangroves and Haslams Creek) to form a unique wetland system that is integral for the maintenance of shorebird and waterbird populations in coastal NSW.

The Homebush Bay Wetlands are listed on the NSW Register of the National Estate as Wetlands of National Importance. There are several ornithological reasons for this listing. The remnant wetlands of the Upper Parramatta River provide habitat for over 140 species of birds and have been ranked sixth in importance for waders in NSW. They are significant for migratory shorebirds, providing habitat for at least 27 nationally-listed bird species under the EPBC Act. This list includes bird species which are listed under the *Japan-Australia Migratory Bird Agreement, 1974* (JAMBA), *China-Australia Migratory Bird Agreement, 1986* (CAMBA) and the *Republic of Korea-Australia Migratory Bird Agreement, 2007* (ROKAMBA). Two species which occur there, the Little Tern (*Sterna albifrons*) and Black-tailed Godwit (*Limosa limosa*) are listed as threatened under the schedules of the TSC Act. The remnant wetlands area also supports one of the two Sydney colonies of the White-fronted Chat (*Ephthianura albifrons*) and provides habitat



or one of the largest populations of Chestnut Teal (*Anas castanea*) in NSW.

The V8 Telstra 500 Supercar Race Event was held at Sydney Olympic Park from 4-6 December 2009 (inclusive). Although the race event was not visible from the Waterbird Refuge (the closest wetland of national importance to the race circuit), it was nevertheless only 355 metres from the nearest part of the circuit. Therefore, there was a need to monitor use of the Waterbird Refuge by waterbirds before, during and after the race event to determine if there were significant impacts from noise or other disturbances. It also provided an opportunity to demonstrate the importance of this wetland to waterbirds in relation to the Parramatta River's tidal cycle and to diurnal/nocturnal cycles.

## 2.2 Survey Methods

A comprehensive dataset of bird abundance at the Waterbird Refuge and nearby wetlands has been maintained by the Sydney Olympic Park Authority for over 10 years. These data were used to establish the long-term conservation value of the Waterbird Refuge as waterbird habitat.

In predicting potential impacts of the V8 race event, bird surveys were conducted at the Waterbird Refuge throughout the day and early evening on 11-13 December 2008 and during two relatively noisy events: "The Big Day Out Concert" (23 January 2009) in the Urban Precinct of Sydney Olympic Park and the Australia Day Picnic Celebrations in Bicentennial Park (26 January 2009). These events did not significantly impact on the use of the Waterbird Refuge by waterbirds. Noise modelling conducted by Heggies Acoustical Consultants Pty Ltd predicted that the noise levels at the Waterbird Refuge produced by V8 race event would not be higher than those produced by the Big Day Out Concert, Australia Day Picnic Celebrations, background traffic on nearby busy roads, or the frequent aircraft that flew low over or near the Waterbird

Refuge. Therefore, it was concluded that the V8 race event would not impact on the use of the Waterbird Refuge by waterbirds. However, a bird monitoring program was recommended at and around the time of the event to test the accuracy of this prediction.

In testing the impact prediction, the abundances and behaviours of waterbird populations were surveyed at the Waterbird Refuge on 3 December 2009 (the day before the start of the race event), 4-6 December 2009 (during the three-day race event) and on 7 December 2009 (the day after the race event) to determine if the race event caused significant disturbances to waterbird and populations. Ideally, there should have been three survey days in both the pre- and post-race periods (equalling the survey period during the race event), which would have provided a measure of daily variation in species richness and abundance for those times, but the race organisers decided to limit pre- and post-race surveys to single days to maximise cost-effectiveness of the assessment of impacts.

Surveys of between 11 and 28 minutes (depending on the numbers of waterbirds on the wetland) were conducted at hourly intervals between:

- ❑ 0912-2010 hrs on 3 December 2009;
- ❑ 0500-0627 hrs and 1107-2122 hrs on 4 December 2009;
- ❑ 0502-0523 hrs, 1007-2013 hrs and 2200-2221 hrs on 5 December 2009;
- ❑ 0500-0518 hrs, 0958-2016 hrs and 2300-2321 hrs on 6 December 2009; and
- ❑ 0500-0518 hrs, 1000-2018 hrs on 7 December 2009 and 0000-0019 hrs on 8 December 2009.

Water levels at Homebush Bay are affected by the tidal cycle in Sydney Harbour. Although the Waterbird Refuge is land-locked, flood gates at the entrance of a man-made channel directs water from the Parramatta River into the wetland each morning in summer to prevent eutrophication. The numbers of shorebirds at the Waterbird

Refuge are highest after dark, when birds come into roost, and when the Parramatta River experiences its high tide. The tidal cycle at Sydney Harbour during the survey period is shown in Table 1. The numbers of Chestnut and Grey Teals on the Waterbird Refuge are also highest at night when these species come in to roost.

The bird surveys that were conducted each day at the Waterbird Refuge included high tide times after dark, when daily maximum numbers of waterbirds and shorebirds occurred there, as well as other times of the day and night that were associated with the changing tide cycle.

All surveys of waterbirds were conducted from the public bird hide at the Waterbird Refuge to minimise disturbances to the birds. All observations were made with a Kowa TSN-821M scope with a 20-60X zoom lens and 8x30 mm Leica binoculars. Moonlight during the night-time surveys was bright enough to identify most bird species from their silhouettes.

The abundance and general distribution of each species on the wetland were recorded during each count. Obvious signs of disturbance to the behaviour of birds (e.g. alarm displays, displacement of birds from their usual foraging and roosting habitats, flight responses) were also recorded during and (when possible) between each count.

### **2.3 Richness and Abundance of Birds**

The richness and abundance of bird species at the Waterbird Refuge during each count before, during and after the race event are shown in Tables 2, 3 to 5 and 6 (respectively).

Sixteen waterbird species were recorded on race event days, compared with 14 and 15 species in the pre- and post-race survey periods. Therefore, the race event did not reduce the number of waterbird species occurring at the Waterbird Refuge. The most abundant species recorded

during the surveys were Chestnut Teals, Grey Teals, Black-winged Stilts, Bar-tailed Godwits and Sharp-tailed Sandpipers.

The pattern of abundance of waterbirds on the wetland during the race event was similar to the day beforehand, with numbers lowest in the middle of the day and highest after dark when birds came in to roost (Figure 1). A similar pattern was also observed on the day after the event (7 December), except early in the afternoon when there were significant increases in numbers of Chestnut and Grey Teals (Figure 2) and Black-winged Stilts (Figure 3). The mid-day increases on the 7 December 2009 resulted from teals and stilts being flushed accidentally from nearby Triangle Pond by two bird-watchers and them settling subsequently at the Waterbird Refuge.

The total numbers of Chestnut and Grey Teals recorded roosting at the Waterbird Refuge at night on 3 December (the night before the race event) (244 individuals) was substantially lower than the abundances on other nights: 366 individuals (on 4 December) to 392 individuals (5 December). Therefore, it is possible that some individuals of these species used the Waterbird Refuge in preference to other wetlands in Sydney Olympic Park on race days.

Bar-tailed Godwits arrived at the Waterbird Refuge to roost each night after dark, about one hour before high tide (Figure 4). The numbers of roosting Bar-tailed Godwits recorded at the Waterbird Refuge ranged from 200 individuals on 3 December to 226 individuals on 5 December. Therefore, the race event did not significantly impact on the use of the Waterbird Refuge by Bar-tailed Godwits as a nocturnal roost site.

Sharp-tailed Sandpipers and Curlew Sandpipers also arrived at the Waterbird Refuge to roost each night after dark, about one hour before high tide. These species often arrived together and within minutes of the arrival times of the Bar-tailed

Godwits. There was no significant variation in the maximum numbers of Sharp-tailed/Curlew Sandpipers recorded during the survey period (40 on 7 December to 56 individuals on 6 December)

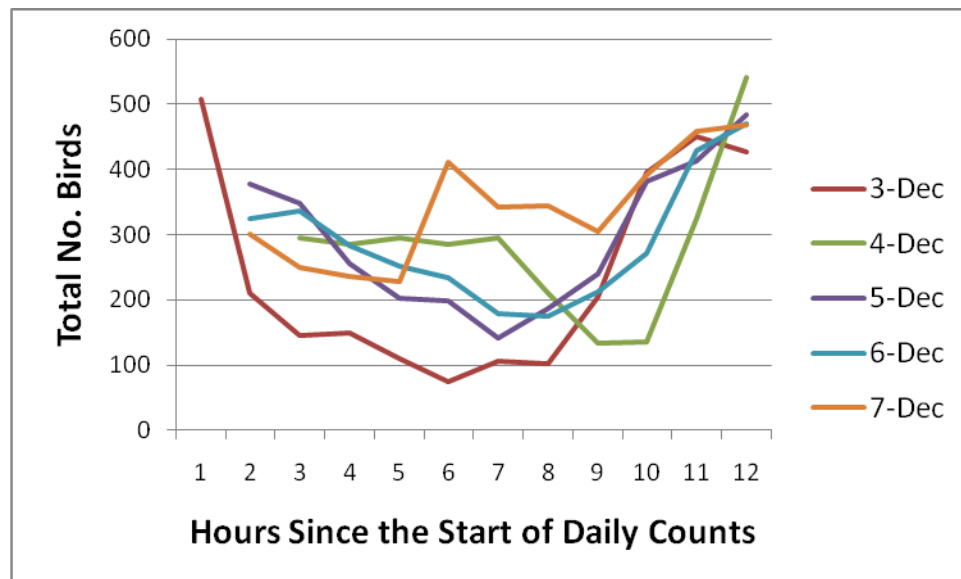
(Figure 5). Therefore, the race event did not significantly impact on the use of the Waterbird Refuge by Sharp-tailed/Curlew Sandpipers as a nocturnal roost site.

**Table 1 TIDAL LEVELS FOR SYDNEY HARBOUR (FORT DENISON) FROM 2-7 DECEMBER 2009 (Source: Australian Bureau of Meteorology)**

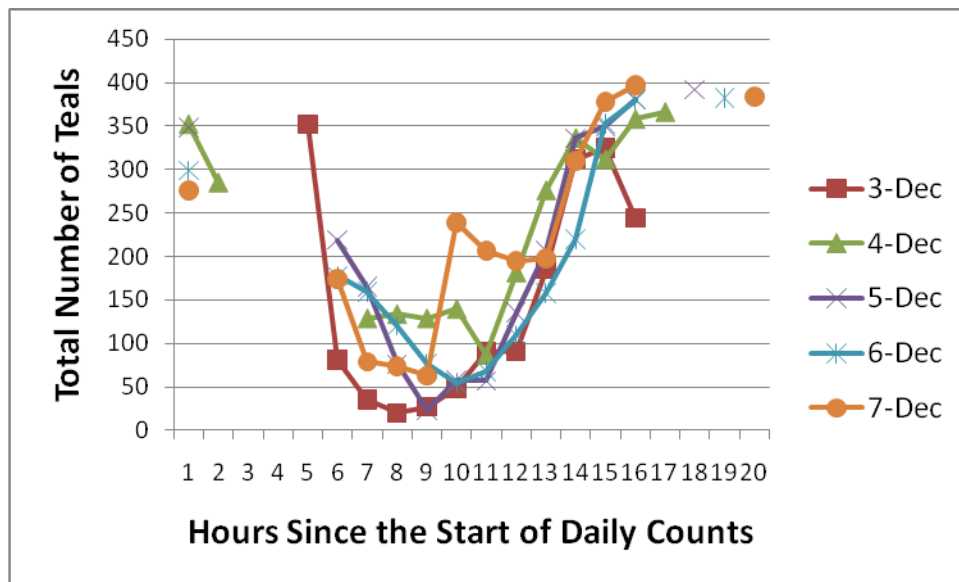
**Blue Font** (2<sup>nd</sup> and 4<sup>th</sup> row): High tide  
**Red Font** (1<sup>st</sup> and 3<sup>rd</sup> row): Low tide

Wednesday 2 December		Thursday 3 December		Friday, 4 December		Saturday 5 December		Sunday 6 December		Monday 7 December	
Time	Height (m)	Time	Height (m)	Time	Height (m)	Time	Height (m)	Time	Height (m)	Time	Height (m)
0107	0.40	0154	0.39	0243	0.39	0336	0.41	0431	0.44	0531	0.48
0740	1.88	0828	1.94	0917	1.97	1008	1.95	1100	1.88	1155	1.78
1422	0.22	1511	0.17	1601	0.15	1655	0.17	1748	0.20	1843	0.26
2017	1.35	2110	1.35	2202	1.35	2258	1.34	2354	1.33		

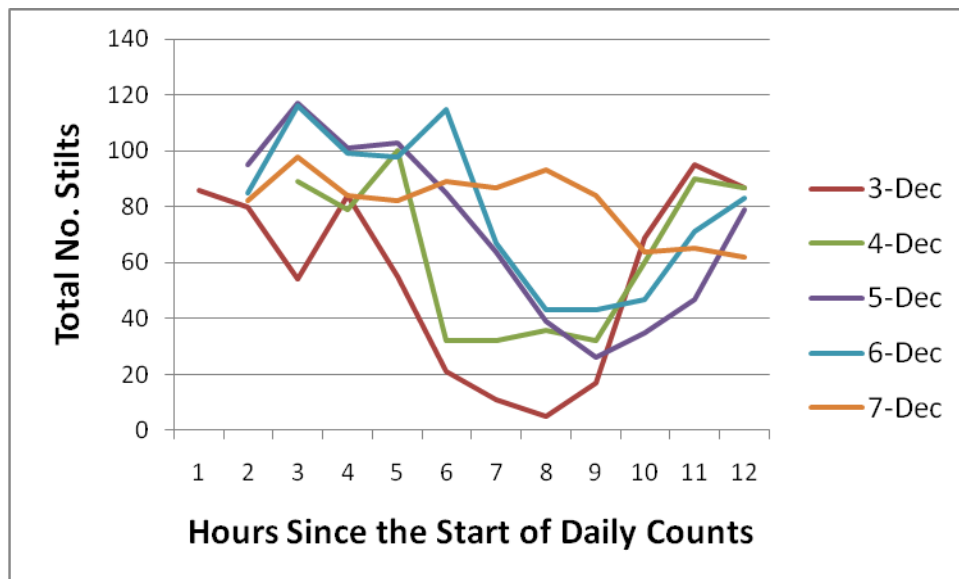
**Figure 1 TOTAL NUMBERS OF BIRDS COUNTED AT THE WATERBIRD REFUGE ON EACH SURVEY DAY**



**Figure 2** TOTAL NUMBERS OF TEAL COUNTED AT THE WATERBIRD REFUGE ON EACH SURVEY DAY

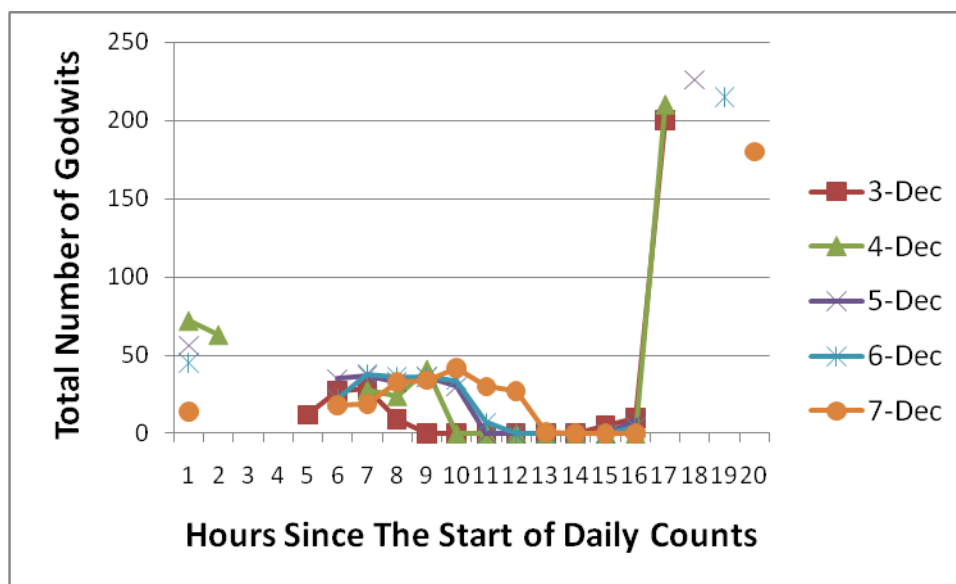


**Figure 3** TOTAL NUMBERS OF BLACK-WINGED STILTS RECORDED AT THE WATERBIRD REFUGE ON EACH SURVEY DAY

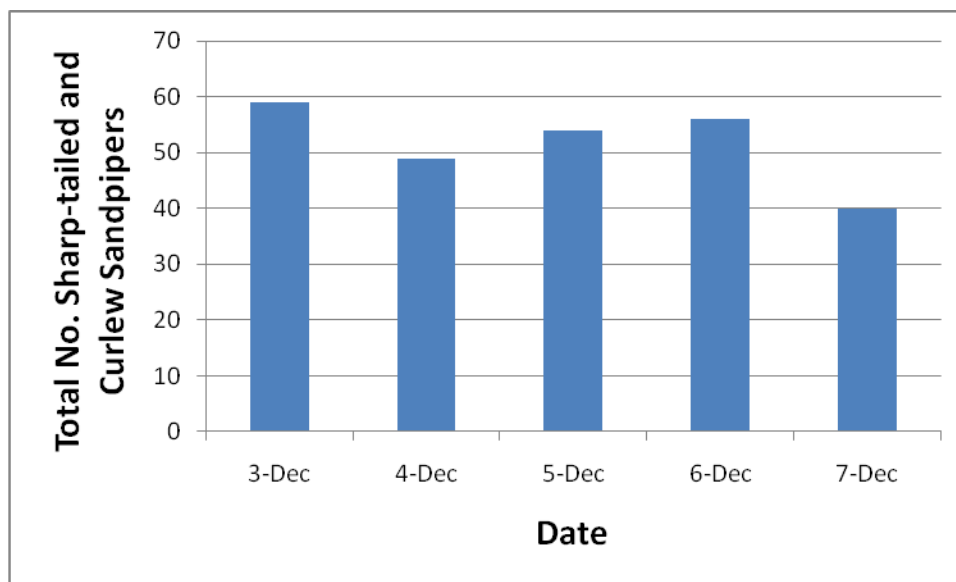




**Figure 4** TOTAL NUMBERS OF BAR-TAILED GODWITS RECORDED AT THE WATERBIRD REFUGE ON EACH SURVEY DAY



**Figure 5** MAXIMUM NUMBER OF SHARP-TAILED AND CURLEW SANDPIPERS ROOSTING ON THE WATERBIRD REFUGE AT NIGHT



## 2.4 Behavioural Disturbances

Noise levels from the racing cars were barely audible from the bird hide at the Waterbird Refuge. Whenever there were bursts of sound from the race event, the noise levels were no higher than the usual background traffic noise originating from Hill Road, Bennelong Parkway

and Homebush Bay Drive. The birds that use the Waterbird Refuge for foraging, roosting and shelter are habituated to these usual background noise levels. Therefore, there were no obvious disturbances to bird behavior from the sound of the race event.

