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Newsletter of the Ecological Consultants Association of NSW

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Back cover ECA Photo Gallery: Photo Competition Entries

Editor: Jason Berrigan

Design and Layout: Amy Rowles



ScoutGuard 04.10.2013 13:39:52

A wedge-tailed eagle hoping for a part in the next Wolf Blass advertisement (see page 22).



Mark Couston, outgoing president (left) and Deryk Engel, secretary (right) presenting at the AGM (see page 9).



Bob Brown (Bob Brown Foundation, centre), Cate Faerhmann MLC (left) and David Shoebridge MLC (right) addressing the crowd. (see page 17)

Front Cover Photo: Eastern Brown Snake juvenile, Goulburn, NSW. Photo Courtesy and Copyright of Steve Sass.

ECA Office Bearers 2012-2013

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Jason Berrigan

Message from the President

August 2013

Dear members,

During the AGM in Leura in August, which was a great success, a new council was elected, including myself as the new president. I am replacing Mark Couston who I would like to thank sincerely for the excellent job he has done for the last three years as the head of the ECA. I would also like to thank Paul Burcher (treasurer) and Deryk Engel (secretary) who have yet again put their hands up to take significant roles within the council. Thanks also to the continuing and new council members, your efforts are greatly appreciated.

As the new president I would like to see greater interaction between our members. There is great opportunity to come together as ecological consultants and share ideas and knowledge, and as the ECA council, understand from you our members how the ECA could serve you better. Running an ecological consultancy with a dispersed business model I understand the importance of maintaining interaction between our team, and in trying to achieve this we have discovered some great tools. We live in the virtual age of information, and as a group of likeminded professionals working remotely from each other we should be using that technology to serve us better. Although we live in a competitive market we don't need to be adversarial, but rather, we should be coming together as a community of ecologists to share knowledge and strive for excellence in our industry. Through the implementation of file sharing and online forums I hope to bring the ECA community closer together.

Aside from looking at ways of innovating our communications and knowledge sharing, we will continue to provide our members with our traditional services such as training courses, the *Consulting Ecology* newsletter and the annual conference. We will also work hard to finalise the good work of Martin Denny and Mark Couston, and many others, by finalising the Certification scheme. I believe the scheme is extremely important as it will guide ecological consultants in the technical and ethical expectations of the industry and highlight to the outside world that we are serious about improving the quality, independence and ethicacy of NSW's ecological consultants. A number of you raised concerns about the costs and professional development requirements and the Certification Committee will review these to ensure the scheme is as equitable and accessible as possible.

Thank you all for your continued support of the ECA, I look forward to working with you all to develop new ways of serving you better.

Rhidian Harrington

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.

KOALA CAUGHT ON CAMERA

*Tom Pollard
Geolink*

These photos are of a male koala inspecting the bait at a camera trap in wet sclerophyll forest at Larnook near Kyogle. The bait was a standard mammal mix of rolled oats, peanut butter and honey and the time of day was approximately 1:30 pm in the afternoon. I think the Koala was just inquisitive. The log that the bait is set up on is covered in a thick moss, and does not appear to have any evidence that it is used as a regular runway. He didn't hang around very long, and hasn't returned since!



OSPREY CHICK UPDATE

*Judie Rawling
UBM and ECA Councillor*

Some of you may be interested in the follow up to the recent storey on the Osprey Breeding Program in Scotland (Consulting Ecology Volume 30). The osprey chick has now been banded, measured and fitted with a satellite device. It is huge! Great photos available on the [Scottish wildlife trust blog @ http://blogs.scottishwildlifetrust.org.uk/osprey/](http://blogs.scottishwildlifetrust.org.uk/osprey/)

A VIABLE ALTERNATIVE TO NEST BOXES?

Photo provided by Dr Stephen Ambrose.



ECA Events

- **PROPOSED ECA WORKSHOPS**
2013 / 2014

- ◆ **Shorebirds**
- ◆ **Terrestrial Orchids (Spring 2013)**
- ◆ **Rainforest Plant ID**
- ◆ **Business Development and Practices Workshop**

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.

Non - ECA Events

- **Annual forum of the Royal Zoological Society of NSW.**

Date: Saturday 2nd November 2013, 9am-5pm.

Venue: Australian Museum

Theme: Dangerous Ideas in Zoology

Details: www.rzsnsw.org.au

- **Australian Wind Energy Conference 2013**

Date: 18-19th November

Venue: Hotel Grand Chancellor, Adelaide

Theme: The post election review for the outlook for the industry and key drivers in 2014

Cost: \$2964.50

2013 Wildlife Schools



Niche Environment & Heritage are once again offering the chance for you to participate in their unique and interesting Wildlife Schools in 2013 and to be trained in the survey, identification and management of the fauna and flora of southeastern Australia.

Emphasis is placed on time in the field to gain maximum experience in survey procedures and to view habitats from the perspective of the wildlife that live in it. The courses concentrate on species listed under both the TSC and EPBC acts, providing the latest research information on their specific requirements.

Our teaching staff are experts in their fields. All our courses are run by recognised professionals with many years of experience studying the target groups - Dr Frank Lemckert; Dr Rod Kavanagh; Dr Bradley Law; Dr Trent Penman; Dr Mark Fitzgerald; Dr Marion Anstis.

Niche are taking registrations now for the following courses:-

- ◆ **Tadpole ID & Survey - 28th to 29th October**

Crommelin Field Station, Pearl Beach. Cost \$750 ex gst, registrations close 11 Oct.

- ◆ **Advanced Frog, Bat & Reptile Survey ID & Management - 12th to 15th November**

Cascade Field Studies Centre, Dorrigo. Cost \$1,400 ex gst, registrations close 23 Oct.

Cost includes all meals and accommodation. Travel costs are not included and travel arrangements are the responsibility of the participant. For further information on individual courses and registration forms, please contact Deretta Brown on email dbrown@niche-eh.com

- **EcoTas13: 5th joint Conference of the Ecological Society of Australia and New Zealand Ecological Society .**

Date: 24th -29th November 2013

Venue: The Aotea Centre, Auckland

Theme: Celebrating ecology on both sides of the

Tasman: diversity and opportunity

Cost: \$225 - \$875 (\$NZ, depending on membership status and number of days)

Details: ecotas13.org

Contact: ecotas13@auckland.ac.nz

August 2013 ECA Membership Report

Amy Rowles

ECA administrative assistant

In total we have 167 members. We have had seven new members and five current applicants over the last six months. The new members are introduced below:

- Chelsea Hankin
- Sarah Warner
- Feach Moyle
- Malith Weerakoon
- Linda Sass
- Ed Cooper
- Kurtis Lindsay

NEW MEMBERSHIP CATEGORIES!

A revision of the ECA membership categories took effect as of the 2013 AGM held on the 2nd of August. The following summarises the new category system and full details are available on the website.

- **Full Member (voting rights)**
 - * Practising Ecological Consultant
 - * Certified Practising Ecological Consultant (*to be activated when Certification Scheme is adopted*)

- **Associate Membership (no voting rights)**

- * Associate Ecological Consultant (*new to industry unable to provide referees or examples of work*)
- * Government Ecological / Environment Officer
- * Non-practising Member
- * Subscriber

- **Student Membership (no voting rights)**

Those members who are currently practising (regional) and Associate members will be automatically moved into the Practising Ecological Consultant, assuming that all criteria are met. Those who are currently non-practising and subscriber will be moved into the Associate Membership category and placed in the appropriate sub-category. This will take effect in December when renewals for 2014 are issued.

All new applications submitted from the 2nd of August 2013 will be assessed using the new category system. Current fee structure is \$200 for Full Membership (Practising Ecological Consultant), \$60 for Associate Membership and \$30 for Student Membership.

Recent Literature and New Publications

Recent Journal Articles / Literature

Predavec M. (2008) **How to Succeed in Business - Zoology in the Private Sector.** *Australian Zoologist* Vol 34 (4). <http://www.rzsns.w.org.au/index.php?/Journals/Australian-Zoologist/australian-zoologist-database.html>

Schumann N., Dann P. and Arnould J. (2013) **Use of terrestrial habitats by burrow-nesting seabirds in south-eastern Australia.** *Emu* V113 (2): 135-144. <http://dx.doi.org/10.1071/MU12088>