A police helicopter surveyed crowd behavior at the race event by circling over a large area to the south-west and west of the Waterbird Refuge. While circling over this area, the helicopter would arc over the western bank of the Waterbird Refuge or over the wetland's south-western corner. Main periods when this type of police surveillance was observed were:

- ❑ 1510-1525 hrs on 4 December;
- ❑ 1435-1605 hrs and 1618-1655 hrs on 5 December; and
- ❑ 1030-1120 hrs, 1250-1305 hrs; 1405-1522 hrs and 1537-1700 hrs.

Repeated police helicopter flights near or over the western part of the Waterbird Refuge was a significant disturbance to birds using the wetland. Nearly all the Chestnut and Grey Teals left the water and sought refuge on the eastern bank of the wetland. Black-winged Stilts and Bar-tailed Godwits huddled together in tight groups with conspecifics in shallow water near the eastern bank, or crouched low among tussock grasses. Masked Lapwings also concealed themselves among grass tussocks. Australian Pelicans huddled in tight groups in deep water near the centre of the wetland. Although the usual behaviours of each bird species were disturbed for the duration of the police helicopter flights, the birds dispersed over wider areas of the wetland and resumed their foraging or day-time roosting behaviours within 10 minutes of the helicopter's departure from the general area.

Surveys of birds inhabiting much smaller wetlands that were nearer to the race circuit (ponds at the Northern Water Feature and The Brickpit Area), conducted by Sydney Olympic Park ecologists, revealed that the race event did not significantly impact on the abundance or types of birds using these areas (J. Harrington & J. O'Meara, Sydney Olympic Park Ecologists, pers. comm).

## **2.5 Conclusion**

This case study demonstrates that the Telstra 500 Supercar Race Event at Sydney Olympic Park did not significantly impact on the abundance or types of waterbirds and migratory shorebirds that used the Waterbird Refuge immediately prior, during and after the event. This is likely to be due to the distance the wetland was from the race track and the noise dampening effect of the race track infrastructure (e.g. grandstands), stands of mangroves and the direction of the prevailing winds.

The police surveillance helicopter significantly disturbed the behavior of birds on the wetland, but not their abundance, during repeated flights over or near the wetland. However, birds resumed their normal behaviours within a few minutes of the helicopter's departure from the local area. Therefore, a recommendation was made to the race event organisers that helicopter flights, especially repeated flights, over or adjacent to the Waterbird Refuge be banned at future race events, if possible.

## **3. RECOMMENDED APPROACHES TO WATERBIRD SURVEYS AND IMPACT ASSESSMENTS**

The following recommended procedure will be obvious to most ecological consultants, but it is surprising the number of impact assessment reports whose approaches are not so comprehensive:

- ❑ Identify clearly the nature of the development or activity proposal and how it is likely to affect directly and indirectly the wetland and its avian inhabitants (e.g. noise, light and chemical pollution, soil erosion, siltation, increased human activity, reclamation, flooding or deepening of parts of the wetland, clearance or degradation of microhabitats,

introduction or increased abundance of pests, feral predators or competitors).

- ❑ Determine the geographical and ecological context of the wetland that is being investigated. Is it an isolated wetland or part of a larger wetland ecosystem? Are the environmental values of the wetland or larger wetland ecosystem locally-, regionally-, state-, nationally- and/or globally-significant? If so, what are these values? How is the wetland currently influenced by surrounding land-uses and activities, and how will the proposal contribute to these influences?
- ❑ Conduct a literature and database search, and consult with the local community, for information about what waterbird species have been recorded on wetlands within the locality or region. Local sources of information can often be obtained from councils, local, state- or nationally-based bird groups or natural history societies, local individuals, and university researchers often have bird data relevant to the wetland ecosystem under investigation. These local sources are sometimes gold-mines of information, e.g. long-term data-sets of temporal and geographical patterns of abundance of waterbird species. In comparison, equally useful datasets from government wildlife databases often just provide species lists.
- ❑ During field surveys, identify and evaluate the condition of avian microhabitats within and around the wetland. How will those microhabitats change if the proposal is approved?
- ❑ Conduct your own surveys of waterbirds on the wetland. What parts of the wetland are used by each species? How does the abundance of each species on the wetland change throughout the 24-hr cycle and what are the environmental factors that influence

the circadian distribution and abundance of waterbirds in the wetland ecosystem? Although the case study described in this article involved waterbird counts every hour, it is usually possible to conduct counts less frequently across a 24-hour period to establish the circadian pattern of wetland use.

- ❑ If possible, conduct your waterbird counts at an appropriate time of the year. For instance, if the proposal is an activity that is limited to a certain time of the year (e.g. a racing car event), then it makes sense to conduct bird surveys at the time of the year when that activity is likely to take place. However, if the proposal is likely to have longer-term or permanent impacts on the wetland and/or the surrounding landscape, then ideally you should be aiming to conduct seasonal surveys, or at least surveys when waterbird species are likely to be present (e.g. austral spring/summer for migratory shorebirds; mid-late summer if your wetland is a permanent water body that waterbirds concentrate on when nearby ephemeral wetlands dry up; peak flood periods if your wetland system is influenced by flood cycles).

As we all know, it is not always possible to conduct these surveys in the right season or year, but the importance of doing this should be impressed upon your clients. The limitations of your surveys should also be identified in your assessment report. Reliance on information gathered during your literature and database search, and consultation with the local community, becomes vital in the absence of personal surveys during peak periods of waterbird activity.

Also record the proportion of time that selected bird species, particularly listed threatened and migratory bird species, are engaged in specific behaviours (time-budgeting), e.g. roosting, foraging, loafing, responding to disturbances.

Time-budgets may be altered significantly by the proposed development or activity without altering the abundance of a species on the wetland which, in turn, may affect the physiological condition of individual birds.

- ❑ Identify or refine the list of potential impacts of the proposed development or activity on the status of waterbird species and their habitats. Develop an ecological management plan to mitigate or avoid these impacts.

It is essential that this process is conducted by a suitably qualified and experienced ecologist. Too often, I have come across reports that have been compiled by consultants who have an inadequate knowledge of the habitat requirements and ecology of selected bird species. Consequently, impact predictions and subsequent mitigation/avoidance strategies are often inadequate.

- ❑ Test the accuracy of impact predictions by monitoring and evaluating the effectiveness of ecological management plans that are implemented as part of the approved development or activity.

The type of data you might consider collecting for comparison with baseline data collected prior to the development or activity includes:

- (a) The availability and condition of microhabitats at the time of the development or activity.
- (b) The distribution and abundance of each bird species within the wetland system.
- (c) Time-budgets of each waterbird species. For instance, the abundance of migratory shorebirds on a wetland may not have been changed by the development or activity, but the time they spend foraging or roosting may be significantly reduced as a result of

disturbances. Migratory shorebirds undergo extensive feather moults during their stay in Australia, which is an energy-intensive process. Individual birds may not complete their moult cycles and/or build up their body fat reserves on time for the return migration to breeding grounds in the northern hemisphere if they are unable to spend sufficient time feeding or roosting. If significant disturbances to behaviours are occurring as a result of the development or activity, what are the sources of these disturbances, and can they be reduced or avoided?

- (d) The distribution and abundance of introduced pests, predators and/or competitors that may occur in or around the wetland system as a result of the development or activity. What impacts are these species having on the status of native waterbird species and their habitats?
  - (e) Do any waterbirds breed in the wetland system? If so, are there any signs that the development or activity has impacted on breeding success, as a result of changes in the availability and quality of breeding habitats, increased disturbances and/or changes in the abundance of pests, predators or competitors?
- ❑ Do not be afraid to admit that some of your impact predictions were wrong! If the development is a permanent or long-term fixture, or if an activity is to be repeated, then be equally bold in modifying your ecological management plan to mitigate impacts that you may not have predicted earlier.



**Table 2 WATERBIRD AND SHOREBIRD COUNTS AT THE WATERBIRD REFUGE, 3 DECEMBER 2009  
(THE DAY PRIOR TO THE V8 TELSTRA 500 EVENT)**

\* Bird count conducted when it was too dark to differentiate between Chestnut Teals and Grey Teals

\*\* Between 180 and 200 Bar-tailed Godwits and 78 Sharp-tailed/Curlew Sandpipers were counted on the wetland at 2100 hrs. It was too dark to estimate accurately the abundance of other bird species on the wetland.

**Water Level in Wetland:** Medium-Full (0912 hrs); Full (1405 hrs); Low-medium (1800 hrs); Low (2000 hrs)

Species	No. Individuals & Survey Times (24-hr clock)											
	0912-0936	1012-1028	1107-1122	1217-1230	1305-1322	1405-1415	1505-1515	1605-1615	1705-1724	1800-1815	1900-1917	1952-2010
Australian Pelican	7	10	8	5	3	2	2	1			3	2
Little Pied Cormorant		1	1	1				1				
Chestnut Teal	273	60	17	10	10	24	57	70	124	202		
Grey Teal	79	21	18	10	17	24	33	21	61	112		
Chestnut/Grey Teal *											325	244
White-Faced Heron					1		1					
Bar-tailed Godwit **	12	27	29	29	9						5	10
Sharp-tailed Sandpiper	27											52
Curlew Sandpiper												7
Ruff	2											
Masked Lapwing		1	1	1		1	2	2		1	4	7
Black-winged Stilt	86	80	54	84	55	21	11	5	17	69	95	87
Red-necked Avocet	11	3	10	12	12						14	8
Silver Gull	12	8	8	8	3		1	2		11	3	19
Australian Magpie-lark						1		1	2		1	
<b>TOTAL</b>	<b>507</b>	<b>211</b>	<b>146</b>	<b>150</b>	<b>110</b>	<b>74</b>	<b>107</b>	<b>103</b>	<b>204</b>	<b>395</b>	<b>450</b>	<b>428</b>

**Table 3 WATERBIRD AND SHOREBIRD COUNTS AT THE WATERBIRD REFUGE, 4 DECEMBER 2009  
(DAY 1 OF THE V8 TELSTRA 500 EVENT)**

\* Bird count conducted when it was too dark to differentiate between Chestnut and Grey Teals and between Sharp-tailed and Curlew Sandpipers

\*\* Teals and migratory shorebirds only were counted during these survey periods

**Water Level in Wetland:** Low over entire survey period.

Species	No. Individuals & Survey Times (24-hr clock)												
	0500-0525 **	0605-0627 **	1102-1125	1200-1217	1300-1317	1405-1420	1500-1510	1600-1610	1700-1713	1802-1817	1900-1917	1954-2011	2100-2122 **
Australian Pelican			19	22	10	10	9	7	8	9	12	18	
Little Pied Cormorant								1					
Chestnut Teal			77	97	118	107	73	140	192	269			
Grey Teal			52	37	11	33	14	42	84	67			
Chestnut/Grey Teal *	352	285									312	358	366
Royal Spoonbill											1	1	
White-faced Heron													
Australian White Ibis			1		1								
Bar-tailed Godwit	72	63	28	24	41								210
Sharp-tailed Sandpiper			2								38	53	
Curlew Sandpiper											7	7	
Sharp-tailed/Curlew Sandpipers *	44	39											49
Masked Lapwing			4	4	2	2	3	2	2	2	2	2	
Black-winged Stilt			89	79	100	32	31	36	32	60	90	87	
Red-necked Avocet			6	7	6	8	1	8	6	8	7	8	
Silver Gull			17	15	7	17	3				4	6	
Australian Magpie-lark						1							
<b>TOTAL</b>			<b>295</b>	<b>285</b>	<b>296</b>	<b>210</b>	<b>134</b>	<b>136</b>	<b>324</b>	<b>415</b>	<b>473</b>	<b>542</b>	

**Table 4 WATERBIRD AND SHOREBIRD COUNTS AT THE WATERBIRD REFUGE, 5 DECEMBER 2009  
(DAY 2 OF THE V8 TELSTRA 500 EVENT)**

\* Bird count conducted when it was too dark to differentiate between Chestnut and Grey Teals and between Sharp-tailed and Curlew Sandpipers

\*\* Teals and migratory shorebirds only were counted during these survey periods

**Water Level in Wetland:** Low (0502 hrs); low-medium (1400 hrs onwards).

Species	No. Individuals & Survey Times (24-hr clock)												
	0502-0523 **	1007-1023	1100-1117	1200-1222	1300-1310	1400-1412	1500-1512	1600-1612	1700-1715	1800-1812	1900-1915	1952-2013	2200-2221 **
Australasian Grebe		1	1					1	1		1		
Australian Pelican		9	12	10	8	10	5	1				3	
Little Pied Cormorant								1	1				
Chestnut Teal		178	111	65	16	50	52	89	144	264			
Grey Teal		41	54	11	8	8	9	47	63	72			
Chestnut/Grey Teal *	348										350	381	392
Australian White Ibis			2										
Bar-tailed Godwit	56	35	37	33	36	30						8	226
Sharp-tailed/Curlew Sandpipers *	12												54
Masked Lapwing		8	6	2	4	4	1	2	2	2	2	4	
Black-winged Stilt		95	117	101	103	85	64	39	26	35	47	79	
Red-necked Avocet		6	7	8	8	6	8	7	2	9	8	8	
Silver Gull		4	2	5	19	5	1		1		1	2	
Australian Magpie-lark													
<b>TOTAL</b>		<b>377</b>	<b>349</b>	<b>255</b>	<b>202</b>	<b>198</b>	<b>142</b>	<b>187</b>	<b>240</b>	<b>382</b>	<b>414</b>	<b>485</b>	

**Table 5 WATERBIRD AND SHOREBIRD COUNTS AT THE WATERBIRD REFUGE, 6 DECEMBER 2009  
(DAY 3 OF THE V8 TELSTRA 500 EVENT)**

\* Bird count conducted when it was too dark to differentiate between Chestnut and Grey Teals and between Sharp-tailed and Curlew Sandpipers.

\*\* Teals and migratory shorebirds only were counted during these survey periods.

**Water Level in Wetland:** Low (0502 hrs); low-medium (1200 hrs); low (1800 hrs)

Species	No. Individuals & Survey Times (24-hr clock)												
	0500-0518 **	0958-1015	1100-1117	1200-1217	1300-1313	1400-1415	1500-1513	1600-1612	1700-1720	1800-1816	1900-1913	2000-2016	2300-2321 **
Australasian Grebe													
Australian Pelican		6	5	6	8	9	3						
Little Pied Cormorant									1				
Chestnut Teal		155	41	83	66	50	52	81	106	140			
Grey Teal		23	118	37	11	5	16	29	52	80			
Chestnut/Grey Teal *	299										353	380	382
Great Egret					1								
White-faced Heron			1										
Australian White Ibis		2		1		2				1			
Bar-tailed Godwit	45	22	38	36	36	34	7					4	215
Sharp-tailed/Curlew Sandpipers *	4												56
Masked Lapwing		2	3	4	4	3	4	5	5	2	3		
Black-winged Stilt		85	116	99	98	115	67	43	43	47	71	83	
Red-necked Avocet		3	2	3	3	2	5	3	2	1	3	3	
Silver Gull		27	12	13	24	14	26	15	3	1			
<b>TOTAL</b>		<b>325</b>	<b>336</b>	<b>284</b>	<b>251</b>	<b>234</b>	<b>180</b>	<b>176</b>	<b>212</b>	<b>272</b>	<b>430</b>	<b>470</b>	



**Table 6 WATERBIRD AND SHOREBIRD COUNTS AT THE WATERBIRD REFUGE, 7 DECEMBER 2009 (THE DAY AFTER THE V8 TELSTRA 500 EVENT)**

\* Bird count conducted when it was too dark to differentiate between Chestnut and Grey Teals and between Sharp-tailed and Curlew Sandpipers.

\*\* Teals and migratory shorebirds only were counted during these survey periods.

**Water Level in Wetland:** Low (0502 hrs); low-medium (1200 hrs); low (1800 hrs)

Species	No. Individuals & Survey Times (24-hr clock)												
	0500-0518 **	1000-1017	1103-1115	1200-1217	1300-1312	1400-1413	1500-1513	1600-1614	1700-1713	1800-1812	1900-1910	2001-2018	2400-0019 **
Australasian Grebe													
Australian Pelican		8	4	11	3	2	1		4	5	4	4	
Little Pied Cormorant		1											
Chestnut Teal		122	62	66	56	216	188	167	153	234			
Grey Teal		52	17	8	7	23	19	28	45	76			
Chestnut/Grey Teal *	276										378	397	384
Great Egret													
White-faced Heron													
Australian White Ibis				3	1	1							
Bar-tailed Godwit	14	18	19	33	34	42	30	27	1				c. 180
Sharp-tailed Sandpiper						1	1						
Sharp-tailed/Curlew Sandpipers *													c. 40
Masked Lapwing		2	6	4	3	4	3	4	4	7	5		
Black-winged Stilt		82	98	84	82	89	87	93	84	64	65	62	
Red-necked Avocet		2	3	3	2	3	3	1	3	3	2	2	
Silver Gull		15	39	25	41	31	20	10	11	3	5	4	
<b>TOTAL</b>		<b>302</b>	<b>249</b>	<b>237</b>	<b>228</b>	<b>412</b>	<b>342</b>	<b>344</b>	<b>305</b>	<b>392</b>	<b>459</b>	<b>469</b>	

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## Challenges of Managing Wetlands in Urban Settings

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Although wetlands have major ecosystem service value (i.e. the value of the ecological services to human societies provided by ecosystems) (Lindenmayer and Burgman, 2005), wetlands have not traditionally been viewed as valuable and many have been drained or filled in the past (Leiper *et. al.*, 2008).