- Stevens H. and Watson D. (2013) **Reduced rainfall explains avian declines in an unfragmented landscape: incremental steps toward an empty forest?** *Emu* 113(2):112-121
<http://dx.doi.org/10.1071/MU12063>
- Schoenjahn J. (2013) **A hot environment and one type of prey: investigating why the Grey Falcon (*Falco hypoleucos*) is Australia's rarest falcon.** *Emu* 113(1): 19-25. <http://dx.doi.org/10.1071/MU12049>
- MacGregor C. , Wood J., Dexter N. and Lindenmayer D. (2013). **Home range size and use by the long-nosed bandicoot (*Perameles nasuta*) following fire** *Australian Mammalogy* - <http://dx.doi.org/10.1071/AM12032>
- Fancourt B., Hawkins C. and Nicol S. (2013). **Evidence of rapid population decline of the eastern quoll (*Dasyurus viverrinus*) in Tasmania** *Australian Mammalogy* - <http://dx.doi.org/10.1071/AM13004>
- Glen A. and Dickman C. (2013) **Population viability analysis shows spotted-tailed quolls may be vulnerable to competition.** *Australian Mammalogy* - <http://dx.doi.org/10.1071/AM12045>
- Moore T. et al., (2013). **Do woodland birds prefer to forage in healthy *Eucalyptus wandoo* trees?** *Australian Journal of Zoology* 61(3): 187-195 <http://dx.doi.org/10.1071/ZO13045>
- Smith A. et al., (2013). **Are there habitat thresholds in koala occupancy in the semiarid landscapes of the Mulgalands Bioregion?** *Wildlife Research* - <http://dx.doi.org/10.1071/WR13010>
- Allan B. et al., (2013). **A cost-effective and informative method of GPS tracking wildlife.** *Wildlife Research* - <http://dx.doi.org/10.1071/WR13069>
- McConville A., Law B. and Mahony M. (2013). **Mangroves as maternity roosts for a colony of the rare east-coast free-tailed bat (*Mormopterus norfolkensis*) in south-eastern Australia.** *Wildlife Research* 40(4): 318-327 <http://dx.doi.org/10.1071/WR12222>.
- Burrows G. (2013). **Buds, bushfires and resprouting in the eucalypts.** *Australian Journal of Botany* 61(5): 331-349. <http://dx.doi.org/10.1071/BT13072>
- Lintermans M. (2013). **A review of on-ground recovery actions for threatened freshwater fish in Australia.** *Marine and Freshwater Research* 64(9): 775-791 <http://dx.doi.org/10.1071/MF12306>
- Pickup M. et al., (2013). **Post-fire recovery of revegetated woodland communities in south-eastern Australia.** *Austral Ecology* V 38 (3) ; 300-312.
- Lee K. et al., (2013). **Anthropogenic changes to the landscape resulted in colonization of koalas in north-east New South Wales, Australia.** *Austral Ecology* V 38 (3) ; 355-363.
- Peacock R., Downing A., Brownsey P. and Cameron D. (2013). **Distribution, habitat preferences and population sizes of two threatened tree ferns, *Cyathea cunninghamii* and *Cyathea x marcescens*, in south-eastern Australia.** *Cunninghamia* V13(1):1-24
- Armstrong R., Turner K., McDougall K., Rehwinkel R. and Crooks J. (2013). **Plant communities of the upper Murrumbidgee catchment in New South Wales and the Australian Capital Territory.** *Cunninghamia* V13(1): 125-265.

Recent Book Releases

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

Title: Best 100 Birdwatching Sites in Australia

Author: Sue Taylor

RRP: \$39.99

No. Pages:256

Publisher: NewSouth Publishing

Date: October 2013

Title: Australian Bird Names: A Complete Guide

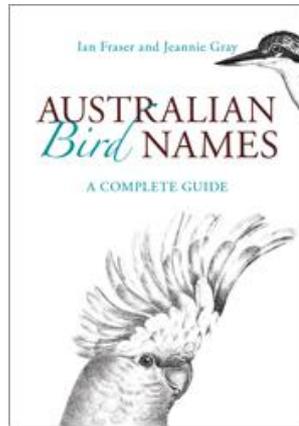
Author: I. Fraser and J. Gray

RRP: \$49.95

No. Pages:352

Publisher: CSIRO Publishing

Date: May 2013



Title: Living Waters: Ecology of Animals in Swamps, Rivers, Lakes and Dams.

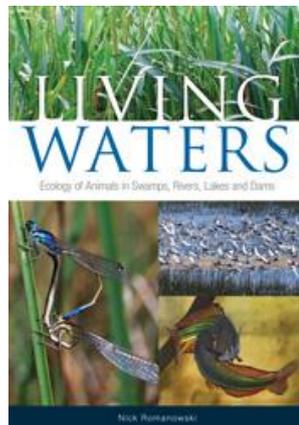
Author: N. Romanowski

RRP: \$39.95

No. Pages:304

Publisher: CSIRO Publishing

Date: October 2013



Title: A Tribute to Des Cooper: Australian Journal of Zoology Special Issue.

Author: Ed. C. Herbert and K. Belov.

RRP: \$75.00

No. Pages:108

Publisher: CSIRO Publishing

Date: July 2013



Title: Australian Beetles Volume 1: Morphology, Classification and keys

Author: J. Lawrence and A. Slipinski

RRP: \$195

No. Pages:576

Publisher: CSIRO Publishing

Date: September 2013

Title: Butterflies: Identification and life history

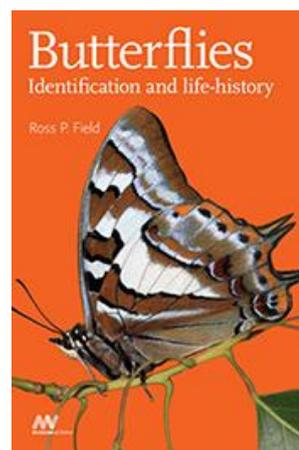
Author: R. Field

RRP: \$29.95

No. Pages:312

Publisher: Museum Victoria

Date: July 2013



Title: Flying Foxes: Australian Night Foresters

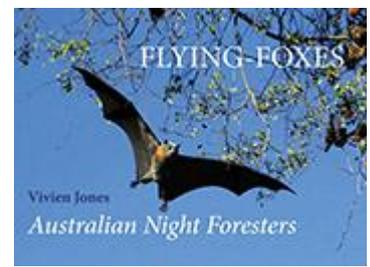
Author: V. Jones

RRP: \$39.95

No. Pages:192

Publisher: Rosenberg Publishing

Date: September 2013



Title: Ecology of Australian Temperate Reefs: The Unique South

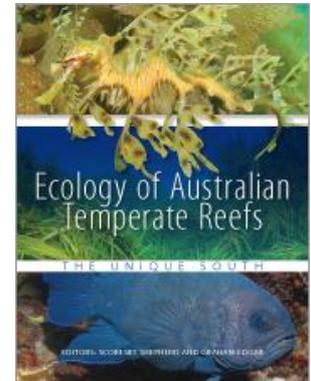
Author: S. Shepherd and G. Edgar

RRP: \$130.00

No. Pages:520

Publisher: CSIRO Publishing

Date: October 2013



Title: A Complete Guide to Reptiles of Australia

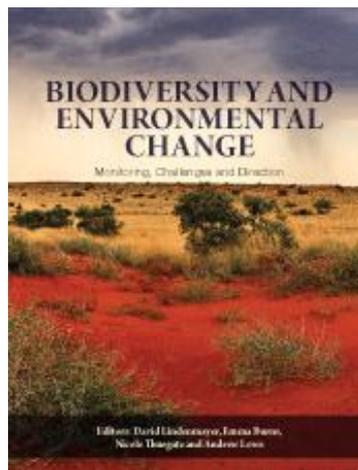
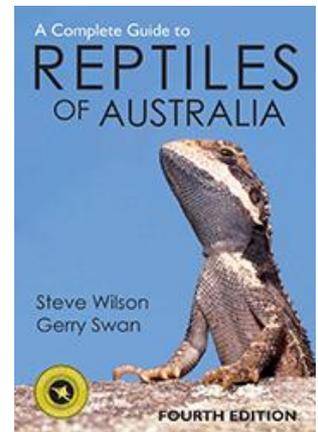
Author: S. Wilson and G. Swan

RRP: \$49.95

No. Pages:592

Publisher: New Holland

Date: July 2013



Title: Biodiversity and Environmental Change

Author: D. Lindenmayer, E. Burns, N. Thurgate and A. Lowe.

RRP: \$120.00

No. Pages:624

Publisher: CSIRO Publishing

Date: January 2014

Title: Social and Economic Benefits of Protected Areas: An Assessment Guide

Author: M. Kettunen and P. Brink

RRP: \$76.00

No. Pages:368

Publisher: Earthscan from Routledge

Date: September 2013

Title: A Traveller's Flora: A Guide to Familiar Plants, Along Roadsides, in Fields and Forgotten Places

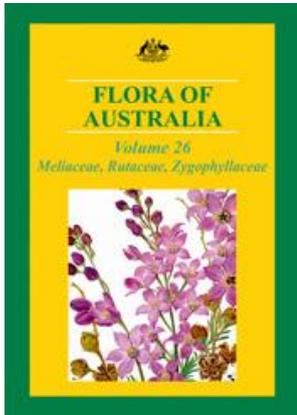
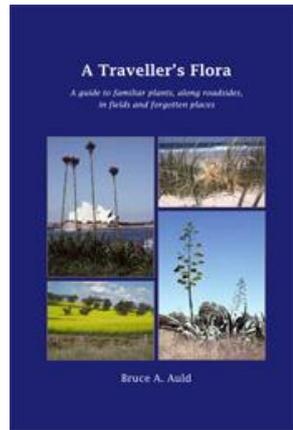
Author: B. Auld

RRP: \$29.95

No. Pages: 180

Publisher: Samara

Date: June 2013



Title: Flora of Australia Volume 26: Meliaceae, Rutaceae and Zygophyllaceae

Author: Australian Biological Resources Study

RRP: \$130 paperback, \$170 hardback

No. Pages: 640

Publisher: CSIRO Publishing and ABRS

Date: June 2013

PHOTO COMPETITION

Congratulations! to **Steve Sass** for winning the last photo competition with his photograph featured on the front cover of a juvenile Eastern Brown Snake at Goulburn, NSW.

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

Email your favourite flora or fauna photo to 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

Photos entered in the competition may also be used on the ECA website

FOR SALE / WANTED

If you have 2nd hand ecological equipment that you would like to sell or would like to purchase you can place an ad in this newsletter. Free for members or \$40 for non-members.

Contact admin@ecansw.org.au.



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BALGOWLAH NSW 2093

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

The ECA Forum Summary

Compiled by Amy Rowles

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 aims to feature 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.

See the forum at www.ecansw.org.au.

Recent activity on the forum has been very slow with only one comment added since the last newsletter.

Danny Wotherspoon commented that the ECA conference at Fairmont, Leura, was excellent, so thank you to the convenor team. A question not adequately answered was about professional conflict of interest in providing offsets. There is potential for a consultant to have an undisclosed financial interest in a 'third party' provider of offset land. Item 38 (c) of the ECA Code of Ethics precludes that.

ECA Grass Identification Workshop

Paul Burcher

Aquila Ecological Surveys and ECA Treasurer

Nineteen people, including seven ECA members, attended our "Grass Identification Workshop" at the Bowden Centre, The Australian Botanic Garden, Mount Annan on the 13th and 14th of June. The workshop was run by Van Klaphake, who used his Guide to the Grasses of Sydney, which covers 171 native and introduced species that occur within the Central Coast botanical region.

As with the eucalypt workshop Van ran for us, Van magically provided a plethora of fresh specimens from

the simple conveyance of his motorbike. After a brief introduction we got down to the serious business of identifying these Poaceous puzzles aided by nothing more than a hand lens to enlarge their components. Participants who may have been 'glumey' about their ability to negotiate this often tricky taxon soon found the process wasn't 'awful' and their interest was spiked by Van's intuitive guide which left no 'dilemmas' as to the identities of the specimens provided.

After lunch on the second day, the group had a wander around the restored woodland adjacent to the venue where around 15 grass species were identified. Apart from a plethora of thanks to Van (an 'auricle' who is not 'callus'), thanks also go to Scott Andrew from the ABG who organised the venue and provided assistance throughout.



Van checks that Fiona Iolini isn't in a panic over a grass identification.



Heads down in the classroom as Van (far right) tackles a curly question.

ECA Conference 'Offsets: determination, assessment and management'

Amy Rowles

ECA Administrative Assistant and Ecotone Ecological Consultants

The 2013 ECA annual conference was held at Leura in the Blue Mountains on Friday the 2nd of August. The day was attended by 107 delegates who enjoyed the presentations given by the 10 guest speakers on a range of 'offset' topics.

The outgoing president Mark Couston began the day with a welcome and introduction with past president Stephen Ambrose closing the conference. The Annual General Meeting was held at 12pm, and of course the day was punctuated with a delicious morning tea, lunch and afternoon tea. A relaxed conference dinner was held at the Station Bar and Wood-fired Pizza at Katoomba, attended by thirty of the conference delegates.

Martin Fallding of Land & Environment Planning gave the Keynote Address, giving an overview of biodiversity offsets. Martin ran through the evolution of offsets and highlighted the following key biodiversity offset principles:

- offsets should only be used when alternatives to avoid or mitigate are not feasible;
- sound ecological studies must be undertaken;
- the offset must achieve benefits in perpetuity;
- offsetting must result in net gain in both native vegetation area and biodiversity values; and,
- the offset must be enforceable.

Martin summarised that offsets are beneficial by:

- placing an economic value on biodiversity;
- being better than what has happened in the past;
- facilitating better conservation and development outcomes;
- standardising methods for assessing and quantifying biodiversity impacts;
- only being used as a last resort option.

However offsets also allow for the following negatives:

- acceptance of loss for uncertain gain;
- many offset areas are already protected;
- allow development approval;
- not based on scientific evidence;
- time lags between losses and gains;
- unproven assumptions about improved land management and rehabilitation; and,
- add to development and social costs.

Martin highlighted the key issues of:

- 1) determining when offsets will apply;
- 2) calculating quantum of offsets; and,
- 3) establishing an appropriate method of offset transfer and governance.

This keynote presentation concluded with future directions for Biodiversity Offsets, including the issue of insufficient land available for offsets in suitable locations.

Feach Moyle discussed the determination, assessment and management of environmental offsets under the EPBC Act. Feach gave a history of the EPBC Act offset policy, which was finalised in October 2012. Offsets are only to be considered after a proposed action has been determined and all efforts have been made to avoid and mitigate the impact, with the residual impact to be offset. Offsets must improve or maintain the viability of the target to be protected. Feach ran through the Offsets assessment guide, including the impact and offsets calculators, threatened species habitat quality and risk of loss. Feach concluded with a discussion on offset management.

Session 2 addressed the establishment, funding and management of offsets. Josie Stokes from Roads and Maritime Services explained the RMS offsets policy, giving some examples. Josie explained that although the Biobanking scheme could be beneficial to RMS, there were major issues with applying the scheme to such projects (i.e. linear shape of the developments resulting in a large variety of habitats and species encountered) and inconsistencies between state and federal regulators. Josie presented the RMS *Guideline for Biodiversity Offsets* (November 2011). RMS has offset 4720ha of land in NSW to date and Josie explained how this information is electronically displayed externally

and internally on internet and intranet registers. Josie finished up with a summary of future directions and challenges for offsetting.

Robbie Economos from Lake Macquarie City Council gave a summary of the LMCC offset policy, using examples and highlighted the many funding and management challenges that face council where offsets are concerned. Council do not have the funds to manage lands that are given to them as offsets, however offsets left in private ownership are under continued development pressure, with enforcement and management problematic. Current legal mechanisms are not good enough to cope with the range of circumstances and Biobanking does not seem to be a popular choice for determining offsets in the LMCC. Robbie also discussed how consultants are able to assist council in making decisions about suitable offsets including:

- producing quality management plans with measurable outcomes; providing realistic management costings; providing data and maps digitally;
- sharing information with council (as good vegetation mapping and flora and fauna data assist in locating offset sites);
- providing sound advice about avoiding and mitigating before offsetting;
- assisting in matching development with offset sites; and,
- addressing some of the ethical issues (i.e. whether an existing reserve should be used as an offset site).

Derek Stellar discussed the OEH Growth Centres Offsets Program and Linking Landscapes. The Growth Centres Offsets Program aims to protect some of the best remaining bushland in Western Sydney and the surrounding region, providing offsets for Growth Centres Biodiversity Certification and Strategic Assessment Program, as well as Edmondson Park Conservation Agreement. The offset program involves OEH seeking suitable offsets on land in the Cumberland Plain; and purchasing land to create new reserves, conservation agreements, and biodiversity credits; as well as developing management and funding plans. Funding of \$397.5m from developers and the government is to be spent over 30+ years.

Derek highlighted that OEH prefer using the Biobanking scheme for offsetting as it is more secure legally and financially. Derek illustrated the six investments that the program has secured, including Wianamatta Nature Reserve. This scheme has to date protected 398.5ha of vegetation, whilst 64.5ha of vegetation has been cleared in the growth areas for development in the same time period. The Linking Landscapes Program aims to identify corridors in the Sydney Basin Bioregion, linking them to funding options, such as Biobanking, with the result of protecting these corridors.

Section 3 included a collection of presentations discussing offsets from a scientific and consultant perspective. Rob Humphries from Eco Logical Australia discussed the Biobanking scheme, what isn't working, and how we can make offsets work better. Rob began with a brief history of biodiversity offsets and relevant legislation. Rob encouraged delegates to make greater use of the Biobanking tools and registers available.

David Nicholson from ERM presented on the EPBC Act Environmental Policy. David discussed the scope of the policy and gave a brief outline about the process of determining offsets. Following this he presented an example of implementing an offset strategy prior to the new EPBC Offset strategy to protect and manage *Darwinia biflora* at a Lindfield site. The developer had to cover a range of costs and several legal agreements including covenants placed on land in the Hornsby LGA and a community association set up. The new EPBC Act Policy will allow more certainty over defining the quantum of impact, a flexible approach to offsetting and a clearer understanding of offset requirements. However constraints include high costs and lack of alignment with State assessments. David finished his presentation by outlining the key points of the new EPBC Act Offset Strategy.

Dr Richard Thackway presented his work on Tracking the Transformation of Vegetated Landscapes and how this can be applied to offset schemes. Richard used Cumberland State Forest as a Case Study to illustrate his model.

Martin Denny gave a practical example of monitoring an offset site and highlighted that this long term monitoring is necessary on offset areas. This is particularly important for areas which are being rehabilitated, to investigate whether management is required.

Elizabeth Ashby began with a brief history of biodiversity impacts, followed by some examples of offset areas in a more urban environment and discussed whether they can be effectively implemented to achieve the desired results. The examples Liz gave illustrated the lack of security of offset sites left in the ownership of the developer. These examples had adequate offsets set aside and good management plans developed. However, as the developer went bankrupt after the development site was cleared, there were no funds available to manage the offset sites. Therefore the project resulted in a negative offset result. Liz also highlighted that long term monitoring of offset sites is essential. Funding must be available to that site if monitoring illustrates that more management is required.

The presenters were then asked to join John Travers to take part in a discussion forum, taking questions from the floor. John began with the first question "Should offsetting be a decision by local council or should it be left to OEH?". Responses included that OEH should deal with the larger areas as they can address the bigger picture, whereas local councils are unable to go outside their LGA boundary. Councils have the local knowledge to deal with the smaller areas, however they are very restricted with funding. It was suggested that a third party to manage offsets would be ideal, provided that there is a sufficient legislation and compliance strategy in place. Several other questions provided valuable discussion, which given the opportunity, could have continued for quite some time.