We now understand that wetlands and the plant species that they support can act as biological filters for pollution and trap sediment runoff which helps to prevent siltation of rivers and estuaries (Queensland Museum, 2003). There are currently numerous wetland rehabilitation projects underway around Australia. Successful examples can be seen at Kooragang Island in New South Wales and Bundamba Wetlands in south-east Queensland.

There are several challenges facing managers of wetlands situated in urban settings. For example, urban stormwater runoff can contribute to poor water quality in wetlands (Leiper *et. al.*, 2008). Weeds or other introduced plant species from nearby residential gardens can spread into a wetland and displace native wetland species. Such challenges are evident at Dowse Lagoon, a large freshwater wetland set within an urban environment, approximately 17 km north of the Brisbane central business district.

Dowse Lagoon has been irreversibly changed by historic management, including being partially 'filled in' with rubbish and hard fill during the Great Depression (BCC, 2008). Dowse Lagoon is part of the EPBC Act listed Moreton Bay Ramsar Wetland which recognises this wetland as being of international significance. However, it has been

suggested that '*in its present degraded state, the lagoon has limited ability to meet the Ramsar criteria for wetlands of international importance*' (BCC, 2004). Brisbane City Council has recently undertaken various steps to improve Dowse Lagoon, including its water quality.

Some of the challenges of managing and rehabilitating wetlands situated in urban settings are discussed below. Particular attention is given to those challenges present at Dowse Lagoon.

### Poor Water Quality due to Urban Stormwater Runoff

Pollution caused by runoff from homes is a recognised problem affecting the health of freshwater wetlands (Leiper *et. al.*, 2008). For example, stormwater runoff from urban areas may contain high levels of nutrients (e.g. from fertilisers used by residents) that can contribute to the eutrophication of wetlands. Eutrophication is the process of nutrient enrichment, usually by nitrates and phosphates, in aquatic ecosystems such that the productivity of the system is no longer limited by the availability of nutrients (Allaby, 2004). The increase in nutrients stimulates algal blooms. The bacterial decomposition of the excess algae, once dead, may seriously deplete oxygen levels in the wetland.

Pollution from runoff is likely to be more problematic when the only source of water to a wetland is from runoff or direct rain, as observed at Dowse Lagoon. Dowse Lagoon was disconnected from Gas Works Creek, a tributary of Cabbage Tree Creek, when the southern swampy end of the lagoon was filled during the 1930s (BCC, 2004). As a result, Dowse Lagoon is now an isolated water body, receiving water exclusively from direct rainfall and runoff from the surrounding urban catchment area of approximately 33 hectares (BCC, 2004). The stormwater runoff and rainfall that enters Dowse

Lagoon is rarely enough to flush water from, and to refresh, the lagoon (BCC, 2004).

In order to improve water quality in Dowse Lagoon, Brisbane City Council constructed a recirculating wetland cell at the eastern margin (Figure 1). The recirculating wetland cell was designed to naturally filter water pumped from the lagoon. The current success of the wetland cell has been impacted by irregular rainfall, as discussed later.

### **Midge Swarms**

Midge swarms associated with wetlands situated in urban settings are considered a nuisance by neighbouring residents. Midge swarms are an indicator of the declining health of a wetland as excess nutrients and the subsequent eutrophication of wetlands is the main reason for abundant midge populations (Trayler, 2009). Midge larvae are thought to use decaying algal material (e.g. from algal blooms) as a food resource (Trayler, 2009).

Dowse Lagoon has been associated with persistent midge (Order Diptera: Family Chironomidae) infestations since the mid 1980s (BCC, 2004). In addition to adding a recirculating wetland cell, Brisbane City Council created a deeper channel around part of the perimeter of Dowse Lagoon to provide a reduction in water temperature and to increase water circulation. This would be expected to aid in the prevention of algal blooms.

Although Chironomid midges are still present in the area surrounding the lagoon, there don't seem to be as many as prior to the rehabilitation works. Brisbane City Council is also planning to introduce native waterlilies which would provide shade (BCC, 2009). This is another way to keep the water temperature cooler.

### **Irregular Rainfall**

The water levels in wetlands typically vary, depending on rainfall and season (Leiper *et. al.*, 2008). As a result of the drought in south-east Queensland, Dowse Lagoon dried out and remained dry during much of 2007. Weeds, wetland plants, e.g. Cumbungi (*Typha* sp.) and Smartweed (*Persicaria* sp.) as well as Broad-Leaved Paperbark (*Melaleuca quinquenervia*) saplings proliferated where water once prevailed. Most waterbirds abandoned Dowse Lagoon in response to its changing environment. However, a pair of Black-Shouldered Kites (*Elanus axillaris*) hunted regularly over the mostly dry wetland. The pair made a nest in a Swamp She-Oak (*Casuarina glauca*) in close proximity to a moderately busy road and raised a pair of offspring in early 2008.

The drought in south-east Queensland was officially declared over in early 2008. The rainfall and runoff since 2008 gradually started filling the lagoon again but it wasn't until the heavy rains in April and May 2009 that the lagoon was filled to capacity. Water levels rose over the vegetation that colonised the lagoon during the drought. This vegetation died and was later removed by Brisbane City Council in June 2009. This action would have prevented any rotting vegetation from increasing nutrient levels in the lagoon further.

As the water returned to Dowse Lagoon, so did the waterbirds, including Magpie Geese (*Anseranas emipalmata*), Black Swan (*Cygnus atratus*), Royal Spoonbill (*Platalea regia*), Hardhead (*Aythya australis*), Australasian Grebe (*Tachybaptus novaehollandiae*), Pacific Black Duck (*Anas superciliosa*) and Grey Teal (*Anas gracilis*).

Several Glossy Ibis (*Plegadis falcinellus*) in breeding plumage were present at Dowse Lagoon during late 2009, usually seen foraging (Figure 2). Glossy Ibis are migratory and nomadic and are

more abundant in the north of Australia (Pizzey and Knight, 2006). Recently, as the water levels have receded and exposed a muddy shoreline, there appears to have been more shorebird activity on the lagoon, particularly by the Marsh Sandpiper (*Tringa stagnatilis*), Black-Winged Stilt (*Himantopus himantopus*) and Masked Lapwing (*Vanellus miles*).

The irregular rainfall over the past years seems to have negatively impacted the establishment of the recirculating wetland cell. The wetland cell does not appear to be working as intended as the emergent aquatic plants that were planted within the cell have died and the cell is often dry (Figure 1).

### **Impediments to Fauna Dispersal**

The ability of fauna to move between a wetland and other suitable habitat can depend on the nature and extent of urban development in the surrounding area. The retention or creation of wildlife corridors can maintain connectivity and facilitate the movement of fauna through suboptimal habitat (Lindenmayer and Burgman, 2005).

In some urban areas, no wildlife corridors have been retained and it is not possible to create a dedicated wildlife corridor, as is the case at Dowse Lagoon. Dowse Lagoon is entirely surrounded by moderately busy roads and residential housing. Although Deagon Wetlands is situated only 650m to the west of Dowse Lagoon, the two wetlands are separated by roads and residential housing which may act as an impediment to movement of particular fauna species. Nonetheless, residential backyards are used by some species as movement corridors.

It is not known to what extent frogs are able to successfully disperse from Dowse Lagoon. Directly after storms in early 2009, many young frogs were observed to be dispersing from Dowse

Lagoon. Many of these frogs became victims of vehicular strike as they attempted to cross roads into the surrounding urban environment. Despite this, a considerable number of frogs representing a range of species can normally be found in backyards in close proximity to Dowse Lagoon, suggesting that many frogs are able to successfully move away from the wetland.

Seven species of frog are regularly heard calling at Dowse Lagoon (under the right conditions), namely the Striped Rocket Frog (*Litoria nasuta*), Striped Marsh Frog (*Limnodynastes peronii*), Green Sedge Frog (*Litoria fallax*), Green Tree Frog (*Litoria caerulea*), Dainty Tree Frog (*Litoria gracilentia*), Bleating Tree Frog (*Litoria dentata*) and, not surprisingly, the introduced Cane Toad (*Bufo marinus*).

During the summers of 2008 and 2009, the chorus of frog calls emanating from the Dowse Lagoon after rain was deafening. It would be interesting to know whether any fish survived the drying of the lagoon as predatory fish species can be an important factor regulating amphibian populations through predation on the eggs and tadpoles (Alford 1999 cited in Hunter and Pietsch, 2008).

### **Weed Incursion from Residential Gardens**

Weed invasion is a recognised problem affecting wetlands (Leiper *et. al.*, 2008). Brisbane City Council is currently undertaking actions that would be expected to benefit the wetland ecosystem including weed removal and planting native shrubs, grasses, and groundcovers which would assist in suppressing weed growth in the future (BCC, 2009) (Figure 3).

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## Call for More Help in Monitoring Shorebirds: Shorebirds 2020 Program

*Information from Birds Australia.*

Efforts of volunteer shorebird counters for the last 28 years have allowed us to understand where the important areas for shorebirds are in Australia, and that shorebirds are showing increasing evidence of decline.

Unfortunately, the threats to shorebirds and evidence of their declines are growing, and we will need data carefully collected in the same way each year if we are going to show conclusively how much trouble some of these species are in or what factors are driving their declines.

This will only be possible if more people can help with data collection happening throughout the country. Please, contact the people listed in the attached schedule if you are able to help, or if you want to put your hand up to coordinate, or be a contact for one of the areas where no-one is yet listed. If you would like to add an area and/or your details to the schedule let us know.

Also, there are random areas spread throughout the country that we need surveys conducted, and we always welcome any shorebird count data you might collect. If you are new to shorebirds, come along to one of our workshops, help scribe data on a count, or join up with locals in your area to learn about this fascinating and increasingly threatened group of birds.

To learn more about the Shorebirds 2020 program and to find all kinds of information on shorebirds visit [www.shorebirds.org.au](http://www.shorebirds.org.au). You will find:

1. tips on how to identify shorebirds, quizzes on shorebird identification, & modules

([http://www.shorebirds.org.au/?page\\_id=48](http://www.shorebirds.org.au/?page_id=48)),

2. power point presentations, & other materials so you can put together a presentation on shorebirds,

3. maps of shorebird distribution in Australia (these include national maps in Google Earth format for Shorebird Areas (the outer boundary within which all the shorebirds of one group should be found during the peak of the non-breeding season), Count areas - (the boundary of the areas that should be counted for any survey), and a national shorebird habitat map, also by

clicking on a state PDF maps for each area are available

[http://www.shorebirds.org.au/?page\\_id=42](http://www.shorebirds.org.au/?page_id=42). These maps will continue to be refined and updated,

4. Background materials ranging from technical reports to examples of public signs designed to limit the impact to shorebirds or inform on their conservation.

You can enter, store, and edit any of your shorebird counts at <http://data.shorebirds.org.au>; just ask for a username and password to get started by e-mailing

[shorebirds@birdsaustralia.com.au](mailto:shorebirds@birdsaustralia.com.au).



Photo courtesy of Narawan Williams

## Write a Caption Competition

**To Enter:** write an entertaining caption for this photo. Winner will receive a \$50 gift voucher for books on sale at the ECA annual conference 2010 book stall. If you are unable to make the conference we can provide you with a list of titles to choose from and have your prize posted to you. Winning entry will be anonymously voted by ECA Council. Email your entry to [admin@ecansw.org.au](mailto:admin@ecansw.org.au) by the 30<sup>th</sup> March 2010.



Photo courtesy of Bob Moffatt

**August 2009 winning caption:**  
*Now do you think it's funny?  
That will teach you for laughing  
at me!*

## Upcoming Events in 2010

### ECA Events

- **2010 ECA CONFERENCE and AGM**

*Title:* Indirect Impacts

*Date:* Early September 2010 (details to be advised).

*Venue:* Sydney (details to be advised)

*Cost:* to be advised.

*Contact:* [admin@ecansw.org.au](mailto:admin@ecansw.org.au) or ph. Amy on (02) 4995 6190.

- **PROPOSED ECA WORKSHOPS 2010**

- **Rainforest Plant ID**
- **Eucalypt ID**
- **Frog and Tadpole**

The dates and venues for these workshops are yet to be determined. You may register your interest in any of these workshops by emailing [admin@ecansw.org.au](mailto:admin@ecansw.org.au).

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### Non - ECA Events

- **The 14<sup>th</sup> Australasian Bat Society Conference**

*Date:* 12-14<sup>th</sup> July 2010.

*Venue:* Museum and Art Gallery of NT, Darwin

*Cost:* early \$130, normal \$150, day \$60

*Details:* <http://conference.ausbats.org.au/>

- **Australian Mammal Society Conference 2010 and Rock Wallaby Symposium**

*Date:* 4-9<sup>th</sup> July 2010.

*Venue:* Australian National University, Canberra

*Details:*

<http://www.australianmammals.org.au/conference2010.htm>

- **Australian Earth Sciences Convention 2010**

*Date:* 4-8<sup>th</sup> July 2010.

*Venue:* National Convention Centre, Canberra

*Cost:* \$495 - \$1165

*Details:* [www.gsa.org.au](http://www.gsa.org.au)

- **BASNA Twitchathon 2010**

*Date:* 30-31<sup>st</sup> October 2010.

*Details:* <http://www.birdsaustralia.com.au/the-organisation/southern-nsw-act.html>

*Contact:* [basna@birdsaustralia.com.au](mailto:basna@birdsaustralia.com.au)

- **BASNA AGM and Symposium 2010**

*Date:* 20<sup>th</sup> March 2010.

*Theme:* Birds and the Hunter

*Location:* Ashtonfield near Maitland

*Cost:* \$20-\$40

*Details:* <http://www.birdsaustralia.com.au/the-organisation/southern-nsw-act.html>

*Contact:* [basna@birdsaustralia.com.au](mailto:basna@birdsaustralia.com.au)

- **2010 Birds Australia Conservation Forum**

*Date:* 29<sup>th</sup> May 2010.

*Theme:* Connecting the bush: from backyards to landscapes

*Location:* Melbourne

*Cost:* \$70-\$100

*Details:* <http://www.birdsaustralia.com.au/whats-on/conservation-forum.html>

- **Second International Conference on Climate Change: Impacts and Responses**

*Date:* 8-10<sup>th</sup> July 2010.

*Venue:* University of Qld, Brisbane, Qld.

*Cost:* \$US 200-550.

- **Australian Systematic Botany Society Conference**

*Date:* December 2010.

*Location:* Lincoln, New Zealand

- **XVIII International Botanical Congress**

*Date:* 23-30 July 2011.

*Details:* <http://www.austplants-nsw.org.au/index.htm>

## Recent Literature and New Publications

### Book Review

#### **'Them and Us' – How Neanderthal Predation Created Modern Humans**

*Them and Us* is written by **Danny Vendramini**, published by Kardooair Press. It retails for **\$44.95 incl. postage** at <http://www.themandus.org>.

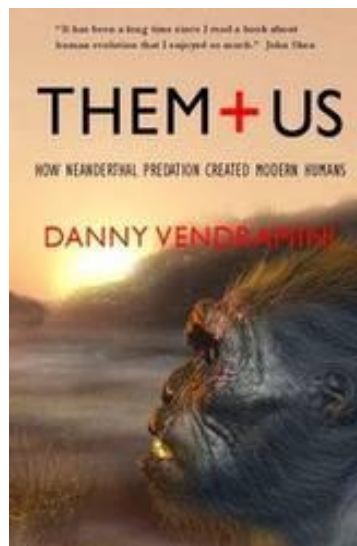
I've always had a fascination with human evolution, and waged goodhearted but sometimes emotionally involved (for the Creationists) debates on blogs over the years over the topic, as well as watched countless documentaries. Of particular interest as high school history and biology lessons lacked sufficient information (in the 1980s), was the apparently deadend role that Neanderthal Man played in our evolutionary tree. I recall with a smile, my Year 12 biology teacher's *faux pas*, when citing a textbook explanation that a Neanderthal could reasonably well pass for someone in today's society, despite their somewhat more heavy set, ape-like appearance, and the whole class turning to look at an unfortunate fellow with very heavy eyebrow ridges and prodigiously long arms (which he used most efficiently in basketball). Then of course was the best-selling fiction series, *Clan of the Cave Bear* by Jean M. Auel ([http://en.wikipedia.org/wiki/The\\_Valley\\_of\\_Hor\\_ses](http://en.wikipedia.org/wiki/The_Valley_of_Hor_ses)) which a girlfriend of mine at the time insisted I read (I settled for the movie adaptation with Daryl Hannah – a fair compromise any man would agree). This book essentially portrayed the Neanderthal as a lesser intelligent and brutish beast doomed to become out-competed by its smarter and much more aesthetically pleasing con-specific Cro-Magnon.

Given this book as a Christmas gift from my mother-in-law, I dutifully read it in idle moments of parental responsibility as child lifeguard by the

pool during an all too short holiday in Bali over the Christmas break. Upon finishing it, I have to agree overall with the sponsor's comment, (eminent anthropologist, John Shea) on the front page which states "It has been a long time since I read a book about human evolution that I enjoyed so much."

From the website, [www.themandus.org](http://www.themandus.org), where you can order this book, the following synopsis is provided:

*Put aside everything you thought you knew about being human - about how we got here and what it all means. After five years of rigorous scientific research, Danny Vendramini has developed a theory of human origins that is stunning in its simplicity, yet breathtaking in its scope and importance.*



*Them and Us: how Neanderthal predation created modern humans begins with a radical reassessment of Neanderthal behavioural ecology. He cites new archaeological and genetic evidence to show they weren't docile omnivores, but savage, cannibalistic carnivores - top flight predators of the stone age.*

*Neanderthal Predation (NP) theory reveals that Neanderthals were 'apex' predators - who resided at the top of the food chain, and everything else - including humans - was their prey.*

*NP theory reveals that Eurasian Neanderthals hunted, killed and cannibalised early humans for 50,000 years in an area of the Middle East known as the Mediterranean Levant.*

*Because the two species were sexually compatible,*



*Eurasian Neanderthals also abducted and raped human females.*

**Them and Us** cites new evidence from archaeology and genetics to demonstrate that this prolonged period of cannibalistic and sexual predation began about 100,000 years ago and that by 50,000 years ago, the human population in the Levant was reduced to as few as 50 individuals.