Thankyou to everyone who organised and attended the conference and we look forward to seeing you all at the 2014 ECA Conference.



Above: Conference Room. **Below:** Mark Couston, outgoing President (left) and Deryk Engel, Secretary (right) presenting at the AGM.



When Communication Is Essential: A Lesson in Workplace Safety

Jason Berrigan

Darkheart Eco-Consultancy and Consulting Ecology Editor

Black Friday and its associated superstitions these days, is generally dismissed by the modern educated person. Most of us simply don't take care not to step on a crack, or avoid black cats. Unfortunately for me, Friday 13th of September was very unlucky, as it became my first workplace accident, which should have been avoided by adequate communication.

Now I'll bet you've seen a few cartoons or kids movies over the years where some character is chased by a swarm of bees and they jump into a pond/dam/river to escape them. I can tell you from personal experience,

(Continued on page 12)

(Continued from page 11)

that (a) it can happen and (b) water is a good escape route.

I was supervising removal of some habitat trees on a major project last week, and working with a bulldozer operator who was doing the tree felling. In my role on this project, I also do the morning pre-clear survey of the area to be cleared. This occurs at 6:30am, and hence my attendance at mandatory toolbox talks are brief (ie sign on and hear first 5 minutes), then I'm off.

As a result, I (and a foreman in charge of me who accompanies me on the pre-clear) missed the discussion about one of the habitat trees having a feral bee hive, and that this tree would be felled at dusk for obvious reasons. I knew of a native bee hive, which by chance, was located about 10m away from the former. The foreman asks me to supervise the removal of a number of habitat trees, which of course, includes the bee tree (unbeknownst to both of us) which has been marked as a habitat tree (apparently it had several hollows). He leaves me to do the job.

The bulldozer operator about an hour before the incident asks me what to do with the bee hive. I (ignorantly) assume he refers to the native bee hive that I saw. In my head I think "Funny that he knows about that hive", and I advise him that it would be nice to push it to the edge and possibly relocate it. I don't appreciate the funny look he gives me.

Hence we proceed to knock over the habitat trees. I'm relieved to find nothing in all but one hollow (no fatalities is always pleasing) where a very angry female brushtail possum and her young let me know how she feels about the loss of her home. Then we come to the 'bee tree'. Neither the dozer operator nor myself bring up the bee hive question again.

Down it goes, and as it is a virtual drought here, the crash generates a dust cloud like an Arabian sand storm which I wade into to see if anything is in the hollows now shattered over the ground.

As the dust clears and I pass the head of the tree, I note a strong formic acid smell and think to myself "must be a big ant nest in this tree". I note a small cloud of insects and assume it's the native bees. Then they start buzzing around me, and I think "wow, they're really annoyed for native bees" as I begin to fill out my datasheet and prepare to inspect hollows.

Then one lands in my hair around my forehead - and there's no mistaking that angry sound. I realise to my horror that it's a feral European bee hive, and I'm instantaneously surrounded by buzzing angry bees. I'm in big trouble.

I burst into a sprint and the adrenaline hits and I'm running like the Usain Bolt. But it's no use. I'm literally swarmed within about 30m. They're in my hair and I'm roaring in pain and anger as I'm stung over and over on my neck, hand and forehead.

I have to escape and FAST, or I'm really going to be in big trouble. I remember a dam located up the slope about 70m. Unfortunately, there's a windrow (line of fallen timber about 2m high and about 4m wide) between the dam and me. I desperately scramble over it, and that's when the entire swarm reaches me. I have sunglasses on, but I can barely see my feet. This is when I get most of my stings. It's a horrible realisation when you're trapped with no escape. I make it to the dam - roar at the spotter (safety supervisor who has no idea what's happening yet - thinks someone's been hit by a tree) "FIRST AID!!!" and dive in. As I've been running with my mouth open, I get a mouthful of stagnant dam water. I lift my head up to spit it out and breathe. The dozens of bees stuck in my hair buzz angrily as they continue to crawl to my scalp and hit paydirt.

The swarm is still above me, and more bees land on me as the spotter screams "get down! get down!" I dive to the bottom of this shallow dam and count to 30.

(Continued on page 25)

Is Amateur Hunting of Game and Feral Animals in NSW Illegal?

Dr Stephen Ambrose

Ambrose Ecological Services Pty Ltd

As ecological consultants working in NSW, we are required to have (among other things) an Animal Ethics Permit from the Animal Ethics Committee (AEC) of the NSW Department of Primary Industries. This is because we conduct animal research and there is a legal obligation under the NSW *Animal Research Act 1985* (AR Act) to, where possible, avoid undue stress, injury and/or death to individual animals during the course of our research. Similar legislation occurs in other states and territories. An Animal Ethics Committee will only issue a permit if it is satisfied that:

- ◆ this legal obligation can be met by a researcher: and
- ◆ in the event of undue stress and injury to an animal, the researcher takes the best possible action to alleviate the animal's suffering.

There is further legal obligation for the researcher to report to the AEC annually, or at the conclusion of the research project, on incidences of undue stress, injury or death to individual animals that occurred as a result of the research, and what procedures were followed when these incidences occurred.

The NSW Government justified the introduction of amateur hunting in 79 national parks and nature reserves in NSW on the grounds that it is likely to be an effective means of controlling feral animal populations in these conservation areas. To measure the effectiveness of this approach, there would be a need to conduct surveys of feral animal populations before and after the introduction of amateur hunting. Therefore, it could be argued that amateur hunting of feral animal populations is an "experimental treatment" in an animal research project, and the before and after feral animal surveys would be examining the effects of applying that experimental treatment. So, from a legal perspective, can amateur hunting be regarded as "animal research" and, if so, is there a legal requirement for amateur hunting to be under the jurisdiction of an AEC? I put this question to Kirsty Ruddock, Principal Solicitor of the Environmental Defenders Office (EDO) recently, and here is her response:

24th April 2013

Dear Stephen,

Re: Advice on Shooting in National Parks and Permits under Animal Research Act 1985.

We refer to your request for advice on 12th April 2013. You have requested advice on whether permits for shooting in national parks are subject to the Animal Research Act 1985 which applies to ecologists.

Summary of Advice

Hunting in national parks in accordance with permits issued by the Game Council in the broader context of testing effectiveness of shooting as a method of feral animal control may fall within the definition of 'animal research' under the Animal Research Act 1985 (NSW) ("AR Act"). This is potentially significant in light of criminal offence created by s47 of the AR Act for harming animals without an appropriate animal research authority. However, taking enforcement action would be difficult due to the criminal provisions and the factual circumstances surrounding the hunting and whether in each case it satisfies the definition of "animal research".

Background

Ecologists and other experts who are involved in animal research are required to have an Animal Research Authority under the AR Act. This is because their research activities have the potential to impact on the welfare of individual animals. A researcher requires approval from an appointed Animal Ethics Committee ("AEC") for each research activity. AEC approval is required for activities such as bird surveys to camera surveillance, animal trapping, handling, tagging and release programs.

You believe that the hunting of animals by shooting in national parks falls within the definition of "animal research" as set out in s3 of the AR Act, and should therefore have research approval from the AEC. In particular, you argue that the recreational hunting program is an experiment aimed at testing the effectiveness of the program in controlling numbers of feral animals in NSW national parks and reserves, further defining its animal research.

Legislation

Game and Feral Animal Control Act 2002 (NSW)

The primary objective of the Game and Feral Animal Control Act 2002 (NSW) ("GFAC Act") under Section 3(a) is to provide for the effective management of introduced species of game animals. This necessarily requires the Game Council as the administering body to undertake research to

ascertain effectiveness in feral animal population control. Further, Section 9 of the GFAC Act confers powers on the Game Council to perform the following functions:

9 Functions of the Game Council

(1) The Game Council has the following functions:

.....

- (f) to promote or fund research into game and feral animal control issues,
- (f2) to promote or fund research into issues regarding animals that interact with game animals.

This supports your view that hunting and shooting in national parks falls within the definition of 'animal research'. The Game Council, under broad powers conferred upon it by section 22 of the GFAC Act, requires hunters operating under the licensing system to report kill data to the Council for research purposes. This strengthens the argument that the Game Council is operating as a research establishment.

Viewing hunting activities as a research project is further supported by the existence of the Game Council Scientific and Research Committee which oversees collation of hunting data amongst other things (from the Game Council of NSW Annual Report 2011/2012).

Animal Research Act 1985 (NSW)

"Animal research" as defined by Section 3 of the AR Act, means "any procedure, test, experiment, inquiry, investigation or study in connection with which an animal is used and, without limiting the generality of the foregoing, includes any procedure, test, experiment, inquiry, investigation or the study in the course of which:

- (a) an animal is subjected to:
 - (i) surgical, medical, psychological, biological, chemical or physical treatment, or
 - (ii) abnormal conditions of heat, cold, light, dark, confinement, noise, isolation or overcrowding, or
 - (iii) abnormal dietary conditions, or
 - (iv) electric shock or radiation treatment, or
- (b) any material or substance is extracted or derived from the body of an animal, but does not include any procedure, test, experiment, inquiry, investigation or study which is carried out in the course of:
- (c) the administration of veterinary treatment to an animal for the purpose of protecting the welfare of the animal, or
- (d) the conduct of normal animal husbandry operations."

The wording of this definitional section is broad but in some aspects also limited by the words used in the section. You would need to show that hunting in national parks is subjecting any animal to "physical treatment" through shooting it. The contrary argument may be that the AR Act is not intended to cover circumstances where animals are killed, as it does not expressly include those terms.

However, we believe there may be another argument that because native animals sharing the habitat will be subjected to noise and possibly psychological impacts from the hunting it is within the definition.

However, you need to be aware that to some extent the need for approval under the AR Act may turn on the particular facts of hunting in question in each case. In relation to subsection (b), it is our understanding that the licensed hunters also collect certain specimens for research conducted by other agencies (Game Council of NSW Annual Report 2011/2012 - samples were being taken from wild pigs shot by recreational hunters for the purpose of disease research). This lends further support to the argument that hunting in national parks can be defined as "animal research".

If hunting in national parks under permits authorised by the Game Council falls within the definition of 'animal research' for the purposes of the AR Act, then hunting without an Animal Research Authority may be in contravention of s47 of the AR Act which states:

47 Unlawfully carrying out animal research

(1) An individual shall not carry out animal research unless the individual is the holder of an animal research authority.

Maximum penalty: 20 penalty units or imprisonment for 12 month, or both.

(2) The holder of an animal research authority shall not carry out animal research:

- (a) otherwise than as authorised by the authority, or
- (b) Otherwise than with the approval, and in accordance with the directions, of the animal care and ethics committee specified in the authority.

Maximum penalty: 30 penalty points or imprisonment for 12 months, or both.

This is potentially significant as section 47 of the AR Act creates a criminal offence and individuals hunting not in accordance with animal research authorities could be imprisoned.

Section 15(4) of the GFAC Act provides that a game hunting licence does not authorise the holder of the licence to contravene any prohibition or restriction imposed by or under any Act or statutory instrument. This would seem to indicate that hunting with a Game Council-issued permit does not prevent the hunter being liable under any other act [except offences under the National Parks and Wildlife Act 1974 (s6A GFAC Act)] which could include offences under the AR Act.

For a person to be found liable under section 47 of the AR Act is not straightforward however as section 47 is a criminal offence and the prosecution must prove the guilt of the individual beyond reasonable doubt. This is a high threshold and there could be reasonable arguments that the hunting is not research. However we still think there could be an argument, depending on the facts of the hunting in each particular case, that they need AR Act approval. You should however be aware though that it would not be difficult to amend the GFAC Act to remove the need for AR Act approval.

Animal Ethics Committees

You have raised the question that if hunting in national parks can be considered animal research, can an AEC oversee the granting of authorities and supervision of research activities?

The Game Council as a statutory corporation created by section 7 of the GFAC Act is capable of becoming an accredited research establishment under the AR Act. An AEC can be created under section 13 of the AR Act for the purpose of granting approval to the primary researcher within the Game Council to issue permits and assess the suitability of applicants. Alternatively, the Game Council could seek approval from, and be supervised by, the Department of Primary Industries default AEC.

An AEC has the power to demand research data to review research activities to assess effectiveness and compliance, the results of which are reported to the Animal Research Panel. The research conducted by the Game Council therefore would be reported to the Panel and would be reviewed alongside all other animal research projects. This would bring research undertaken in the context of feral animal population control under the same umbrella as other animal research.

Another method through which the Game Council can be required to be compliant with the AR Act is through Section 9(e) of the GFAC, which requires the Game Council to liaise with the Pest Animal Council, livestock health and pest authorities and other relevant bodies in connection with their respective functions. The Minister for Primary Industries could potentially direct the Game Council to liaise with the Animal Research Panel or an AEC when exercising the function of issuing permits.

Yours sincerely,

*Kirsty Ruddock
Principal Solicitor, EDO*

SO WHAT DOES THIS MEAN?

The EDO advises that amateur hunting in national parks and nature reserves could be defined as “animal research” under the AR Act. If so, amateur hunting could be in breach of the AR Act because there would be no reporting to an AEC about how hunting is impacting on the welfare of individual animals, especially native (non-target) animals. However, as stated by the EDO, it would be relatively easy for the NSW Parliament to legislate for AEC involvement or to exempt amateur hunting from this requirement.

My concern is that most, if not all, hunters are not trained to recognise undue stress that they may cause animals, especially non-target species. Examples of undue stress to animals that may arise from hunting activities include:

1. Abandonment of dependent young (e.g. desertion of nests by birds, abandonment of pouch young by kangaroos and wallabies).
2. Abortion of unborn foetuses (flying-foxes and marsupials are particularly vulnerable to aborting foetuses when stressed).
3. Avoidance of favoured feeding areas during and between hunting expeditions.

There is also the question of whether or not individual hunters can provide accurate information to an AEC. Hunters focus their attention on hunting game and feral animals; to observe, record and effectively treat other animals who have been harmed or impacted in the process, if administered properly, would impact significantly on the time available to an amateur hunter for recreational hunting.

Based on what is required in recognising and reporting incidences of undue stress, injury and mortality to an AEC, and treating animals that have been accidentally injured, it is probably necessary to have a veterinarian and/or an appropriately experienced zoologist accompanying each hunting expedition, which is clearly an impractical solution.

CONCLUSION

I presented the EDO letter to the rest of the ECA Council for consideration of further action against amateur hunting in national parks and nature reserves. As ECA members already know, the ECA Council did

send a letter of concern to the NSW Premier and other politicians, outlining its concern about amateur hunting from the perspective of personal safety of its members and other park users. However, the majority of the Council voted against using the advice from the EDO to argue against amateur hunting on the grounds that animal welfare is not a core interest of the ECA. On a personal level, I find that decision and the reason for it very disappointing. As ecological consultants we deal with animal welfare issues on an almost daily basis. Outside academic and government animal research establishments, ecological consultants are in the best position to advise government decision-makers and administrators on animal welfare issues arising from field research. There are also some ECA members who have had first-hand experience studying and/or managing feral animal populations, in their capacity as university or government researchers prior to becoming ecological consultants, and/or as ecological consultants involved in designing and implementing feral animal management programs. Therefore, I feel that the ECA has lost an important opportunity to contribute to this aspect of the hunting debate.

I have subsequently made the legal advice that I requested from the EDO available to other non-government organisations, who have been proactive in using it to debate the hunting issue.

I thank the Environmental Defenders Office, Kirsty Ruddock in particular, for their prompt and detailed advice on this matter.

‘No Amateur Hunting in National Parks’ Rally, Sydney

Dr Stephen Ambrose

Ambrose Ecological Services Pty Ltd

5th May 2013

Clarification from the author:

As a professional ecologist, I recognise that we have a feral animal problem across Australia, including in and around NSW national parks and nature reserves. Therefore, I also recognise the importance of professional shooters whose hunting activities are under the direct supervision of national parks staff in helping to control feral animal populations in high conservation areas. “No hunting in national parks” rallies occurring in NSW don’t seem to differentiate between professional and amateur hunting in

national parks. I, and no doubt many other biologists, have attended one or more of these rallies in opposition to amateur, rather than professional, hunting. The following article is a summary of my observations of the Sydney rally, which was co-ordinated by the National Parks Association of NSW.



Protesters in Hyde Park just before the start of the march down Macquarie Street to Parliament House.



One of many home-made protest signs that were on display at the protest.

On 18 April 2013, a number of ECA members attended the Sydney protest rally against amateur hunting in NSW national parks and nature reserves. School holidays, a lunch-time protest and a well publicised contentious issue guaranteed a good crowd. The official NSW Police estimate of crowd size was 3000, although mainstream media variously reported between 1000 and 3000 people attending the rally.

The peaceful rally started from the fountain in Hyde

Park in Sydney and people of all ages marched slowly, chanting and waving banners, as they marched down Macquarie Street to the NSW Parliament. The assembled crowd was then welcomed to Garigal land by a representative of the Garigal Nation.



An official welcome to the land of the Garigal people.

The speakers who addressed the rally were Bob Brown (Bob Brown Foundation), Bob Debus (former NSW Minister for the Environment and Attorney-General, current member of the Blue Mountains Conservation Society), Kevin Evans (CEO of the National Parks Association of NSW), Leanne Taylor (CEO of the Wildlife Information Rescue and Education Service, WIRES) and Anne Gardiner (General Secretary of the Public Service Association of NSW).

Bob Brown began his speech with this stirring statement:

"We are standing in front of a great church [St Stephen's Uniting Church], a spiritual centre in Sydney. We stand opposite a centre of democracy – the [NSW] Parliament, the oldest parliament in Australia. Guns are banned in the first, guns are banned in the second, but Premier O'Farrell has invited guns into the greatest cathedral of all – our national parks."

Bob Brown said he feared the decision to allow amateur hunters into NSW national parks would be replicated in other states and territories, as well as in Australian World Heritage Areas.

Bob Debus addressed "bush walkers of NSW and your children" when he said the decision to allow hunting in NSW national parks was part of a "deliberate attack on the very idea of national parks".



Bob Brown (Bob Brown Foundation, centre), Cate Faerhmann MLC (left) and David Shoebridge MLC (right) addressing the crowd.



Bob Debus, former Environment Minister & Attorney-General in the NSW Parliament, and current member of the Blue Mountains Conservation Society.

"I think we are talking about a culture war on natural conservation," he said.

"National parks are one of the great international ideas of the last century. Parks cover nearly 10 per cent of NSW: they include our best-loved places and were visited more than 350 million times last year. Visitors are encouraged to walk, camp, swim and cycle; to understand and enjoy our outstanding natural and cultural heritage.