*The death toll from Neanderthal predation generated the selection pressure that transformed the tiny survivor population of early humans into modern humans.*

*This Levantine group became the founding population of all humans living today. NP theory argues that modern human physiology, sexuality, aggression, propensity for inter-group violence and human nature all emerged as a direct consequence of systematic long-term dietary and sexual predation by Eurasian Neanderthals.*

*Vendramini's discovery of the traumatic secret history of our ancestors resolves the last great mysteries of our species - how, why, when and where we became human beings.*

*It is unquestionable the biggest shake-up in evolutionary theory since Darwin.*

In general, I found the authors argument and evidence for many of these claims quite justifiable, and I have no doubt the Neanderthals routinely ate our ancestors as part of their diet, much as monkeys eat other species of monkeys as part of theirs. I was also relatively convinced of his re-evaluation of the Neanderthals previously humanistic conceived appearance revised into something more ape-like, and their longevity in the fossil record certainly indicates they were a very successful species in at times extreme environments, unlike my previous conceptions.

I was completely unaware that there is evidence to suggest that we as a species were almost wiped out, and that our gene pool could be based on what we now consider a non-viable (<500) population from a genetic point of view (with associated consequences). As the author suggests, by some amazing feat demonstrating the fundamental principles of Darwinism, our species did an abrupt about turn and a reversal of fortunes took place leading us to our position today as top dog in the food chain.

However, as an ecologist, I am not convinced that our ancestors were almost driven to extinction by Neanderthal predation alone. I assume some other factors came into play as with extinctions of native species with which we are familiar, and these are not paid adequate consideration, at this time, in this book. I think that other ecologists are likely to find the author's hypothesis and discussion of ecological evidence interesting, even. It is in terms of analyzing the author's hypothesis and evidence in terms of ecological principles that I think other ecologists will find this book interesting even if human evolution is not their key interest.

The author also extrapolates the theory to explain some of our historical and persisting cultural practices such as the status (and control) of women, ethnic/religious differences, and general inter-relationships with any that we perceive physically different than ourselves. In regards to the latter, the author postulates that this is a remnant of early man's recognition of the predatory Neanderthal from a distance, allowing time for the crucial decision of fight or flight. In some aspects, some of this seems credible but at times I thought that the author was trying to explain everything with his theory of Neanderthal predation of humans, without hard evidence. To his credit, he duly acknowledges that some aspect of his theory remains untested and is even speculative, but generally provides very good

evidence to back up the crux of his Neanderthal predation theory.

Of particular interest was his argument that the development of our “hairless ape” characteristics was due to the “*them and us*” predator recognition, with natural selection and socio-behavioural forces driving selection for non-ape like characteristics. The author generally satisfies in my mind the question of whether Neanderthals interbred with early man. However I thought some of the explicit details on some aspects may be a bit distasteful to some readers. A key question that he raises is how our species has a hidden and non-seasonal oestrus compared to other primates who could put advertising executives to shame with their awareness campaigns. He considers this evolved as a way of avoiding mating with Neanderthals (e.g. attracting rape via pheromone detection). This is possible, but in my opinion, could have also been a way for females to maintain bonds with males who provided food and protection long before and after the extinction of the Neanderthal.

I was impressed to read about evidence of early man turning the tables and consuming Neanderthal Man, and apparently his cousins of the same species at times (the other kind of chicken, apparently), and was unaware that there is significant evidence of the origins of our war-like nature dating back to this time, with many discoveries of what could be described as war graves and massacre sites. I was not totally convinced that early man’s predation or “hyper-aggression” (manifesting as a deliberate mission to wipe out his former predator) was the sole reason for the progressive demise of Neanderthal Man. As an ecologist, I am more inclined to think it was due to humans eventually expanding their range and out-competing and displacing a closely-related species (Neanderthal Man), combined with factors such as climate change.

The author also proposes a second theory, called *Teem Theory*, in this book and in a separate paper (available for download from [www.themandus.org](http://www.themandus.org) as follows:

“...(Danny Vendramini) *argues that the evolution of innate behaviour, emotions and instincts in multicellular animals is regulated, not by natural selection, but by a second evolutionary process encrypted in non-protein-coding DNA.*”

Essentially this theory attempts to explain how our behaviour is underlain by this ancient programming collated from a time of great stress, and indelibly coded in our DNA. This theory would take another review in itself to give due consideration and explanation. Overall, I found the concept interesting, but it needs more research to convince me of its validity.

Overall, a thoroughly interesting and certainly thought-provoking read. I wish the Australian author all the best for success and adoption of the main tenets of this theory, once it has endured the rigor of debate and review in the scientific literature.

Jason Berrigan

Darkheart Eco-Consultancy

ECA Member and Consulting Ecology Editor

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## Recent Journal Articles / Literature

Penman T. et al (2009). Long-term changes in understorey vegetation in the absence of wildfire in south-east dry sclerophyll forests. *Australian Journal of Botany* **57 (7)**: 533-540

Russell T. et al (2009). High possum mortality on urban roads: implications for the population viability of the common brushtail and the common ringtail possum. *Australian Journal of Zoology* **57 (6)**: 391-397

Bullen R. et al (2009). Bat heart mass: correlation with foraging niche and roost preference. *Australian Journal of Zoology* **57 (6)**: 399-408



Ball T. et al (2009) Diet of the squirrel glider in a fragmented landscape near Mackay, central Queensland. *Australian Journal of Zoology* **57** (5): 295 – 304.

Thompson G. and Thompson S. (2009). Comparative temperature in funnel and pit traps. *Australian Journal of Zoology* **57** (5): 311-316.

Glen A. et al (2009). Interactions between chuditch (*Dasyurus geoffroii*) and introduced predators: a review. *Australian Journal of Zoology* **57** (5): 347-356.

McDowell M and Medlin G. (2009). Using the diet of the barn owl (*Tyto alba*) as an indicator of small vertebrate abundance in the Channel Country, south-western Queensland. *Australian Mammalogy* **31**(2): 75-80.

Hayes I. and Goldingay R. (2009) Use of fauna road-crossing structures in north-eastern New South Wales. *Australian Mammalogy* **31**(2): 89-95

Marks C. et al (2009). DNA genotypes reveal red fox (*Vulpes vulpes*) abundance, response to lethal control and limitations of contemporary survey techniques. *Wildlife Research* **36** (8): 647-658.

Lunney D. et al (2009). The long-term effects of logging for woodchips on small mammal populations. *Wildlife Research* **36** (8): 691-701.

Ruibal M. et al (2009). Field-based evaluation of scat DNA methods to estimate population abundance of the spotted-tailed quoll (*Dasyurus maculatus*), a rare Australian marsupial. *Wildlife Research* **36** (8): 721-736

Durant R. et al (2009). Nest-box use by arboreal mammals in a peri-urban landscape. *Wildlife Research* **36** (7): 565-573

Winning G. and Saintilan N. (2009) Vegetation changes in Hexham Swamp, Hunter River, New South Wales, since the construction of floodgates in 1971. *Cunninghamia* **11**(2): 185-194.

Benson D. and Picone D. (2009) Monitoring vegetation change over 30 years: lessons from an urban bushland reserve in Sydney. *Cunninghamia* **11**(2): 195-202.

Martyn A. et al (2009) Seed fill, viability and germination of NSW species in the family Rutaceae. *Cunninghamia* **11**(2): 203-212.

Clarke P. et al (2009) Post-fire recovery of woody plants in the New England Tableland Bioregion. *Cunninghamia* **11**(2): 221-239

## Recent Book Releases

Information Source: CSIRO Publishing Website  
<http://www.publish.csiro.au>

**Title:** Effective Ecological Monitoring

**Author:** David Lindenmayer and Gene Likens

**RRP:** \$49.95

**No. Pages:** 184

**Publisher:** CSIRO Publishing

**Date:** March 2010



**Title:** Australia's Biodiversity and Conservation

**Author:** Will Steffen

**RRP:** \$69.95

**No. Pages:** 248

**Publisher:** CSIRO Publishing

**Date:** December 2009

**Title:** Macropods: The Biology of Kangaroos, Wallabies and Rat-kangaroos

**Author:** Graeme Coulson and Mark Eldridge

**RRP:** \$150

**No. Pages:** 424

**Publisher:** CSIRO Publishing

**Date:** February 2010

**Title:** Australian Palms: Biogeography, Ecology and Systematics

**Author:** John Leslie Dowe

**RRP:** \$140

**No. Pages:** 304

**Publisher:** CSIRO Publishing

**Date:** February 2010

**Title:** Dry Times: Blueprint for a Red Land

**Author:** Mark Stafford Smith and Julian Cribb

**RRP:** \$49.95

**No. Pages:** 184

**Publisher:** CSIRO Publishing

**Date:** December 2009



**Title:** Arguments for Protected Areas

**Author:** Ed. Sue Stolton and Nigel Dudley

**RRP:** \$59.95

**No. Pages:** 256

**Publisher:** Earthscan

**Date:** March 2010

**Title:** Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change

**Author:** David Cole and Laurie Yung

**RRP:** \$69.95

**No. Pages:** 368

**Publisher:** Island Press, USA

**Date:** February 2010

**Title:** Ecosystem Response  
Modelling in the Murray-  
Darling Basin

**Author:** Ed. Neil Saintilan and  
Ian Overton

**RRP:** \$99.95

**No. Pages:** 448

**Publisher:** CSIRO Publishing

**Date:** April 2010



**Title:** Planting Wetlands and Dams

**Author:** Nick Romanowski

**RRP:** \$59.95

**No. Pages:** 168

**Publisher:** Landlinks Press

**Date:** November 2009

**Title:** Wetland Habitats : A  
practical Guide to Restoration  
and Management

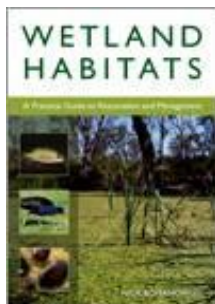
**Author:** Nick Romanowski

**RRP:** \$49.95

**No. Pages:** 192

**Publisher:** Landlinks Press

**Date:** May 2010



**Title:** Biodiversity and the Law: Intellectual Property,  
Biotechnology and Traditional Knowledge

**Author:** Ed. Charles McManis

**RRP:** \$108

**No. Pages:** 520

**Publisher:** Earthscan

**Date:** October 2009

**Title:** Murray River Country: An Ecological Dialogue  
with Traditional Owners

**Author:** Jessica Weir

**RRP:** \$34.95

**No. Pages:** 228

**Publisher:** Aboriginal Studies Press

**Date:** September 2009

## 2010 ECA Membership Report

*Amy Rowles*

*ECA administrative assistant*

In total we have 124 members. We have fourteen new members since the last edition of the newsletter. The new members are introduced below:

**Name:** Robbie Economus-Shaw

**Membership Status:** Non-practising

**Qualifications:** B Sc, Dip Geo Sc, DURP, MES

**Company:** Lake Macquarie City Council

**Location:** Lake Macquarie

**Name:** Laura Worthington

**Membership Status:** Associate

**Qualifications:** B Sc. (Hons 1)

**Company:** Total Earth Care

**Position:** Project Officer

**Location:** Narrabeen

**Name:** Adam Greenhalgh

**Membership Status:** Non-practising

**Qualifications:** Dip. Biol. Tech., B. Env. R. Mngt.

**Company:** ADG Environmental Consultancy

**Location:** Yattalunga

**Name:** Rhidian Harrington

**Membership Status:** Practising

**Qualifications:** B. Sc. (Hons), M Sc, PhD

**Company:** Niche Environment and Heritage

**Position:** Senior Ecologist / Director

**Location:** Umina Beach

**Name:** Sonja Elwood

**Membership Status:** Non-Practising

**Qualifications:** B. Env. Sc.

**Company:** Pittwater Council

**Location:** Mona Vale

**Name:** Sharyn Gale  
**Membership Status:** Non-practising  
**Qualifications:** B. Sc. (Env Biol) (Hons): M. Env. Mgmt.  
**Company:** Wyong Shire Council  
**Position:** Development Planner (Ecologist)  
**Location:** Wyong

**Name:** Simone dUnienville  
**Membership Status:** Practising  
**Qualifications:** B Sc. (Env. Biology), M Sc. (Wild. Mgt)  
**Company:** SMEC  
**Location:** North Sydney

**Name:** Anne Clements  
**Membership Status:** Practising  
**Qualifications:** M. Sc., PhD  
**Company:** Anne Clements and Associates  
**Location:** North Sydney

**Name:** Ariane Weiss  
**Membership Status:** Practising  
**Qualifications:** M. App. Sc. (Env Sc)  
**Company:** GIS Environmental Consultants  
**Location:** North Curl Curl

**Name:** Adriana Corona Mothe  
**Membership Status:** Non-practising  
**Qualifications:** PhD Science (experimental marine ecology)  
**Company:** Coffey Environments  
**Location:** Rhodes

**Name:** Heidi Kolkert  
**Membership Status:** Associate  
**Qualifications:** B. A, B Sc. (Hons)  
**Company:** OzArk Environmental & Heritage Management  
**Position:** Ecologist / Project Officer  
**Location:** Dubbo

**Name:** David Andrighetto  
**Membership Status:** Practising (regional)  
**Qualifications:** B. App. Sc. (Environmental Resource Management)  
**Company:** GeoLINK  
**Location:** Coffs Harbour

**Name:** George Orel  
**Membership Status:** Associate  
**Qualifications:** B. App. Sc. (Environmental Health)  
**Company:** SEMF Pty Ltd  
**Location:** North Sydney

**Name:** Peter Irish  
**Membership Status:** Associate  
**Qualifications:** B. Appl. Sc.  
**Company:** Ecotone Ecological Consultants  
**Position:** Ecologist  
**Location:** Waratah

**2010 Annual Subscription  
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[admin@ecansw.org.au](mailto:admin@ecansw.org.au)**

## The ECA Forum

Compiled by Jason Berrigan

*The ECA Forum on the ECA's website is one of the many privileges of membership, and is intended:*

- To encourage discourse within the membership.
- To enable a forum for members to raise issues that affect members, the industry and the ecologist.
- To provide a venue for depositing information eg anecdotal sightings, interpretation of legislation, etc.
- To inform members of changes to legislation, upcoming events, draft reports, etc on public exhibition.
- To reduce some of the email generated by in-house chat within the membership.
- To provide a means of archiving information shared within the membership for future reference.

*The Forum features a range of issues from legal to anecdotal, comments and questions by some members seeking some clarity on some issues or assistance in a work-related matter or some hotly debated issues.*

*If you haven't had time to log on and catch up, here's a summary of some of the recent and most commented on topics up to the 19<sup>th</sup> July 2009:*

### 1. Essential References

**Seeded by: Jason Berrigan**

Jason started a new topic which is intended to provide a pool of references (books, scientific papers, websites, etc) that every ecological consultant should have. Stephen Ambrose listed a reference book which describes the origins and meanings of the scientific names of most of the world's bird species. ECA members are encouraged to add their own personal favourites.

This topic will assist researchers, consultants and students to find references valuable to their work, as well as alert ECA members to references they may not have known even existed.

### 2. Scorpions:

**Seeded by: Stephen Ambrose**

Stephen provided an anecdotal account of observing a localised swarm of scorpions on the lawn at night just outside a holiday cabin at Manning Point, east of Taree on the mid-north coast of NSW. The camping ground was near littoral rainforest and wetland. He advised that this followed 5 days/nights of heavy rain, and wondered if anyone knew if this was a significant event e.g. mass mating in response to heavy rains. No-one has offered an explanation.

### 3. Flying Foxes and Nectar in Northern NSW

**Seeded by: Brian Hawkins**

Brian related an anecdotal observation of the complete absence of bats in the well known Bellingen camp on the Mid North Coast, an event believed to have happened for only the second time this century. This was despite his observations of moderately good supplies of nectar around (better than this time last year), with Banksias, Forest Red Gums and some coastal Blackbutts flowering. He postulated that for the Flying-Foxes to have left, there must be intense flowering somewhere else, probably within a night's flight. He advised that in other times that the Bellingen camp has emptied, it has been in response to Forest Red Gum (*Eucalyptus tereticornis*) blossoming near Bungawalbin, or to White Box (*Eucalyptus albens*) blossoming on the north-western slopes.

Jason Berrigan advised that he has not observed any significant increase in numbers exiting camps

from Port Macquarie or Kendall, but the unusually hot late winter may have thrown out flowering times and hence feeding patterns.

Liz Ashby added her observations of Grey-Headed Flying-foxes feeding on Small-fruited Grey Gum (*Eucalyptus propinqua*) out the front of her house this spring, when they have not done so in any of the other eight springs she has lived there (Bensville, Central Coast). She reported usually only seeing them feeding on the *E. robusta* Swamp Mahogany in her street in April-May.

#### **4. When does an Introduced Animal Become Native?**

**Seeded by: Deryk Engel**

Deryk began this topic with a quote from the DECCW which states for the Dingo:

*"The dingo is Australia's wild dog. As the largest native carnivorous mammal in the country, it is a magnificent animal in its natural habitat and plays a vital role in maintaining the balance within ecosystems. The dingo's origin is uncertain, though scientists now believe that it is related to Asian and Middle Eastern wolves that probably arrived in Australia between 3,500 and 4,000 years ago".*

He deduced that this was a recognition that an introduced animal (one that arrived in Australia) "plays a vital role in maintaining ecosystem balance", and postulated that for this species to go from introduced to "native", the line in the sand is drawn at 3500 years. Based on this, Deryk posed the hypothetical of the role of patches of blackberry or lantana that occur in cleared paddocks. In these situations, in the absence of native plants, the weeds provide sheltering and breeding sites for native species such as wrens and finches. Removal of these introduced plants (as required by the *Noxious Weeds Act*) in this situation would cause the local extinction of these native species. Therefore, he posted the question:

Does an introduced species become "native" (like the Dingo) once it provides a role in maintaining the ecosystem balance?

He argued that some introduced plants and fauna are all that's left in some ecosystems, with native animals becoming adapted to the resources these provide (particularly in the absence of native "equivalents"). He described an example of select species of birds that have learnt to turn cane toads over (and feed on their stomachs) thereby avoiding their poison sacks; and a study looking at the diet of Black-shouldered Kites in the Liverpool Local Government Area (NSW) identified that the introduced Mouse made up around 98% of this species dietary intake. The root systems of introduced plants may also provide the key function of soil stability.

Deryk remarked that our current management regime channels vast sums of money into pest control and weed eradication, but our actions may in some situations be actually having a negative effect on maintaining the balance of ecosystems by removing resources native species have adjusted their life cycle patterns to utilise. He pondered that money could be better spent on other ecological issues such as the purchase of land and inclusion of that into the conservation reserve network, or research into issues such as the treatment of Tasmanian Devil mouth ulcers. He suggested that perhaps we are at the stage where we may have to reconsider the yard stick we are using to define an exotic species (ie. if a species is fulfilling an ecological role and maintaining/adding to, the ecosystem balance, then it should be considered native).

Jason Berrigan considered Deryk's question a management paradox, suggesting that perhaps the best approach is battlefield triage. Therefore address these species where they are a problem (ie. a threatening process; and leave where they are "unnatural" but not a problem). For example, filling a vacant niche such as the

House Mouse in the Kite's diet. At least this approach may be taken for now, until we have the luxury of resources and time (ie. 30% of our biodiversity is not likely to be extinct by 2050).

Stephen Ambrose stated that another conundrum arises when you are not sure if a species is native to Australia and has been introduced to overseas countries or vice versa, or is a cosmopolitan species. He cited as an example the carnivorous freshwater aquatic plant, *Aldrovanda vesiculosa* (an aquatic trigger plant), a species that is rare and is globally threatened. It is found only in a few wetlands in Australia (several wetlands along the east coast, one wetland in Armidale NSW, a few wetlands in northern Australia, and another in Esperance in south-western Australia). The same species also occurs in isolated pockets in southern and eastern Europe, northern Africa, east Asia (including Japan, China, south-east Asia, Indonesia) and New Guinea.

This plant is believed to have been dispersed by shorebirds (waders, freshwater terns, etc), gallinules (swamphens, moorhens, coots, etc), herons, egrets, ibises or passerines bathing/drinking in wetlands, but it is unknown if it originated in Australia and spread over the world, or vice versa. If *Aldrovanda vesiculosa* was introduced into Australia, and was introduced naturally by migrating birds or by other means, it would have to be regarded as a species that is native to Australia. After all, Cattle Egrets and Sacred Ibis dispersed naturally into Australia in the late 1970s as a result of global expansions of their ranges, and both are now considered species that are native to Australia.

Stephen added that a genetic study of global populations of *Aldrovanda vesiculosa* will be the subject of an honours project at the University of WA next year. The results of the study may shed some light onto the evolutionary biology of this species and perhaps pathways of dispersal between continents.

Brian Hawkins added his opinion that the words "introduced" and "native" are ecologically meaningless, and who cares when a species arrived here? Australia's history of northwards drift is a history of successive biological "invasions", and he would guess that most of the "native" species here today are invaders or the descendants of invaders. The trouble is, people often use "native" to mean "good", and "introduced" to mean "bad". The underlying supposition is that "nature" is unchanging; that the situation in Australia in, say, 1750, is how Australia was "meant" to be; that divergences from this situation are bad and that, as conservationists, our goal is to try and return the land to how it was back then. He concluded that he did not believe there to be a scientific rationale for this way of thinking.

In contrast, Liz Ashby considered these key words to have very important ecological implications. She argued that an introduced species can behave quite differently in its new home compared with its native state. Studies of such differences can shed light on ecological processes for the species and the ecosystems as well as on the drivers of population dynamics - essential information for conservation management. She also considered Stephen's example interesting because knowing whether it is a relic species or one hitching a ride on migrating birds may tell us which direction the species is heading - expanding or contracting - and so help in assigning scarce conservation dollars.

Brian acknowledged that Liz had made a good point, though considered it related more to whether a species is in the early stages of invasion (or colonisation) or not, rather than whether a species is "native" as currently defined in Australia. He thought the definition of "native" as existing here prior to 1750 (or whenever) is ecologically meaningless, and suggested that perhaps "old" or "new" would be better terms. He added that he was echoing Derek's



suggestion that, at least from the perspective of conservation biology, the most useful distinction is not between “native” and “non-native” species, but between species that are “settled” in their ecosystems and those that are wreaking havoc.

Stephen further added he thought one needs to be careful about distinguishing between introduced species that are “settled in their new ecosystems” and “those wreaking havoc”. He stated that there are numerous examples globally of introduced species being “dormant” in their new environments, only to become pests at a later stage, a good example being the Common Starling in eastern Australia. It was released deliberately in eastern Australia in the 1850s & 1860s, primarily to control insect pests in agricultural regions, but it wasn't until the mid- to late-1910s (in NSW & Victoria) and the 1920s/30s (in Qld) that significant population explosions occurred. Fortunately, the arid and semi-arid zones of southern Australia appear to have been a relatively effective barrier in preventing the movement of Common Starlings from South Australia into south-western WA. However, cage traps containing decoy birds at Eyre Bird Observatory (about 250 km west of the WA/SA border) trap progressively more Common Starlings each year. Moreover, at least two Common Starlings have been observed in Alice Springs in recent times (one as recently as September 2009), suggesting that this species is becoming more adapted to surviving Australian semi-arid and arid conditions. Stephen pondered the scenario of what will happen once the deserts of central and southern Australia no longer act as a significant barrier to the westward movement of Common Starlings.

In regards to his earlier example, he also added that he considered it important to establish whether *Aldrovanda vesiculosa* is native to Australia or introduced. If the latter, then there is a danger that a future environmental trigger could lead it to choking aquatic environments

much like *Salvinia* or Alligator Weed. He also remarked of hearing a couple of years ago that Cotton had “escaped” plantations in northern Australia and had significantly infested some waterways and wetlands in Kakadu NP.

## **5. Accreditation of Ecological Consultants:**

**Seeded by: Stephen Ambrose.**

This on-going topic was brought to the forefront again by a member vote at the ECA AGM in 2009 for Council to follow up on Martin's Denny's proposed ECA Accreditation Scheme in the last edition of *Consulting Ecology*. Members were recommended to review the proposal and participate in the formulation of the program.

On the general topic of accreditation, David Paull added that he thinks there are some dangers for relying on the government's “accredited expert” concepts as identified in the BioBanking regulation also scheduled to take effect in order to have a transparent accreditation system for consultants. He commented that that the *Native Vegetation Act* also establishes the use of “accredited experts”, and when he checked the public register, noticed that CMAs are already using accredited experts to make variations to PVP agreements. He asked if anyone knew what process was taken to assign accreditation numbers to these “experts” and, are these “experts” in fact CMA employees.

David stated that he fully supports an independent accreditation process for consultant ecologists, though considered one category should be sufficient and less complicated. He considered that consultants have different specialisations in their respective scientific fields, but all should be capable of undertaking survey, assessment, mitigation, rehabilitation and management tasks to some degree, hence only requiring the one general category.

Jason Berrigan added that Simon Mustoe had recently announced the EIANZ had developed its own draft accreditation guidelines for ecological consultants, and recommended members review them.

#### **6. Recommended Suppliers of Ecological Survey Equipment:**

**Seeded by: Jason Berrigan**

Jason started this new topic to collect useful websites from which members may source equipment such as batteries, spotlights, etc, at cost-effective prices. Jason recommended the following:

<http://www.ozbatteries.com.au/6v-3.htm>: For very cheap 6V batteries.

[http://www.doublercush.com.au/index.php?page=shop.browse&category\\_id=336&option=com\\_virtuemart&Itemid=1&vmchck=1&Itemid=1](http://www.doublercush.com.au/index.php?page=shop.browse&category_id=336&option=com_virtuemart&Itemid=1&vmchck=1&Itemid=1): For dimmer switches to add to Lightforce spotlights.

[http://www.southsidebatteries.com.au/catalogue/deepcycle\\_batteries/p81](http://www.southsidebatteries.com.au/catalogue/deepcycle_batteries/p81): For cheap 12V batteries. ECA members are encouraged to submit their preferred equipment suppliers.

#### **7. Correct Spelling of Common Bird Names**

**Seeded by: Stephen Ambrose**

Stephen indicated that many consultants appear to be confused about how to spell correctly the common names of bird species. For instance, he has seen the correctly spelled Bar-tailed Godwit variously written as Bar-Tailed Godwit, bar-tailed godwit, Bar Tailed Godwit, Bar tailed Godwit, bar tailed godwit, Bartailed Godwit, bartailed godwit and even BarTailed Godwit.

The spelling rules used by the International Ornithological Congress (IOC) in its list of bird species of the world are listed below:

1. Official English names of birds must be capitalized (e.g. Yellow-throated Scrubwren);
2. Patronyms must be used in the possessive case (e.g. Smith's, Ross's)
3. Names must not include diacritical marks.
4. Geographical words in a name may be in noun or adjective form but must be consistent for that location (e.g. Australia Shelduck should not be a substitute for Australian Shelduck).
5. Use of hyphens in compound group names to indicate relationships between species should be minimised. (This rule is sometimes ignored in naming Australian birds, e.g. the Black-Cockatoos).
6. Hyphens should be used in compound names only to connect two names that are birds or bird families (e.g. Cuckoo-shrike) or when the named would otherwise be difficult to read (e.g. White-eye).



**This pair of Australian Magpies at Telegraph Point produce an albino almost every year. Photo Courtesy of Jason Berrigan**

## **Short Note: Cumberland Plain Woodland Now Listed as Critically Endangered Under the Commonwealth and NSW State Legislation.**

Brendan Smith  
Biosis Research Pty Ltd  
ECA Council Member

January 2010

As many Sydney based readers would be aware, Cumberland Plain Woodland (CPW) has recently been up-listed from “Endangered” to “Critically Endangered” under both the Commonwealth *Environment Protection and Biodiversity Conservation Act*, (1999) (EPBC Act) and NSW *Threatened Species Conservation Act* (1995) (TSC Act). The highest category for which an ecological community is eligible to be listed is critically endangered.

There are often differences in the definition and description of listed threatened Ecological Communities (EECs or TECs if you prefer) between the State and Commonwealth legislation. The recent uplisting of CPW provides a good example of such differences with a few (but not all) of the key differences and similarities described in the following short note.

### **Distribution**

Former descriptions of CPW under both the State and Commonwealth legislation had poorly defined the distribution of this community leaving its occurrence in areas outside or on the edges of the Cumberland Plain open to varied interpretation. Both the State and Commonwealth listings for CPW have clarified this uncertainty with the Commonwealth listing advice for example, stating (p1):

*Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest represents certain occurrences of the coastal plain grassy eucalypt woodlands that are*

*endemic to the shale hills and plains of the Sydney Basin Bioregion in NSW and which occur primarily in, but not limited to, the Cumberland Sub-region (the Bioregion and Sub-region are taken from the Interim Biogeographic Regionalisation for Australia (IBRA) Version 6).*

The Sydney Basin Bioregion obviously extends well beyond the boundaries of what has previously been identified in some references as the Cumberland Plain or the Cumberland Plain sub-region.

### **Condition Thresholds**

In contrast to the determination under the NSW TSC Act, the Commonwealth listing advice (Threatened Species Scientific Committee 2008) prescribes condition thresholds which (p7):

*...are intended to function as a set of criteria that assists in identifying when the EPBC Act is likely to apply to an ecological community. They provide guidance for when a patch of a threatened ecological community retains sufficient conservation values to be considered as a Matter of National Environmental Significance, as defined under the EPBC Act. This means that the protection provisions of the EPBC Act are focussed on the most valuable elements of Australia's natural environment, while heavily degraded patches, which do not trigger the “significance test” of the EPBC Act will be largely excluded.*

The listing advice prescribes four categories of condition thresholds for patches of CPW that meet the description of CPW. Included among the prescribed condition threshold categories under the EPBC Act are minimum requirements for CPW in relation to patch size and native species cover (other factors including connectivity and presence of large mature trees are also included but have not been discussed here).

In order to qualify as CPW under the EPBC Act, a patch of this community must always have the diagnostic upper tree layer species present and either a native shrub or ground layer present (Threatened Species Scientific Committee 2008). For example, patches where the upper tree layer species are present, but the mid-storey and ground cover have been competitively displaced by weeds (as is typical of many patches of CPW), these patches would not be included as CPW. With reference to the four condition categories (see Table 1 within the listing advice) and the minimum condition thresholds, patches of CPW that meet the description for CPW under the EPBC Act must have a minimum of 30 per cent cover of native species in the understorey.

Further to the above, patches of CPW which are represented only by native shrub or ground cover such as a derived native grassland or shrubland are specifically excluded from the national listing of CPW. In contrast, the determination for CPW under the TSC Act (NSW Scientific Committee 2009) states:

*Either or both of the upper-storey and mid-storey may be absent from the community. Native grasslands derived from clearing of the woodland and forest are also part of this community.....*

Such derived native grasslands and shrublands are therefore included as CPW under the TSC Act.

The condition thresholds under the EPBC Act also have a minimum patch size for CPW of 0.5 hectares. No such patch size thresholds apply under the TSC Act. Interestingly, the NSW Scientific Committee notes that approximately half of all mapped patches are less than three hectares in size (NSW Scientific Committee 2009); presumably many of these are less and 0.5 hectares in size.

## Conclusions

It could be presumed that the implications of the uplisting of CPW to critically endangered would mean that a greater proportion of development applications impacting on this community are likely to trigger the requirement for referral to the Commonwealth. However, in light of the prescribed condition thresholds, many medium to small developments will be able to more confidently rule out a requirement for referral to the Commonwealth.

At face value it appears that the NSW TSC Act affords significantly greater protection for CPW than the EPBC Act. However, operation of the TSC Act and the varied degree of constraint applied to development consent under different parts of the *Environmental Planning and Assessment Act* (1979) (EP&A Act) (for example Part 3A, Part 4, Part 5 and Biodiversity Certification) provides continued uncertainty. Perhaps a change in state government will alter the outcome for CPW? A further question is how local government will interpret the critical status of CPW; will the same constraints as those applied to Blue Gum High Forest extend to CPW across the Sydney Basin Bioregion?

## References

NSW Scientific Committee (2009). Cumberland Plain Woodland in the Sydney Basin Bioregion - critically endangered ecological community listing, <http://www.environment.nsw.gov.au/determinations/cumberlandwoodlandsFD.htm>, Accessed January 2010

*Threatened Species Scientific Committee* (2008). Commonwealth Listing Advice on Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. [Online]. Department of the Environment, Water, Heritage and the Arts. Canberra, ACT: Department of the Environment, Water, Heritage and the Arts.

## Butterflies in Australia

Alan Hyman

Most people with even a passing interest in Australian wildlife are both attracted to, and protective of our iconic fauna such as the koala or kangaroo. In nature however, even the smallest creatures have their special places in the scheme of things. Butterflies for example are perhaps the most recognisable and benign of all insects, yet often our closest encounters with them may be fleeting glimpses of colour as they soar over the back fence or dart across a bush track. Closer observation can bring a deeper insight, adding a new dimension to our appreciation of their beauty and their role in the environment.

Butterflies, together with moths, belong to the insect order *Lepidoptera* (scaled-wings) and are generally diurnal (day flying). Various species flit, flap or flutter, different flight characteristics which can act as an aid to identification at a distance. Adult insects do not eat but employ a proboscis, a hollow tube which coils up like a spring, to suck moisture from the ground or nectar from flowers (buddleja is an ideal example, but even that rampant weed, lantana, is an attractant in the wild). These plants are not to be confused with the specific food plants on which the caterpillars (*larvae*) of individual species feed. Their life-cycle, metamorphosis, from *ovum* (egg) to *larva*, thence *pupa* (chrysalis) to *imago* (adult) is a complex miracle of nature. Butterflies occur from rainforest to semi-desert locations and are most abundant in terms of species and absolute numbers in our tropical areas where they may be encountered all year round. The temperate parts of the continent also have their own endemic species which in general fly from spring to autumn. Of necessity, only a small number can be described here.

Most of Australia's 400+ butterflies belong to one of five families. The large and colourful

Swallowtails (*Papilionidae*) are represented by 18 species, several of which are protected by law in Queensland. These include the metallic green and black Birdwings (*Ornithoptera spp*) and the electric blue and black Ulysses (*Papilio ulysses*). Found the length of the east coast is the unmistakeable Orchard Swallowtail (*Papilio aegeus*) with a wingspan of over 100mm. The sexes have quite different wing colours and patterns (dimorphism), males being black with cream patches and red hind wing spots, while females are grey-brown and white with red and blue hind wing markings. Larvae have a range of food plants but readily feed on citrus, the planting of orchards having facilitated the species wide geographical distribution. The 'kite swallowtails' (*Graphium spp*) are triangular in appearance and very fast flyers. In this group are several species which incorporate green in their colour scheme, relatively unusual for butterflies. Included are the Macleay's Swallowtail (*G. macleayanus*), and the Green-spotted Triangle (*G. agamemnon*).

The *Pieridae* (whites and yellows) are small to medium in size. One of the most familiar is the ubiquitous Cabbage White (*Pieris rapae*), a European butterfly accidentally introduced to Australia via New Zealand in 1937. It is the only species to have an economic impact, its larvae eating the leaves of many plants including cabbage, cauliflower and broccoli. Very abundant in certain seasons is the migratory Caper White (*Belenois java*). Males are chalk white with black borders, females more heavily marked. Larval food plant is *Capparis* and, despite their numbers these butterflies do no damage to the garden. The Mistletoe feeding Jezebels (*Delias spp.*) are beautifully coloured on the undersides with black, white, red and yellow. The Wood White (*Delias aganippe*), an inhabitant of the drier eucalypt forests and the winter-flying Black Jezebel (*Delias nigrina*) are a typical examples.