"The Liberal lands minister Tom Lewis established the National Parks and Wildlife Service 45 years ago and it has been nurtured by a succession of ministers. I doubt any minister entertained the idea that recreational shooting was compatible with the purpose of a national park.

“Nevertheless, amendments to the Game and Feral Control Amendment Act 2012, will result in the introduction of recreational hunting in most of our national parks before the end of the year.

“They call it ‘conservation hunting’ but the term is deliberately misleading.

“It is not just the danger that shooting would bring to park users, including young families; it is not just the deep offence that would be caused by aggressive intrusion into places many people regard as sacred. Scientists and professional land managers provide advice based on nationwide research which shows that intermittent, unplanned shooting is useless for controlling feral animals.

“Animal species that become feral succeed because they breed quickly. A control program must eliminate the majority of individuals at any location to be effective. That only happens when land managers and landowners work together on a systematic eradication program, which typically involves several control methods: baiting and trapping as well as shooting.”

Leanne Taylor, CEO of WIRES said:

“The number of native animals being injured from bullets and arrows from [amateur hunting] activity in state forests is bad enough. Our organisation invests heavily into caring for native animals that are orphaned, injured or sick. Hunting in national parks will inevitably stretch our resources and ability to cope with the calls on our voluntary services.”



Leanne Taylor (CEO of WIRES) addressing the crowd.

Anne Gardiner, from the Public Service Association of NSW, said National Parks staff were acting in the interests of the community, saying it was *“unsafe and ineffective”* to allow the Game Council to oversee recreational hunting in national parks.



**Anne Gardiner,
General Secretary of the Public Service Association (PSA) of NSW**

Kevin Evans from The National Parks Association revealed that even politicians within the government disagree with recreational hunting in national parks and called on them to come out publicly with their concerns. Kevin also reminded us that the fight to end amateur hunting in national parks is ongoing and that we must not back down just because we have done *“our bit”* in attending the rally.



Kevin Evans, CEO of the National Parks Association of NSW

Although protesters had a serious and loud message that it wanted NSW parliamentarians to hear, the rally was punctuated by one rather entertaining incident. The NSW Fire Brigade responded to an emergency call from somewhere in the Sydney CBD, which necessitated a fire truck, siren blazing, passing through the assembled crowd as it made its way slowly down Macquarie Street. Expert police co-ordination, instructions to the crowd from Bob Brown at the stage microphone, and a willingness of the crowd to let the fire truck through, meant that two waves of crowded people parted momentarily, came back together as one, and the rally continued as if nothing had happened!

Postscript to the Hunting Issue

Dr Stephen Ambrose

Ambrose Ecological Services Pty Ltd

14th July 2013

On 4 July 2013, Premier Barry O'Farrell announced the abolition of the NSW Game Council, based on the findings of the review of its operations ("The Dunn Report"). The statutory roles of the NSW Game Council will now be taken up by the NSW Department of Primary Industries.

The Dunn Report said that the Game Council was confused about its roles under the *Game and Feral Animal Control Act 2002*. It was meant to develop plans for hunter safety, public land access, licencing, education, compliance of licenced hunters and research. But the report concluded that the Game Council was seemingly unconcerned about issues of public safety, devoting their time and resources to promoting "conservation hunting" and keeping tallies of animals killed by hunters on private land.

In a simultaneous announcement, Environment Minister Robyn Parker revealed that amateur hunting will begin as a trial in 12 national parks in October 2013, rather than in the 75 parks that were included in the original hunting program. Amateur hunting in State Forests has also been suspended. Shooters in the trial hunting program will be "closely supervised" by National Parks and Wildlife staff wherever hunting takes place, although it is not yet clear what that supervision entails, and if National Parks and Wildlife

will be given additional government resources to carry out the supervision.

The Minister also announced that the results and recommendations of the trial hunting program would be peer-reviewed. If the trial amateur hunting is deemed successful in controlling feral animal populations in the 12 designated national parks, then it would be introduced into the other 63 national parks. It has not yet been announced who will be conducting the peer reviews and the terms of reference for those reviews.

Smile for the Camera

Laura Worthington

RPS

Our family property is located approximately 20 kilometres north-west of Scone, in the Upper Hunter Shire. It covers over 500 hectares and is characterised by rugged terrain, including steep slopes, deep gullies and small escarpments. The property supports a diversity of native vegetation communities, including grassy woodlands, dry sclerophyll forests, small tracts of rainforest, riparian forest and open areas on the upper slopes, previously used for cattle grazing. A creek flows through the bottom of the property and several farm dams are located upon the upper slopes. The property is not currently managed for any particular purpose.

Due to the large area and diversity of habitats, the property supports an incredible abundance of animals. Birds are particularly diverse with Powerful Owl, Masked Owl, Rufous Fantail, Glossy Black Cockatoo and White-Throated Needletail just a few of the more significant species that we have recorded. Eastern Grey Kangaroo (*Macropus giganteus*), Swamp Wallaby (*Wallabia bicolor*), Wallaroo (*Macropus robustus*) and Common Wombat (*Vombatus ursinus*) are some of the commonly occurring native mammals. The property is also home to a large number of introduced species, including Feral Pig (*Sis scrofa*), Red Deer (*Cervus elaphus*), Fallow Deer (*Dama dama*), Feral Goat (*Capra hircus*), Red Fox (*Vulpes vulpes*) and Rabbit (*Oryctolagus cuniculus*).¹⁹

ECA Photo Gallery

Photo Competition Entries



Right: Squatter Pigeon (southern) taken near Coppabella QLD (Photo courtesy of Kurtis Lindsay).

Left: A timid Eastern Pygmy-possum *Cercartetus nanus* within the Sydney Metropolitan Catchment (photo courtesy of Kylie Reed)

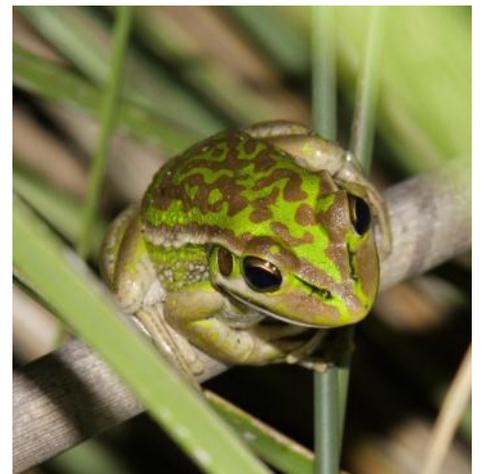


Above Right: *Strophurus taeniatus* taken near Cloncurry, QLD (Photo courtesy of Kurtis Lindsay).

Left: Burton's Legless Lizard (photo courtesy of Jason Berrigan)



Left: Eastern Dwarf Tree Frog, Kooragang Island. **Above Right and Right:** Green and Golden Bell Frog, Kooragang Island. (photos courtesy of Toby Lambert)



ECA Photo Gallery

Photo Competition Entries



Left: Brown Antechinus
Antechinus stuartii
Right: Bush Rat
Rattus fuscipes.
(photos courtesy of Laura Worthington).



Left: *Ctenopus pantherinus*
near Cloncurry, QLD
(photo courtesy of Kurtis Lindsay).

Right: Tawny Frogmouth
(photo courtesy of Kathryn Chesnut)



Right: Phasmid-striped Gecko (*Strophurus taeniatus*) east of Cloncurry, QLD.



Below: Brown Tree Snake taken near Blackwater QLD

(Photos courtesy of Kurtis Lindsay).



Right: *Litoria littlejohni* in amplexus recorded within the Sydney Metropolitan Catchment (photo courtesy of Kylie Reed)



Over the last six months, various remote cameras have been set up around the property to capture the diversity and number of animals moving about. The cameras have taken some fantastic shots, including inquisitive deer eye-balling the lens, wombats grazing alongside kangaroos and feral pigs and fighting bucks, just to name a few.

However, the following photos, taken by a ScoutGuard SG560K 8MP IR Trail Camera, are probably some of the most spectacular images captured to date. The camera was established at a deer carcass in mid-April this year. Almost 2000 photos were taken at this location as the carcass was scavenged upon by pigs, foxes, ravens and Wedge-tailed eagles (*Aquila audax*). It has been difficult to select just a few to share. Most interesting is observing the apparent hierarchy of animals as they feed on this carcass. During the day it would appear Wedge-tailed eagles, seen in groups of up to four birds, fended off any hungry foxes and ravens, which were forced to wait until the eagle left before they could feed. Generally, at night the carcass appeared to be monopolised by feral pigs; one particularly large pig returned to feed on the carcass over several nights, and on one night, chose to have a bit of a rest between feeding bouts right next to the carcass. Once the pigs moved on, groups of up to six and eight foxes each night would move in to feed, fight and even appeared to mate.

Photos courtesy of Lee Dally.