The *Nymphalidae* (Nymphs) include the familiar Yellow Admiral (*Vanessa itea*), black and

burgundy with yellow forewing bands and the Australian Painted Lady (*Vanessa kershawi*), so-called because fresh specimens have a pink flush on the underside of the wings. The sub-family *Satyrinae* (browns) includes the aptly named Common Brown (*Heteronympha merope*), extremely abundant in the south-eastern Eucalypt forests, males being tawny orange with brown markings and blue eyespots. (Other species in this genus, especially the males, all have a variation on this basic 'design'). The dissimilar females are larger, appear later in the season and have a distinctive orange, black and yellow pattern. When at rest on the forest floor, their underwing colouration camouflages them perfectly amongst the leaf litter. Mention must also be made of the elegant Sword-grass Brown (*Tisiphone abeona*), brown-black with orange or cream markings which vary according to the geographical race. Its larvae feed on *Gahnia* and unfortunately when this plant is cleared from swampy areas by 'developers' the butterfly also becomes locally extinct. Once seen and never forgotten is the Monarch (*Danaus plexippus*), its orange wings with black veins spanning 90mm and possessing a graceful, gliding flight. This tough, long-lived insect breeds on such plants as Milkweed and has its origin in North America.

The Blues (*Lycaenidae*) are the small jewels of the butterfly world. The Imperial Blue (*Jalmenus evagoras*) for example has brown-edged, shining pale blue upper surfaces with cryptically marked buff undersides and tiny black 'tails'. This species breeds on *Acacia*, the gregarious larvae being attended (as are many species in this family) by ants in a symbiotic relationship. The Yellow Spot Blue (*Candalides xanthospilos*) has the upper side deep purple with pale orange fore wing spots and silky grey-white beneath. When in flight, this species 'flashes' as the alternate light and dark wing surfaces catch the sunlight.

The Skippers (*Hesperiidae*) are mostly small and dull-coloured, being generally brown with

various combinations of black, orange and yellow markings. With squat bodies, 'hooked' antennae and possessing a swift darting flight, they often rest on foliage with forewings closed and hind wings outspread. Quite distinctive is the Splendid Ochre (*Trapezites symmommus*), having a 45mm wingspan. The colouration is deep brown with pale yellow and orange markings above, tawny orange with pale blue spots and yellow blotches below. Larvae feed on *Lomandra*.

To complicate matters, there are also day-flying moths which superficially resemble butterflies. One example is the familiar black and cream Grapevine Moth, (*Phalaenoides glycinae*) having larvae which, as the name suggests, enjoy dining on grape leaves (including the ornamental variety) in addition to native *Hibbertia*.

My fascination with butterflies goes back to primary school days when a like-minded friend and I would patrol our local inner-suburban lanes and parks with homemade nets and cardboard boxes, collecting haphazardly with little thought given to preservation or presentation. Years later, armed with more sophisticated equipment and knowledge I wandered in Sydney's North Shore bushland, southern NSW and North Queensland, assembling a small reference collection with specimens set, labelled and displayed in entomological cabinets. Today however, in these enlightened times, photography has virtually supplanted this practice. I currently enjoy 'capturing' butterflies on film (or yes, digitally) in our nearby bush (Morton National Park) or home garden. This can be a more difficult task than one might imagine as they are generally wary of close approach (assuming that they alight within range) and seldom pose motionless with wings outspread for the 'classic' portrait. The attraction to butterflies is addictive because they encapsulate the essence of freedom and beauty, nature at its most whimsical.



Like much other wildlife, butterflies are endangered because of habitat destruction, air pollution, pesticides, bushfire, climate change and even genetic engineering of plants. Being highly visible insects, their relative abundance and variety (or lack thereof) can act as an 'indicator' or marker for the wellbeing of less obvious species and, by extension, the overall health of the environment. The term 'biodiversity' implies a species-rich world. Without butterflies, our lives would be aesthetically and spiritually poorer.

*Essential reference:*

*The Complete Field Guide to Butterflies of Australia*  
Michael F. Braby CSIRO Publishing 352pp softcover  
ISBN 0 643 09027 4

*Alan lives with his wife Wendy and their four cats in the small NSW Southern Highlands town of Bundanoon. They are volunteers with the local Currabunda Wetland and Morton National Park Groups. They are also currently coordinating a pilot revegetation project within a nearby pastoral property. He and Wendy enjoy nature, bushwalking, bush regeneration, gardening - and a decent coffee!*

*For further information please telephone Alan on (02) 4883 7763.*

**See inside back cover for the photos that accompany this article:**

- 1) Grapevine Moth (*Phalaenoides glycinae*)
- 2) Black Jezebel (*Delias nigrina*)
- 3) Cabbage White (*Pieris rapae*)
- 4) Caper White (*Belenois java*) – female
- 5) Common Australian Crow (*Euploea core*)
- 6) a) Blue Banded Eggfly (*Hypolimnias alimena*)  
b) Common Eggfly (*Hypolimnias bolina*) – female  
c) Red Lacewing (*Cthosia cydippe*)
- 7) Imperial Blue (*Jalmenus evagoras*) – underside
- 8) Imperial Blue (*Jalmenus evagoras*) – upperside
- 9) Macleay's Swallowtail (*Graphium macleayanus*)
- 10) Monarch (*Danaus plexippus*) – female
- 11) Orchard Swallowtail (*Papilio aegeus*) – female
- 12) Orchard Swallowtail (*Papilio aegeus*) - male
- 13) Wood White (*Delias aganippe*)
- 14) Yellow Admiral (*Vanessa itea*)
- 15) Splendid Ochre (*Trapezites symmokus*)
- 16) Australian Painted Lady (*Vanessa kershawi*)
- 17) Green-spotted triangle (*Graphium agamemnon*)

## Collection of Debts

*Dr Stephen Ambrose*

*Ambrose Ecological Services Pty Ltd*

*ECA President*

Previous issues of the ECA Newsletter have dealt with means of collecting long-overdue payments from clients. I have some recent experience in debt collection that I'd like to share with members.

I started the working year with seven clients in the private sector whose invoice payments were between three and five months overdue. They had not previously responded to written overdue notices, or answered or returned phone calls.

All seven clients are based in Sydney, so earlier in the week I took the bold move of making surprise visits to their offices. I explained my cash-flow problem as a result of delayed payment by numerous clients, and asked each client in a diplomatic way if they could hand me a cheque for the amount owed. At the end of the day I deposited seven cheques into my business bank account and none of them have bounced!

I have to admit that I was very nervous about such a potentially confrontational approach to debt collection, but was reassured that it was the right thing to do after the first two clients had been called upon. All clients complimented me for my business approach to debt collection, and one offered me another project after handing across the cheque because he said that he felt guilty about the delay in payment for the previous project (I'd like to think that the offer of more work was also in response to the client's satisfaction with the previous work).

I also think that these visits strengthened business relationships. Each client engaged in conversation about the financial and project challenges they had faced over the last 12 months, the theme

common to everyone was cash-flow. But all felt positive about business opportunities over the coming year. In a way, I think many clients felt relieved they could talk to someone who could relate to their cash-flow problems. Perhaps I should take on a new role as a business therapist!

Yes, it took a good part of my day collecting these debts, which could have otherwise been spent on project work. But at the end of the day, I had collected everything that was owed to my company, there was no obvious animosity from clients to my approach, and I feel that all of them appreciated the personal approach without the use of lawyers, debt collectors or the courts. Perhaps I just had a lucky day or that clients were in a relaxed mood after the Christmas/New Year break. Or perhaps it's the way for all of us to collect outstanding debts in future.

## **A Waterproofing Option for Anabat Detectors – Protecting Your Tool**

*Deryk Engel, Stephen Bloomfield and Jennifer Edwards*

### **I. Introduction and background.**

Reference to the National Parks and Wildlife Services' Threatened Species Survey and Assessment: Guidelines indicates that, when using an echolocation detector, the survey effort recommended is "2 sound activated recording devices utilised for the entire night (a minimum of 4 hours), starting at dusk for 2 nights" (National Parks and Wildlife Service [NPWS] and SMEC Australia 2003 pg 105). In their guidelines the NPWS makes the comment that "Some species could be active later in the evening, perhaps due to commuting times from roost sites, and would not be detected earlier in the evening. The identification of these species can be improved by using recording devices that have the potential to record all night" (NPWS and SMEC 2003 pg 102). In light of this, where possible, ecological consultants who target Yangochiropterans and

Rhinolophoidea (microbats) generally establish their echolocation units before dark at sites that are likely to be used by microbats (e.g. flyway or roosting site), and leave their units in place for the duration of the evening. With this in mind, whilst ecological consultants endeavour to undertake microbat surveys during periods when the climatic conditions are favourable to the detection of this fauna group, in some cases this is not always possible. Pressures from clients, development application deadlines and so forth do not lend themselves to deferring field work till a period of dry weather is predicted. There is also the possibility that, when establishing a detector at a particular site when the weather is favourable, that, as the night progresses, these conditions deteriorate and, possibly, result in showers.

The current price for an echolocation detector (Anabat SD1™) purchased from Titley Electronics is around \$2200.00 (excl GST). To follow the NPWS guidelines, an ecologist would need to purchase two of these units, this being a considerable capital outlay for equipment that is to be left on a site for the entire duration of the evening. Anabat echolocation detectors are, at present, not waterproof, and moisture on the gold plating of the sensor can compromise the effectiveness of these devices and the quality of the calls recorded. Water damaged sensors can be replaced, at a current cost of \$138.00 (excl GST). Again if two or more echolocation detector sensors are used during the course of a study, and these become water damaged, this is another cost a consultant must bear.

Protecting the Anabat unit itself is both possible and readily achieved. The units can be placed in a waterproof container, though this still leaves the sensor exposed to the elements (whether it is connected to the unit itself, or on the end of an extension lead).

Protecting echolocation detectors from adverse weather conditions has been considered in an article written by Chris Corben (Corben 2006). This article discusses the pros and cons of various techniques including the use of membranes, pipes, reflectors and removing the sensor from the Anabat unit itself and placing it on an extension lead. From a consultants perspective, who is also likely to be carrying spotlights, tape recorders, call playback equipment and so forth, use of pipes and cumbersome reflectors is not really practical (particularly at those survey sites where vehicle access is limited). For consultants a membrane over the front of the sensor would be the most practical and cost efficient solution, as long as it did not compromise the overall quality of those calls being recorded. Corben notes that “the sorts of membranes which let sound through well (e.g. “Glad Wrap”), are not very good at keeping out rain. Or even if they are, they might stay wet for extended periods after a soaking, affecting sound transmission even more” (Corben 2006).

In 1990 a book was published call “Last Chance to See” (Adams and Carwardine 1990). In this, the authors travelled the world to see species that were threatened with near extinction, one of the stories discussing how the authors tried to record the calls of the Yangtze River Dolphin (*Lipotes vexillifer*). The authors did not have an underwater microphone and were therefore faced with finding some technique to waterproof their recording equipment. After several attempts, in the end, the authors alighted on the idea of wrapping the microphone they had in a condom. The condom permitted the microphone to stay dry, whilst also allowing the recording of the Yangtze River Dolphin’s calls.

If condoms can prove effective for waterproofing a microphone, logic would suggest that the placement of a condom over an echolocation detector’s sensor would also work.

## 2. Methods.

To test the above theory, two digital Anabat units, a ZCAIM™ and SD1™ were used. A condom (Ansell Ultra Thin™) was placed over the SD1’s sensor (Plate 1), whilst the ZCAIM was left uncovered. Both detectors were placed side by side on the ground, the units themselves being enclosed within waterproof containers (Plate 2). A hole has been established within each container, permitting the exposure of the sensor. The inclusion of a foam seal within the containers design prevents water accessing the enclosed units. When placed on the ground, the sensors themselves were approximately 200 millimeters apart.

The study was conducted over two consecutive nights, these being the 6<sup>th</sup> and 7<sup>th</sup> of January, 2010. For reference, the weather conditions experienced during these two nights were:

- Partly cloudy skies (3/10<sup>th</sup> cloud cover), warm temperatures (24°C) and light to moderate south-east winds on the 6<sup>th</sup>; and
- Overcast skies, warm temperatures (23°C) and light to moderate south-east winds on the 7<sup>th</sup>.

The sensitivity of both detectors was set at 6, the detectors being left in place for the duration of each night. On the evening of the 6<sup>th</sup>, the detectors were turned on at 16.55 hours, whilst on the 7<sup>th</sup> they were turned on at 17.05. Any calls recorded were analysed using Anabat 6.3 computer software.



Plate 1: Condom protection on Anabat unit.



**Plate 2: Anabat units in waterproof containers, with sensors exposed.**

As an aside, it is noted that a reservoir is included in the design of a condom. We found that, with a bit of fiddling and the use of a rubber band, this could be moved so that it didn't cover the front of the sensor (thereby possibly interfering with any calls recorded - refer to Plate 1). We also note that, in choosing a condom, we selected one that was not coloured, contoured, ribbed or flavoured, were standard size, and as ultra thin as possible.

The site selected for the experiment was within the Royal National Park, south of Sydney. The location of the survey site was approximately 1.2 kilometers east of the Bundeena Drive/Maianbar Road intersection (Easting 325700, Northing 6224758). The survey site selected supported an overstorey of eucalypts that are to 10m in height with a moderate to high density shrub layer that is approximately 2m high. The vegetation is characteristic of that which has developed on the underlying Hawkesbury Sandstone geology. Given the presence of Bundeena Drive in conjunction with the overhanging eucalypt canopy, a flyway has been established which is expected to be used by microbats during their foraging and dispersal periods.

### 3. Results and discussion.

By the completion of the study, each of the echolocation detectors had recorded identifiable calls of those Microbats present. Once downloaded and analysed, the calls obtained by the condomed Anabat were comparable to those recorded by the ZCAIM unit. Overall, comparison of those calls recorded by the two units did not appear to indicate any distortion or frequency modification due to the presence of the condom (refer to Plates 3 to 6). As evident in Plates 3 to 6, visually, no major variations between the two units were evident. The calls recorded by the condom wearing Anabat were both "clear" and easily identifiable.

It is acknowledged that, during the first night, the ZCAIM unit recorded 187 identifiable microbat passes, whilst the condom wearing Anabat only recorded 132. A similar result was obtained at the completion of the second evening; the ZCAIM unit again recording 187 identifiable microbat passes, whilst the condom-wearing Anabat only getting 122. It is therefore acknowledged that the presence of the condom is reducing the number of calls recorded.

The comparison of the two units identified that, during the course of the two evenings, the non-condomed Anabat Unit recorded a total of 8 Microbats, whilst the condomed unit only recorded 6 (Table 1). The presence of the condom could therefore be considered to influence both the number of calls recorded and the number of identifiable microbat passes. Alternatively, the microbats themselves could have been at (or beyond) the limit the detector's zone of reception (Figure 1), a situation that would arise in the field whether a unit has a water proofing membrane on it or not.

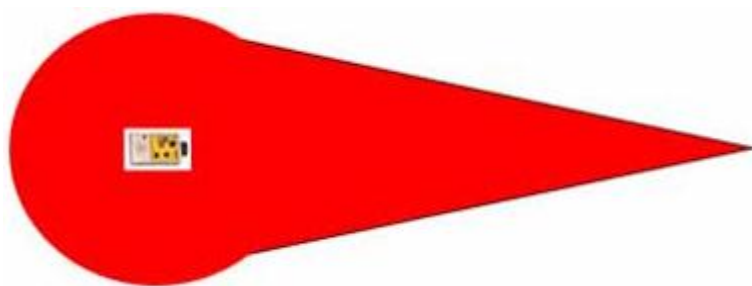
**Table 1: Microbats recorded during the course of the study.**

**Key**

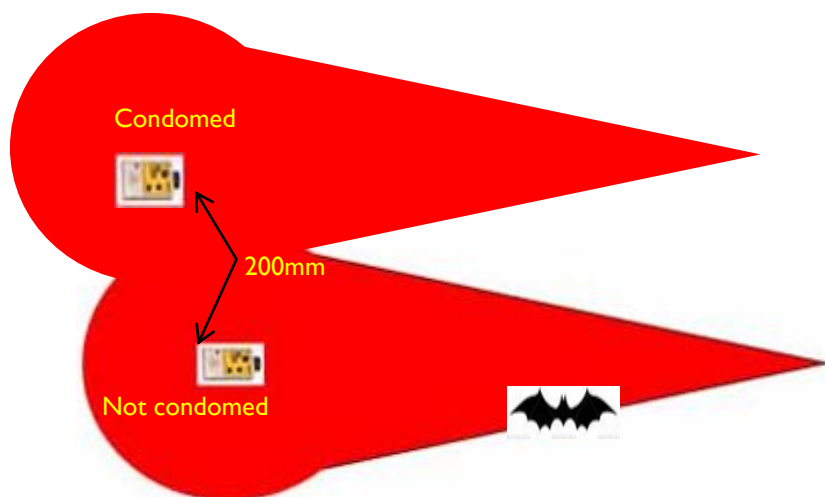
\* - confirmed identification.

# - probable identification.

	<b>ZCAIM unit – no condom</b>	<b>SD1 - condom</b>
<b>Evening 1</b>	* Eastern Horseshoe Bat ( <i>Rhinolophus megaphyllus</i> )	* Eastern Horseshoe Bat ( <i>Rhinolophus megaphyllus</i> )
	# Large-Eared Pied Bat ( <i>Chalinolobus dwyeri</i> ) – 1 pass	
	* Gould's Wattled Bat ( <i>Chalinolobus gouldii</i> )	* Gould's Wattled Bat ( <i>Chalinolobus gouldii</i> )
	# Chocolate Wattled Bat ( <i>Chalinolobus morio</i> )	# Chocolate Wattled Bat ( <i>Chalinolobus morio</i> )
	# Little Bentwing Bat ( <i>Miniopterus australis</i> ) – 1 pass	
	* Eastern Bentwing Bat ( <i>Miniopterus (schreibersii) orianae</i> <i>oceansis</i> )	# Eastern Bentwing Bat ( <i>Miniopterus (schreibersii) orianae</i> <i>oceansis</i> )
	* Little Forest Bat ( <i>Vespadelus vulturnus</i> )	* Little Forest Bat ( <i>Vespadelus vulturnus</i> )
<b>Evening 2</b>	* Yellow-Bellied Sheath-tail Bat ( <i>Saccolaimus flaviventris</i> )	* Yellow-Bellied Sheath-tail Bat ( <i>Saccolaimus flaviventris</i> )
	* Eastern Horseshoe Bat ( <i>Rhinolophus megaphyllus</i> )	* Eastern Horseshoe Bat ( <i>Rhinolophus megaphyllus</i> )
	* Gould's Wattled Bat ( <i>Chalinolobus gouldii</i> )	* Gould's Wattled Bat ( <i>Chalinolobus gouldii</i> )
	* Eastern Bentwing Bat ( <i>Miniopterus (schreibersii) orianae</i> <i>oceansis</i> )	
	* Little Forest Bat ( <i>Vespadelus vulturnus</i> )	* Little Forest Bat ( <i>Vespadelus vulturnus</i> )
<b>TOTAL SPECIES DETECTED</b>	5 – Confidently. 3 – Probably.	4 – Confidently. 2 – Probably.