Figure 2: A wedge-tailed eagle hopping for a part in the next Wolf Blass advertisement



Figure 3: Three Wedge-tailed eagles pick at the carcass while a fox waits for his turn in the background

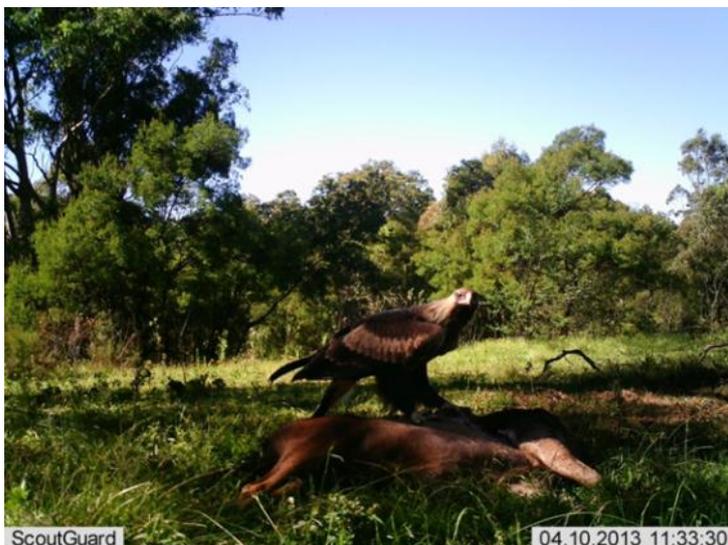


Figure 1: A Wedge-tailed eagle is first to arrive at the carcass



Figure 4: A fox is deterred by a Wedge-tailed eagle



Figure 5: A large pig returned to feed on the carcass over several consecutive nights



Figure 8: Foxes get feisty around the carcass.



Figure 6: A fox waits while a large pig feasts on the carcass



Figure 9: Foxes appeared to mate by the carcass on several occasions



Figure 7: How many sets of eyes can you count?

More On Lyme Disease

Dr Stephen Ambrose

Ambrose Ecological Services Pty Ltd

Recognition of Lyme Disease in Australia:

On 28 May 2013, the Australian Government's Chief Medical Officer, Professor Chris Baggoley, announced the establishment of the Clinical Advisory Committee on Lyme Disease (CACLD). The purpose of the CACLD is to advise the Chief Medical Officer on the following issues:

1. The extent to which there is evidence of *Borrelia* species causing illness in humans in Australia;
2. The most appropriate laboratory diagnostic testing algorithms (best world practice) for persons who have suspected borreliosis in Australia;
3. The most appropriate treatments for borreliosis in Australia;
4. The most appropriate ways to disseminate information to health professionals and the general public on borreliosis/Lyme Disease;
5. The requirements for research into borreliosis in Australia; and
6. The generation of appropriate new questions relevant to the above terms of reference.

These terms of reference mark the first official recognition of the Australian Government that Lyme Disease occurs in Australia. Hopefully, it will result in the allocation of government funds for Lyme Disease research, education, diagnostic testing and treatment in Australia.

ECA Workshop on Lyme Disease Abandoned:

The ECA Council announced last year that it would organise a workshop on Lyme Disease. However, this proved very difficult because of conflicts within the medical profession. The ECA had planned to invite experts who, collectively, would have provided a range of perspectives on the incidence of Lyme Disease in Australia; how to medically treat Lyme Disease patients; and identify directions for future research.

However, it soon became clear that some of the key experts would not take part in an ECA workshop if peers with conflicting ideas, or were competitors for research funding, also took part in the workshop. Therefore, the ECA succumbed to politics of the medical profession and abandoned the idea of running the workshop.

Reduce the Risk of Contracting Lyme Disease:

The Center for Disease Control and Prevention in the United States recommends the following measures for reducing the risk of contracting Lyme Disease and other tick-borne infections:

Know where to expect ticks: *Ixodes* ticks live in moist and humid environments, particularly in or near wooded or grassy areas. You may come into contact with ticks during outdoor activities around your home or when walking through vegetation such as leaf litter or shrubs. To avoid ticks, walk in the centre of trails and avoid tall vegetation.

Use a repellent with DEET (on skin or clothing) or permethrin (on clothing and gear): Repellents containing 20% or more DEET (N, N-diethyl-m-toluamide) can be applied to the skin, and they can protect up to several hours. Always follow product instructions! Parents should apply repellents to their children, taking care to avoid application to hands, eyes, and mouth. Products containing permethrin can be used to treat boots, clothing, and camping gear. Treated items can remain protective through several washings.

Perform daily tick checks: Check your body for ticks after being outdoors, even in your own yard. Conduct a body check upon return from potentially tick-infested areas by searching your entire body for ticks. Use a hand-held or full-length mirror to view all parts of your body and remove any tick you find. Take special care to check these parts of your body and your child's body for ticks:

- Under the arms
- In and around the ears
- Inside the belly button
- Back of the knees
- In and around all head and body hair
- Between the legs
- Around the waist.

Check your clothing and pets for ticks because ticks

may be carried into the house on clothing and pets. Both should be examined carefully, and any ticks that are found should be removed. Placing clothes into a dryer on high heat effectively kills ticks.

Remove attached ticks quickly and correctly:

Remove an attached tick using fine-tipped tweezers as soon as you notice it. If a tick is attached to your skin for less than 24 hours, your chance of getting Lyme disease is extremely small; however, other diseases may be transmitted more quickly.

Over the next few weeks, watch for signs or symptoms of Lyme disease such as rash or fever. See a healthcare provider if these develop.

Be alert for fever or rash: Even if you don't remember being bitten by a tick, an unexpected summer fever or odd rash may be the first signs of a tick-borne disease, particularly if you've been in tick habitat. See your health care provider if these symptoms develop.

Prevent ticks on animals: Prevent family pets from bringing ticks into the home by limiting their access to tick-infested areas and by using veterinarian-prescribed tick collars or spot-on treatment.

Create tick-safe zones in your yard: Modify your landscaping to create "Tick-Safe Zones." It's pretty simple. Keep patios, play areas, and playground equipment away from shrubs, bushes, and other vegetation. Regularly remove leaf litter, clear tall grasses and brush around your home, and place wood chips or gravel between lawns and wooded areas to keep ticks away from recreational areas (and away from you).

Use a chemical control agent: Effective tick control chemicals are available for use by the homeowner, or they can be applied by a professional pest control expert.

Discourage deer; Deer are the main food source for adult ticks. Keep deer away from your home by removing plants that attract deer and by constructing physical barriers that may discourage deer from entering your yard and bringing ticks with them.

(Continued from page 12)

About then, I realise my iphone is still in my pocket, as is my expensive torch I use for inspections, and my radio. I surface, and for what its worth, throw them to the bank. A smaller number of bees buzz me, and others are attacking the spotter who's trying to help me (he later tells me that when I hit the dam he couldn't see my head or shoulders for the bees). I'm standing chest deep, leaning backwards and holding my hair in the water, crushing bees in my hair with the one hand that has a glove on it, and swearing in anger and pain.

I hear the spotter yell at me to run to him. I stumble out of the dam and run as bees buzz around us, and he half drags me around to the front of the nearby vacant house. My head and right hand are on fire and I can barely breathe. It is at this time I recall, my father is allergic to bees.

We get to a safe place about another 50m away, and I slide off his arm to writhe on the ground and curse enough to make merchant seaman blush. The pain is intense and unrelenting. I've been stung by wasps and bees over the years - the worst being 3 on the head when I was a kid, but this was something else. I have a very good idea of what it would feel like if I was doused in petrol and set alight.

The spotter is a good guy, and begins pulling/crushing still live bees out of my hair bare-handed and smacking them off my shirt. A few other people arrive, and begin scratching out the stings, which helps to reduce some of the pain and swelling. They pull off my shirt and cover me with a thermal blanket as I begin to shiver (I'm soaking wet, and possibly in shock). Someone has called an ambulance, who gets lost on the way out, and takes ages to arrive. I try not to count the seconds as I wait in my private hell. They finally arrive, ask me about my breathing (no swollen throat), check my abdomen for swelling, check my blood pressure and heart rate (up just a tad), and tell me that it appears I'm not allergic. "How

(Continued on page 31)

The following 'Pursuing a Career in Ecological Consulting' is a brochure that was recently created by the University Liaison Sub-committee of the ECA council as a response to frequently being contacted by university graduates asking questions about the Ecological Consulting Industry. This brochure has also been uploaded on the ECA website.

PURSUING A CAREER IN ECOLOGICAL CONSULTANCY

1. What does an ecological consultant do?

Ecological consultants are responsible for undertaking a range of activities in relation to the assessment of the ecological values of a location. In general, these assessments relate to proposed development activities such as residential, industrial and mining constructions. They may also be to provide information on the ecological values of areas to a range of stakeholders. Assessments are necessary because there are a range of legal obligations established under state and federal environmental laws that need to be considered when an activity will result in an impact on the natural environment.

- ◇ Ecological consultants may also be asked to:
- ◇ design, implement and monitor the effectiveness of ecological management plans;
- ◇ provide expert ecological advice in court cases, to independent commissions of inquiry, parliamentary groups, urban planning groups and at local council meetings;
- ◇ peer review work conducted by other ecological consultants; and
- ◇ train others in university or TAFE courses, conferences and workshops or on-the-job.

An ecological consultant will be involved in a variety of interesting activities such as field surveys, use of geographic information systems (GISs), consultation with clients and stakeholders, interpretation of environmental legal documents and preparation of reports and management plans just to name a few.

There are a range of standard documents written by ecological consultants including flora and fauna reports, environmental impact assessments, opportunity and constraint reports, species impact statements, vegetation maps, vegetation management plans, threatened species management plans, fire management plans and peer review of development applications.

2. Main industry sectors in ecological consultancy.

Ecological consultants work with a variety of organisations:

- ◇ Federal and State government departments such as environmental protection agencies, conservation agencies (e.g. NSW Office of Strategic Lands), land management agencies (e.g. NSW Office of Strategic Lands) and catchment management authorities.
- ◇ Local councils undertaking assessments of property in parks and reserves; critical review of development applications; application or development zoning.
- ◇ Large developers of residential, industrial or mining projects.
- ◇ Law firms that deal with environmental and planning issues.
- ◇ Community groups who require expert advice on ecological values and management e.g. environmental action groups, bushcare groups.