**Figure 1: “General” zone of reception for an Anabat unit (Corben 2006).**



**Figure 2: General zone of reception expected during the course of the current experiment.**

In the current experiment, as the sensors were approximately 200 millimetres apart, there is the possibility that, as the bat(s) flew beyond the unit’s zone of reception, the condomed Anabat did not detect either the Large-Eared Pied Bat (*Chalinolobus dwyeri*) or Little Bentwing Bat (*Miniopterus australis*) (Figure 2). Again, during the course of any targeted microbat study, this situation could easily occur.

It is noted that, during the course of this study, those additional microbats recorded through use of the ZCAIM were only allocated a confidence identification level of probable. A confidence level of probable is allocated to a species in instances where there is the possibility of confusion of those calls recorded with those of other bat species.

From a consultant’s perspective, it is interesting to note that the condomed unit did detect both hollow dependant and cave utilising microbats, including two species that are listed under the NSW *Threatened Species Conservation Act 1995* (Table 1). If this technique was employed during the course of a development proposal where the weather conditions encountered/predicted were not optimal for the detection of microbats (thereby requiring a detector’s sensor to be waterproofed), a consultant can be assured of recording microbats (assuming individuals are present at a site). In undertaking the relevant assessments, as the weather conditions were a “limiting factor to the success of the study”, a consultant should combine the outcomes of the targeted study with the adoption of the



precautionary approach, thereby ensuring that the impact(s) of a development on the site's/locality's microbat populations are appropriately assessed. The consultant can also be confident that, during the course of their investigation, should the weather conditions deteriorate and rainfall ensue, their expensive field equipment is protected.

Whilst a vast majority of the calls recorded using the condom wearing Anabat were comparable to those obtained through use of the ZCAIM unit, some of the calls recorded were affected. Compared to the calls recorded using the ZCAIM unit, these calls exhibited shorter durations and/or lacked diagnostic characteristics. However, portions of these calls still permitted the species to be confidently/probably identified, based on the frequency of the call, the site's location and reference to documented microbat distribution patterns (i.e. Eastern Horseshoe Bat [*Rhinolophus megaphyllus*], Yellow-Bellied Sheath-tail Bat [*Saccolaimus flaviventris*]). As such, the use of a condom is could be seen as reducing the duration and quality of some of the calls recorded. There could also be the possibility that the condom limits the distance at which the detector is receiving calls. This, however, is unsubstantiated and without further studies conducted in a controlled environment, this can not be confirmed or negated.

#### 4. Conclusions.

The protection of one's equipment during the course of a field survey is important to a consultant. Initial capital outlays on echolocation detectors are costly and it is in the interest of a consultant to find cost effective solutions that protect their units whilst not exposing the survey methodology to criticism. Similarly, the replacement of water damaged detectors and sensors is a cost a consultant can do without. As noted previously, the replacement of a water damaged sensor will cost a consultant a fee of \$138.00 (excl GST) per unit, whilst the Anabat

itself is in excess of \$2200.00 (excl GST). Waterproofing an Anabat unit is therefore an important financial objective for a consultant, though, as noted, the ecologist needs to ensure that the technique adopted does not compromise either the detectors overall effectiveness or the objectives of the fauna study. If this was the case, the consultant is left exposed and their survey methods/report outcomes open to criticism.

The use of a condom, of which a packet of may only cost \$9.00 (incl GST), has been found to provide a convenient and waterproof solution that does not appear to compromise either the overall frequency and clarity of those calls recorded. The use of a condom appears to provide a cost effective solution to the problem of waterproofing an Anabat's sensor, without compromising its overall sensitivity. In the current experiment/configuration, the use of the condom did reduce the diversity of microbats detected, though the results did identify the presence of both hollow and cave dependant/utilising species. The reasons for this reduction in species diversity is not known and could be attributed to a number of variable that have nothing to do with the use of the condom itself (e.g. the bat being beyond the detector zone of reception). As a condom would be used during climatic conditions that were not optimal for the detection of microbats, a consultant should be drawing on the field results and adopting a precautionary approach thereby not compromising the overall investigations outcomes or ultimate assessments. Over other waterproofing methods, condoms have the advantage of being wallet size, easily transportable and quick to employ. The use of a condom is considered to be a simple and cheap option that provides a consultant with peace of mind, whilst still achieving the overall objective of the job.

It is acknowledged that the purchasing of condoms does have some disadvantages,

particularly when asking the sales assistant if they have any that are ultrathin. Combine this with the simultaneous purchase of numerous batteries (for your two Anabat units), peanut butter, honey, rolled oats and stockings (latter which you are going to use to put bait in), and the situation becomes more bizarre and less convincing to explain. Similarly, provision of receipts for numerous packets of condoms to one's accountant at the end of the financial year, and trying to explain to the ATO why these are a legitimate ecological expense, is fraught with danger.

Obviously when using a condom common sense must prevail. If the weather forecast does not predict rain, then an exposed unit is considered to be more effective than a condomed one. But, if a consultant who is targeting microbats at a time when overcast conditions prevail (or showers are

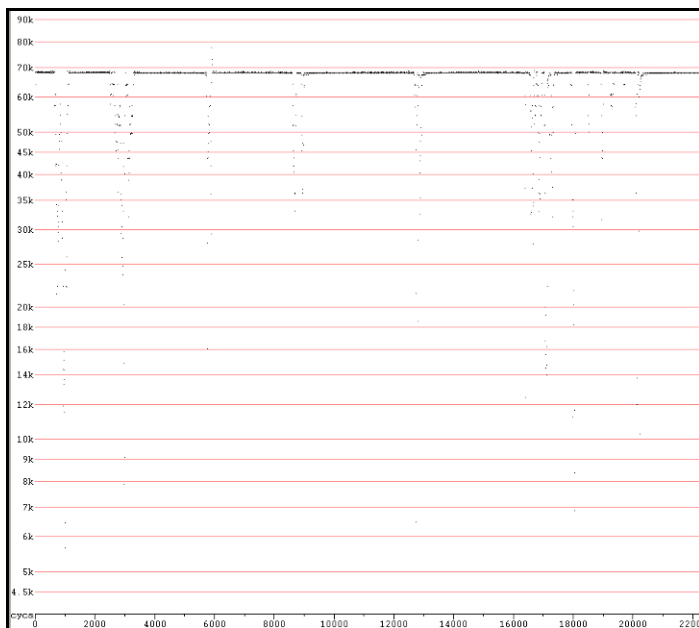
predicted/pending), and is not in a position to adjust their field work schedules to coincide with better conditions, to provide your Anabat with a waterproof cover, we recommend you use your head and put a condom on your unit.

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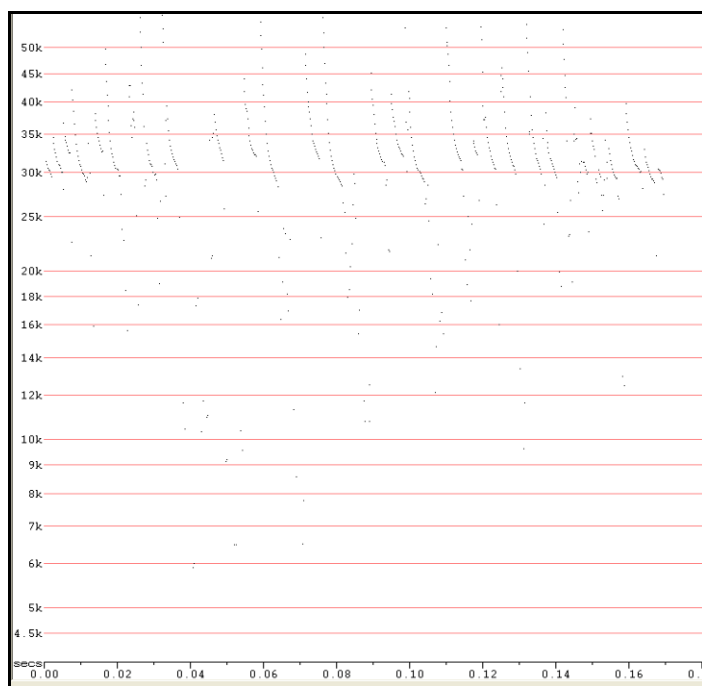
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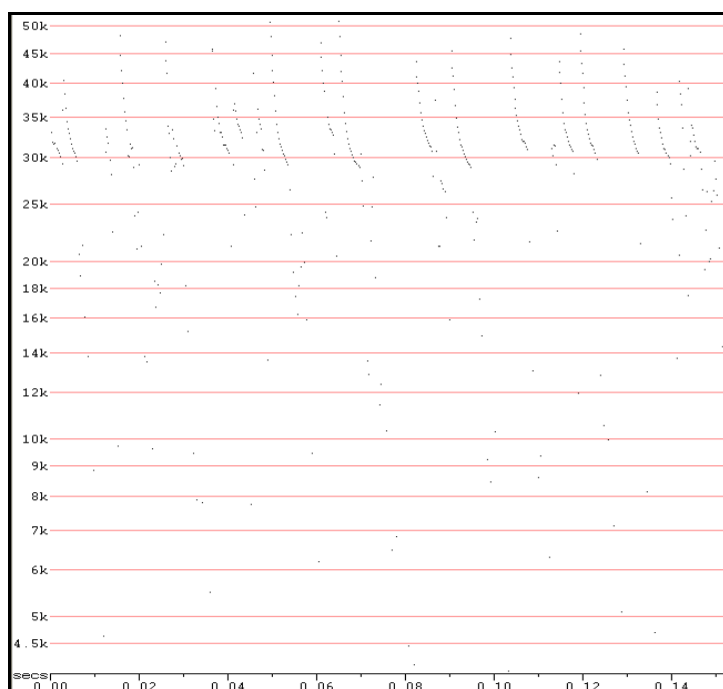
**Plate 3: The characteristic call of an Eastern Horseshoe Bat (*Rhinolophus megaphyllus*) using a ZCAIM Anabat detector without a condom.**



**Plate 4: The characteristic call of an Eastern Horseshoe Bat (*Rhinolophus megaphyllus*) using a SD1 Anabat detector with a condom.**



**Plate 5: The characteristic call of a Gould's Wattled Bat (*Chalinolobus gouldii*) recorded using the ZCAIM unit.**



**Plate 6: The characteristic call of a Gould's Wattled Bat (*Chalinolobus gouldii*) using a SD1 Anabat detector with condom.**

## A brief note on Dendroglyphs or 'Carved Trees'

*Phil Cameron and Dr Jodie Benton*

### Introduction

The purpose of this 'note' is purely educational, we hope that information presented here may result in the detection of extant dendroglyphs by consulting ecologists when assessing the same trees for their habitat values (given their age).

In an Australian context, Culturally Modified Trees are trees that have been scarred, incised, carved or marked by Aboriginals through cultural practice. This group does not include the more recently scarred / incised trees that have been marked by European surveyors etc.

The removal of bark from trees, as well as carving of the heartwood, are both Aboriginal practices known to have been undertaken in prehistory as

well as in the post-contact era. With the influx of Europeans, steel tomahawks became a very sought after item in Aboriginal communities and post-contact tree scarring and carving may have increased early in this period. The removal of bark from trees – resulting in the trees we call 'scarred' – was undertaken primarily to provide material for the creation of objects for everyday use. These included 'coolamons' – dishes (for holding water, seeds etc.), shields, cradles, canoes as well as bark to be used in hut construction. Some trees were also scarred for the purpose of providing toe holds into the trunks so they could be climbed or for providing access into hollows for the capture of mammals, birds, goannas or eggs. The carving of a design into the heartwood of a tree once the bark had been removed was more of a social practice and these carvings – known as 'dendroglyphs' were created for many reasons, including as markers for human burials, significant locations, bora grounds and possibly as tribal boundaries.

Identification of culturally ‘scarred’ trees as opposed to trees scarred by natural phenomenon, or more recent European impact, is a major challenge to archaeologists. Various archaeologists and the DECCW have prepared handbooks to aid in the accurate identification of scarred trees and references to a couple of these are provided below.

European modified trees include trees marked by explorers, surveyors, or trees modified for a particular purpose such as providing bark sheets, those coppiced for timber production or trees that show evidence of the early European practice of ring barking.

### Carved Trees - Dendroglyphs

Dendroglyphs are most commonly formed through the removal of the outer bark (scarring) such that the heartwood is exposed and can be carved into. Carvings are predominantly curvilinear in nature, but other patterns have been recorded including checkers, circular motifs, cross hatches, herringbone, lunates (half moon shaped), punctuates (covered in holes), scrolls and spirals. Carvings can also be anthropomorphic (representing human forms) or zoomorphic (representing animal forms).

According to early ethnographer Mathews, a dendroglyph may be produced by any one of the following actions (Mathews 1898):

- The object to be portrayed is outlined by nicks and cuts in the bark of a tree with a tomahawk;
- The whole of the bark within the outline of the figure is removed, leaving the sapwood exposed i.e. the outline of a goanna, no further work would be required for this type of dendroglyph;
- Portions of the bark and sapwood are first removed, and the glyphs are cut into the heartwood proper. This is the most common

method. Today the vast majority of these on living trees are re-enclosed / almost enclosed such that the carvings are indistinguishable, indecipherable or lost (**Figure 1**); and

- Figures represented by merely scratching or incising the motive on the bark-surface without penetrating to the sapwood, as distinct from nicks or cuts with a sharp instrument as detailed in point 1.

### Antiquity

The oldest European written record is from Surveyor-General John Oxley. On July 29<sup>th</sup> 1817, whilst exploring the banks of the Lachlan River, where he described ‘*a mounded earth grave, within a cleared circular area possessing three rows of parallel mounded earth ‘seats’ behind with two carved cypress pine trees to the north and west of the grave.*’

The earliest documentation of the relationship of carved trees with a bora ground and bora ceremony dates to 1832 (Henderson<sup>1</sup> as recorded in Etheridge 1918). The area observed was ‘*a secluded spot of the forest near the rich green banks of the Macquarie River*’ near Wellington in NSW. The accompanying plate shows 28 variously incised carved trees and their relationship to the bora ground.

Mathews (1915: 34) remarks that ‘*on more than one occasion I have discussed these remarkable native productions (with other interested parties) and they have suggested that they came into vogue after the first settlement of the British in 1788.* The main argument for this was that ‘*nearly all carving on the glyphs recorded had been done with a metal tool*’. This may be the case however, there is a degree of evidence from the 1880s to 1915 stating that ‘*very old carved trees with considerable depth of regrowth*’ were observed that could not have possibly been made after 1788. One such example is the groups

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<sup>1</sup> Henderson, J. 1832 *Observations on the Colonies of NSW and Van Diemens Land*. Calcutta.

of trees that mark the grave of 'Cumbo Gunerah', the Red Chief of Gunnedah who is said to have lived in approximately 1745.

It is also known that due to the significance of carved trees, the tradition of maintaining carvings is also practiced. One such tree examined by OzArk appeared to possess both stone axe marks from the original carving with 'maintenance' marks from a steel axe. An example of stone and steel axe marks on the one dendroglyphs is shown in **Figure 2**. This tree was vandalised after being recorded in the early 1980s resulting in the lower half of the carving and scar being consumed by a fire lit at the base of the tree.

Oral history within Aboriginal communities also remains as a source of information about dendroglyphs and their possible antiquity and associations. It is sadly true, however, that this information source is declining in many areas with the demise of the older generation who had firsthand experience of the practice or memories of stories from their forebears.

Further comment on the antiquity of the practice of carving trees is not feasible due to the fact that there are no written records prior to 1788 and that the trees themselves do not remain alive for more than c. 400-500 years at the maximum.

## Classification

The classification of dendroglyphs has been a problematic pursuit from the first time it was attempted. Edmund Milne, who worked for the NSW Railways, first published his findings in the *Scientific Australian* in 1914, proposing a three tier categorisation based on the assessed interpretation of the tree (i.e. commemorative, burial or bora). When tested for use over the whole of NSW in 1918, R. Etheridge Jnr, Director and Curator of the Australian Museum found that it was really only feasible to separate the trees into two, groups, as follows (Etheridge 1918: 6).

1. Trees in proximity to native graves, as memorials to the deceased. These may be single or in groups of up to five in number. These trees are known as 'taphoglyphs' and the incisions into the heartwood are thought to be the deepest. This grouping was extended to include trees marked to commemorate some important tribal event, because evidence to distinguish them from those relating to burials is rare. One such group of trees occurs south of Narromine (central westNSW) to mark the scene of an important battle where the Bogan mob killed the best boomerang thrower of the Narromine mob (both Wiradjuri language group). Recent inspection of these trees showed that the scars had completely closed being evidenced only as a slight 'slit' in the trunk, very easy to miss unless otherwise informed. These trees evidence over 20 different designs (as noted above) and defy further classification
2. Trees that signify a bora ground or initiation / ceremony site and are known as 'teleteglyphs'. They may be found in lines or dotted over a space of several acres, often interspersed amongst three dimensional ground models. Carved designs were divided by Etheridge into four groups – anthropomorphic, zoomorphic, physiomorphic and quasi-geometric, and included representation of mythological figures and totems.

Taphoglyphs (carved trees indicating graves), are in a way 'head stones' marking a grave, although they were apparently rarely at the head of the grave as is European practice, but were often oriented to a central point within a groups of trees where the grave may be. Lang (1885 as quoted in Etheridge 1918: 28) remarked that '*the natives frequently designed figures of some kind on the trees growing near graves of deceased warriors. Some observers have fancied that in these designs they recognised the totem of the dead man; but on this subject evidence is by no means clear*'. The carving of



tapholglyhs is thought to have been reserved for the head men or powerful 'doctors' or wizards' of the tribe (Etheridge 1918: 11).

### Tree species

To date, there has been no exhaustive review of the species of tree recorded as possessing dendroglyphs over NSW. The most common species to be encountered in the field and recorded in the various text are 'box' (white, black, grey, yellow, bimble), although white cypress pines, coolibah, river red gums and at least two kurrajongs on the same property (the latter species considered to be 'unique') are known.

### Actions to take if one is located

Identification of a dendroglyph in the field may be problematic as the scar may be nearly closed or the design may be heavily deteriorated. The safest management of a tree that you suspect may contain a carving would be to take a 'due diligence' approach, recording a GPS point and talking several photographs followed by a phone call to the regional DECCW archaeologist who would in turn notify their respective cultural heritage officer for a follow up inspection.

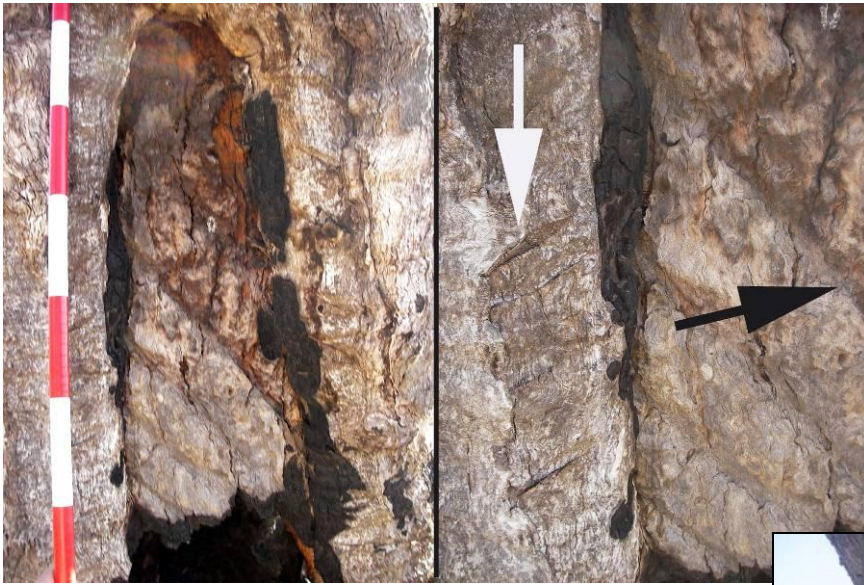
If any of the readers require assistance or further knowledge please feel free to contact us on 02 6882 0118. axe.



**Figure 1: Yuranighs grave**

Yuranigh accompanied Sir Thomas Mitchell's expedition to Qld in 1845-1846 and was an important friend and companion to Mitchell. He died in Molong on the 29<sup>th</sup> of April 1850, hence the photos taken (2008) were after 158 years of regrowth. The figure at the bottom right hand corner shows detail of the carvings inside one of the narrow slits in the tree. The trees are all yellow box. The designs had been made with a steel axe.





**Figure 2: Dendroglyph detail showing stone hatchet marks (black arrow) and maintenance with a steel tomahawk (white arrow).**

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Ethridge 1915 *The dendroglyphs or 'Carved Trees' of NSW*. NSW Department of Mines, Memoirs of the Geological Survey of NSW, Ethnological Series No 3.

Oxley 1820 *Journal of two expeditions of internal NSW (1817-1818)*, p138 and 141 (with accompanying plate).



**Figure 3: The great tree had been deliberately damaged by fire after it was first officially recorded in the 1980s, leaving only the upper most portion of the carving intact (above, scale pictured = 10cm). Regrowth had at a later date (prior to recording of the tree in the 1980s) been trimmed away from the scar (above right).**

The aetiology of this dendroglyph remains unknown, however the great grandson of an Aboriginal woman married to a miner who lived on the property, believes it marked the scene of a Bogan mob battle and noted that although his great grandfather (the white miner) had extensive ring barking on the property, he always made sure that the dendroglyph was left undamaged.



## Bat Adventures in Austin, Texas

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Ecotone Ecological Consultants Pty Ltd

<sup>1</sup>ECA Council Member

<sup>2</sup>ECA Member

On our return from an extended trip to the UK (a report in the next issue), we decided to make a quick stopover in parts of the USA. After visiting friends in Toronto we headed for Seattle and on to the San Juan Islands where thanks to our friend and tour guide Terry Domico, we encountered a variety of wildlife, including killer whales, an impressive barred owl (*Strix varia*) (**Plate 1**), white-tailed deer, ospreys, bald eagles, hummingbirds and a bat box American style (large) full of little brown bats (*Myotis lucifugus*) (**Plate 2**) to name a few.



**Plate 1. Barred Owl**

We then spent a night at Las Vegas (yeah – one night was enough) and drove to the Grand Canyon via the Valley of Fire and returned via Bryce Canyon (**Plate 3**) and Zion National Park. The scenery was impressive and different at each location, and the wildlife abounds with heaps of squirrels, deer, many birds and chipmunks (one of which was getting seeds out of a car's radiator) (**Plate 4**). If you ever intend visiting the Grand Canyon, go to the North Rim as it is less commercialised and allow a few days just to visit there.



**Plate 2. Bat box USA style, San Juan Islands. Inset: Large Brown Bats, using the nest box.**



**Plate 3. Bryce Canyon**



**Plate 4. Uinta Chipmunk seen at the Grand Canyon**

And now on to the main subject of this travellers tail: Austin, Texas. Why would anyone select Austin as a holiday destination? The answer is

simple in this household – bats! Apparently Austin’s only claim to fame is copious live music (although we did not see or hear any) and 2 million Mexican Freetail Bats (*Tadarida brasiliensis*) living under the Congress Avenue Bridge over the Colorado River. The nightly exodus has been developed into a major tourist attraction, mainly by the endeavours of Bat Conservation International (BCI), which is based in Austin, and bat rehabilitation guru Barbara French. We had hoped to spend some time with Barbara, however she had just moved to Mineral Wells in Texas to help run Bat World Sanctuary and this was too far away, given our short stay in Austin.

Back at the Congress Avenue Bridge, one of the drawcards is that the bats start to leave before sunset, which is great for spectators. We rolled up at the bridge at about 7 p.m. and with the aid of a torch were able to see countless bats jammed into the much stained girder gaps of the bridge. The crowd started to build (it was a Sunday) to the point that half a dozen crowded tourist boats were anchored near the bridge and people were three deep along the river bank and bridge footpaths. On cue, the bats started their fly-out, starting at the southern end of the bridge and moving to the northern end like a ‘Mexican Wave’. An endless broad ribbon of bats followed the Colorado River to the east, truly an amazing sight (**Plate 5**).



**Plate 5 a & b. Mexican Freetail Bats leaving Congress Avenue Bridge, Austin, Texas.**

After about an hour we decided to have a meal at the nearby hotel overlooking the river, and even the menu had bats drawn around the margins. It was dark by the time that we finished our meal and bats were still leaving the bridge, so we walked across the bridge for a different perspective as the spectators started to thin out. On our way back we could not go past the young fellow selling ‘Keep Austin Batty’ t-shirts.

The next day we were in for even bigger things batty. We hired a car and visited the offices of BCI just out of town. Unfortunately, being summer, most of the researchers (including Merlin Tuttle) were away in the field, however we did manage to organise a visit to Bracken Cave some 100km south of Austin. This cave is the home of an impressive 20 million Mexican Freetail Bats and is owned by BCI. Access is by group bookings only and fortunately for us, the one night we had available had been booked by San Antonio Zoo staff and we were able to tag along. After a visit to a nearby show cave and great views of hummingbirds, we joined the queue at the cave gate eagerly awaiting escort to the cave. The bats at Bracken Cave start to exit even earlier than at Congress Avenue Bridge, with the first bats leaving at 6.15 p.m. (over 2 hours before dark). By the time we arrived at the cave, the exodus was in full swing with a constant stream of bats leaving the entrance (**Plate 6**). Being daylight the







**Plate 6 a & b. Mexican Free-tail Bats leaving Bracken Cave, Austin, Texas.**

predators were also active, with birds of prey diving through the ribbon of bats hoping for a quick feed. Four species regularly prey on the bats: Swainson's Hawk, Cooper's Hawk, Red-tailed Hawk and Peregrine Falcon. Snakes (Western Coachwhip Snake (*Masticophis flagellum*) observed) also hang about the cave entrance cleaning up any bats that went to ground. After dark, owls, skunks and raccoons apparently take over as it takes until 11 p.m. for all the bats to

leave the cave. They start to return at about 5.30 a.m. with the last bats returning at 8.30 a.m. The bats are only present during spring to autumn which allows for the guano to be mined during winter and this is sold as fertiliser – the bats may be small but you can imagine how much guano 20 million bats would produce in a season, especially as they eat several tons of insects per night.

After an hour and a half of watching this incredible sight, we were escorted out at dusk and could not contain the excitement of being able to witness one of the largest congregation of animals and top ten wildlife wonders of the world. If visiting the USA, we seriously recommend making the effort to visit Austin. The bats at the Congress Avenue Bridge are reason enough, but the Bracken Cave is the 'icing on the cake'.



# Regional Reports

*This column of Consulting Ecology, encourages those regional members to let the rest of us know what issues they are facing in their area. If you are a regional member and have something you would like to share with the membership, please consider contributing to this column.*

## A Consultant's Birthday

Brian Hawkins  
Flametree Ecological Consulting  
ECA Member

I received no presents on my birthday last December. Instead I went to work, driving a couple of hours to a bridge over a creek at the foot of the Gibraltar Range, west of Grafton. As it turned out, the work itself was like a huge birthday present.

The aim was to see if any microbats flew out of the bridge at dusk, and to look for frogs in the creek. Surrounded by a pile of gear (Anabat, spotlight, headtorch, clipboard, CD player, camera, dictaphone, spare batteries, etc.) I settled down on a grassy bank to await nightfall. A platypus came and paddled in the pool beneath me, almost close enough to touch, its small eyes not registering my motionless silhouette as a danger – until I flinched to discourage a March-fly from landing, when it disappeared in a bulge of water.

As darkness fell, some Peron's and Eastern Dwarf Tree-frogs began calling from a dam somewhere, intersecting with the last cries of the summer Koels, and a Common Green Tree-frog uttered a series of deep grunts before tiring and falling

silent. I heard with pleasure, on the bank nearby, the soft, almost apologetic call of a Giant Barred Frog – such an unassertive noise from such a bruiser of an amphibian. It's always nice to find a Threatened species: it makes the consultant feel competent and virtuous.

A tribe of Dainty Green Tree-frogs, hidden in the branches overhead, began groaning in unison in response to some obscure cue. They groaned once and fell silent. Wark wark wark, said a Great Barred Frog further along the creek.

The first microbats were flying in the open country around me, but still nothing had emerged from the concrete structure of the bridge. I had done quite a few bridge surveys, but had never seen anything fly out apart from swallows. Finally, an hour after sunset, I got up and left.

I walked a hundred metres down and a hundred metres up the creek, finding nothing new, except for the common and widespread Striped Marsh Frog. Some toadlets were calling in a nearby paddock, so I wandered off to have a look – I wasn't sure whether they were Uperoleias or Pseudophrynes. I seldom take the pains to hunt down toadlets, as the effort is often considerable, and the rewards are usually meagre: they are not spectacular frogs. But I was being paid, so I set to with a will, and before long I had unearthed a little Uperoleia – and what a Uperoleia! A shiny chocolate jewel with flashes of sulphur, gold and crimson!

As I sat in the dark paddock, photographing the frog and keying it out, I heard a whoosh and a soft thud, very near. I looked up and there was a Feather-tailed Glider on top of my camera bag. For a moment it just sat there, and I just sat there. Then I began to try, without moving, to photograph it. Immediately the animal took fright and ran off into the grass, headed for the trees, trailing its fabulous tail behind it like a comet.



It seemed I had stumbled into a treasure trove! I had been out in the paddock for a long time – an hour? Every so often a car would come by, or a giant truck with its headlights slicing through the darkness, re-establishing the whereabouts of the road and bridge. Otherwise I might have got lost.

At last I returned to the bridge to fetch the Anabat, pack up and leave. Swallows, disturbed by my torch, were flitting to and fro and hanging from the ceiling. Hanging from the ceiling? No, they were bats – Eastern Horseshoe Bats: gorgeous orangey creatures with piggy noses that made them look like babies sucking on giant dummies. They dangled and gazed at me stupidly. At last, a bridge with bats in it!

Where had they come from? Were they roosting in the bridge? Why had I not seen them flying out earlier? These questions could wait. I drove home, exhilarated by the night's work, and happy also that someone else would be doing the 7-part tests.

\* \* \*



**Above: Uperoleia laevis**

**Below: Swallow and Horseshoe Bat under bridge**



Postscript to previous article (Volume 23): The RTA has agreed to leave the Cameron's Corner wetlands and paperbark forests alone.



**Left:  
Horseshoe  
Bat under  
the bridge.**

### **Hair-sampling device warning**

#### **DECCW AEC concern regarding non-target captures and deaths when using hair-sampling devices such as hairtubes**

The DECCW AEC has recently received feedback from researchers regarding unwanted capture and death of target and non-target species when using hair-sampling devices.

After much consideration on this issue, the DECCW AEC will in future require all researchers to give consideration to the need to use such devices in their survey. Due consideration must be given to alternative methods, and any proposed use of the devices will need to be clearly justified over alternative methods in the AEC protocol application or renewal. Alternative methods with potential to provide similar results include remote cameras and tracking tunnels.

The AEC also recommends that hair-sampling devices would be more appropriately used in cooler months, when unwanted capture of reptiles is likely to be reduced. Also the sticky substance used in the devices may be less sticky due to lower temperature and lower humidity at this time.

This applies to any hair-sampling device and any sticky capture medium, including commercial preparation and sticky tapes.

If you have any queries, feedback or comments, please contact [aec@environment.nsw.gov.au](mailto:aec@environment.nsw.gov.au).

Source: email circulated by **Lisa O'Neill** A/Executive Officer DECCW Animal Ethics Committee



## Contributions to the Newsletter, Volume 25

Contributions to the next newsletter should be forwarded to the editor, Jason Berrigan [editor@ecansw.org.au](mailto:editor@ecansw.org.au) or the administration assistant Amy Rowles [admin@ecansw.org.au](mailto:admin@ecansw.org.au) by the  
**1<sup>st</sup> of June 2010.**

- Articles may be emailed in WORD, with photos included or referenced in an attached file as a jpg.
- Please keep file size to a minimum, however there is no limit on article size (within reason)
- Ensure all photos are owned by you, or you have permission from the owner
- Ensure that any data presented is yours and you have permission from your client to refer to a specific site (if not please generalize the location).
- All articles will be reviewed by the editorial committee, and we reserve the right to request amendments to submitted articles or not to publish.
- Please avoid inflammatory comments about specific persons or entity

The following contributions are welcome and encouraged:

Relevant articles  
Anecdotal ecological observations  
Hints and information  
Upcoming events  
Recent literature  
New publications (including reviews)  
Member profiles  
Photographs



Anthony M Saunders  
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p 1300 7999 50 (Direct)

## Advertising Opportunities with the ECA

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2. \$300 for company name with some detail and a link
3. \$500 for company name within box, logo, details and web link

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### Newsletter:

1. \$100 for a third of a page
2. \$250 for a half page
3. \$500 for a full page
4. \$1 / insert / pamphlet

*Advertising is available to service providers of the Ecological Consulting industry. The ECA will not advertise a consultant or their consulting business.*

**If you wish to advertise, please contact the ECA administrative assistant on [admin@ecansw.org.au](mailto:admin@ecansw.org.au).**

*"Non-ECA promotional material presented in the ECA Newsletter does not necessarily represent the views of the ECA or its members."*

# ECA Photo Gallery

(Photo Competition Entries)



**Top Row from left:** Lurcher *Yoma sabina* (Photo courtesy of Veronica Silver). Common Brushtail Possum (Photo courtesy of Peter Bell). Powerful Owl (photo courtesy of Graham Dart). *Varanus panoptes* in south west Queensland, hiding in salt bush (Photo courtesy of David Paull).

**Left:** Tawny Frogmouth (Photo courtesy of Harry Engel)  
**Right:** Snake Vs Dragon (Photo courtesy of Peter Bell)



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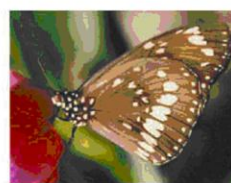
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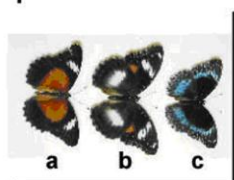
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## Butterflies of Australia.

Article on pages 50.

Species names listed on page 48.

Photos courtesy of Alan Hyman



# ECA Photo Gallery

(Photo Competition Entries)



**Above: 2nd Place** - Orange Lacewing *Cethosia penthesilea*. Photo courtesy of Veronica Silver. **Below:** Red variant of the native Cape York Sundew *Drosera indica*, from Cape York Peninsula, far North Qld. Photo courtesy of Deborah Gleeson.



**Above:** Fringe Spider Orchid *Caladenia tentaculata* found on a rock outcrop near Holbrook. Photo courtesy of Martin Sullivan.



**Right:** Cruiser *Vindula arsinoe*. Photo courtesy of Veronica Silver.



**Left:** Western Bearded Dragons *Pogona minor* were a regular sight during recent fieldwork in central Western Australia.

**Right: 3rd Place** - Splendid Fairy Wrens were quite abundant in the acacia shrublands during recent fieldwork in central Western Australia. But the shyness of coloured males made them extremely difficult subjects to get a good photo of, this being the best Steve could manage with a 500mm zoom and continuous shooting. Photos Courtesy of Steve Sass of Envirokey.