3. Qualifications and Experience

(a) Qualifications

The usual minimum requirement is a degree (or equivalent) in a biological science from a recognised (government -accredited) tertiary institution. Most ecological consultants have at least a B. Sc. (Hons) degree, some with higher degrees (M. Sc. or Ph.D).

A few people who have a relevant diploma in applied science from a TAFE College (e.g. Dip. Biol. Tech. or Dip. Appl. Sc.), and who have worked for several years as a scientific officer or field assistant in a biological discipline, have also been successful as ecological consultants.

Degree certificates that are purchased on the internet from “non-accredited universities” or diploma mills are not recognised by government authorities and the environmental consultancy industry in Australia.

(b) Experience

Many graduates think they are readily employable as ecological consultants once they have completed their studies. In most cases this perception is WRONG!

As an ecological consultant you are expected to provide expert advice and efficient services to your clients and government authorities. Therefore, you will need relevant business and scientific skills that have not necessarily been acquired from a tertiary education. Some of these skills are prerequisites for employment as an ecological consultant, others will be acquired during on-the-job training.

A prospective ecological consultant should have:

- ◇ relevant tertiary qualifications;
- ◇ an understanding of environmental planning and assessment processes and the parties involved;
- ◇ research skills: fluency in web-based data, information sources and office computer software;
- ◇ good database management and report-writing skills;
- ◇ good client liaison skills and the ability to work efficiently as part of a project team;
- ◇ the ability to meet tight deadlines while still maintaining a high standard of work; and
- ◇ (usually) a current driver’s licence.

Field ecologists should also have proven experience in flora and/or fauna and habitat survey and recording techniques, including the ability to identify plant and/or animal species and their habitats. Database managers must be proficient in the use of software for data storage and analysis (biostatistical packages) and presentation of data (e.g. GIS software).

Predicting potential ecological impacts of development or activity proposals, and recommending how to reduce or avoid them, are specialist skills that are usually learned early in ecological consultancy. Therefore, a good knowledge of threatening processes and the ecological requirements of species and communities is a highly desirable attribute when applying for a job as an ecological consultant.

4. Applying for a Job as an Ecological Consultant

(a) Where to Look

- ◇ **General Job Seeking Sites** such as:

Australian JobSearch www.jobsearch.gov.au/
CareerOne www.careerone.com.au/
AllJobs www.alljobs.com.au/

SEEK www.seek.com.au
MyCareer www.mycareer.com.au/

◇ **Environmental Job Seeking Sites** such as:

NRMjobs www.nrmjobs.com.au

Enviro Jobs www.envirojobs.com.au

Environment Jobs www.environmentjobs.com.au

Environmental Jobs www.environmentaljobs.com.au

◇ **Websites of environmental consultancies.** Many companies advertise job vacancies on their websites. Some also invite you to send them your *curriculum vitae* so that they can invite you to apply for a job when a potentially suitable vacancy becomes available.

◇ **Websites of relevant professional associations** such as the Ecological Consultants Association of NSW (ECA) www.ecansw.org.au, Environmental Institute of Australia and New Zealand www.eianz.org and Ecological Society of Australia www.ecolsoc.org.au. These sites advertise job vacancies, provide information about the ecological consultancy industry and some provide contact details of environmental consultants.

◇ **Professional networking sites** such as LinkedIn. These sites allow you to promote your qualifications and experience to targeted audiences, interact with environmental consultants and learn about current environmental issues and the ecological consultancy industry. These sites also advertise job vacancies.

◇ **Employment sections of newspapers and other periodicals.**

◇ **Recruitment Agencies.** Some job seekers use professional recruitment agencies who have established extensive networks within a broad range of employment sectors.

◇ **University online bulletin boards** sometimes advertise jobs, fix-term internships or work experience positions for undergraduates (university vacation periods) or new graduates.

(b) How to Stand Out From the Crowd

There is a good chance that a job which is advertised widely will attract a lot of applicants. Here are some tips to help you stand out from the crowd:

Qualifications. Good grades and higher degrees will usually move your application towards the top of the pile in the initial job selection process.

Relevant Work Experience. Consultancies often prefer to employ people who have had previous work experience as an ecological consultant or field ecologist. Try to gain relevant work experience during university or TAFE vacations; some tertiary institutions that run applied environmental science courses team up with industry groups to provide this experience as a course requirement.

If you are a recent graduate without relevant work experience, you may like to offer to work as a volunteer for a short and defined period of time. This may be difficult for you financially at the time, but it is a way to demonstrate first-hand your workplace capabilities to a potential future employer.

(c) Preparing Your Application

Do your homework before submitting a job application. Research the company and the type of job advertised. Job descriptions often identify someone you can contact for further information about the position. Use that opportunity to ask intelligent questions to find out more about the job.

Your letter of application must always address the selection criteria that are in the job description. Provide relevant details under sub-headings that relate to each criterion. A form letter that is used for all job applications is not acceptable because it demonstrates that you have not thought enough about the advertised job, as well as an apparent lack of interest. Your letter should be comprehensive, but succinct.

Each job application should include your *curriculum vitae* (cv) or *resume*. The *cv* should summarise information about your educational qualifications, list additional training courses you have completed, relevant work experience (job titles, employers, projects, dates of employment), relevant publications (if any), and the names and contact details of at least three professional referees.

If possible, ask someone who is familiar with environmental or ecological consultancy to review your letter of application and *cv* before you submit it to the potential employer.

Always submit your job application by the advertised deadline. A key component of all consultancy work is the ability to meet numerous deadlines. A late job application may create doubt in the mind of a potential employer about your ability to do this.

Always inform your referees that they have been nominated in your letter of application and provide them with a copy of the job description. This will assist them in providing a reference if the potential employer or employment agency contacts them about your application.

(d) The Job Interview

If you have made it to the interview stage, then you are on the shortlist of job applicants for the position. Ensure that you turn up to the interview on time and dress smartly.

Prepare for the interview by going over your letter of application, refreshing your knowledge of the company and the advertised job, and identifying questions that you would like to ask the interviewers – the interview is just as important for you to learn about the company and the job, as it is for the interviewer(s) to learn about you.

You may be called for a second interview. This is usually an indication that the potential employer cannot decide between two applicants and needs further information, or there is a need to clarify additional issues that have been raised in the job selection process.

(e) Additional Hints

If you wish to talk to someone in the workplace about ecological consultancy, organise an appointment beforehand. Owners and managers of ecological consultancies are busy people and they may take some time to respond to unsolicited inquires (emails, postal letters, phone calls) for a job or work experience opportunities.

Be honest about your capabilities and work experiences when applying for a job in ecological consultancy this will avoid the embarrassment of being employed in a job for which you are not suited.

5. Career pathways in ecological consultancy

Ecological consultants usually start as members of a team that provides assistance to the Project Manager/Senior Ecologist. In most consulting companies there will be a structure that allows for the movement of a consultant from Project Officer/Ecologist to that of Senior Project Manager/Senior Ecologist.

There are a number of avenues for ecological consultants to improve their skills and ensure they remain up to date with current practices and ecological knowledge. Following these avenues will be important to a consultant's career pathway.

6. Ongoing Training & Accreditation

Not everything you need to know can possibly be covered in a tertiary degree or be provided by your employer. While your employer will probably be proactive in providing training in the use of their business systems and OH&S you will be responsible for identifying and chasing opportunities for acquiring additional ecological skills and business management skills. A variety of courses are available in field survey methods, use of GIS software, first aid courses, 4 x 4 courses, workshops and conferences that are run by various organisations, either government, private or professional. These training opportunities should take several forms:

Direct interest: Learning opportunities can be tailored to your interests (e.g. assessment of microchiropteran bat populations or eucalypt identification). Skills learned can be used directly in your daily activities. Some consulting companies will support their staff acquiring these skills.

Indirect interest: You should also be on the lookout for opportunities which broaden your general ecological skills. For example, while you may have little interest in undertaking bird banding or orchid identification, having a basic understanding of these topics will allow you to understand relevant literature and manage projects which require these investigations.

Business skills: Although most ecologists groan at the mere thought of spending time learning business skills, (such as understanding and negotiating contracts, project and people management) these provide the basic building blocks for life as a consultant.

Safety: Training courses in the area of safety should be tailored to the skills you require in the industries you are working in. As a minimum you should receive training in first aid and four wheel driving, with other training being added should the need arise (e.g. working in remote locations).

Accreditation: During your career, legislation will vary and requirements to meet certain standards within the industry will change (e.g. BioBanking Accreditation, AusRivas Certification). Participation in these schemes, where appropriate, is recommended to broaden your skills base and to ensure that you remain up to date within the industry requirements.

7. Setting up your own consultancy business

Working for yourself has many advantages but before going out on your own there are a number of factors that you need to consider.

- ◇ Do you have the depth of ecological experience necessary to provide clients with scientifically robust advice?
- ◇ Are you sufficiently knowledgeable with regards to providing sound advice within the legal frameworks?
- ◇ Have you worked on a wide range of projects that have given you sufficient experience across several industries and project types?
- ◇ Do you have sufficient standing and connections within the industry to allow you to attract clients?
- ◇ Do you have strong connections with colleagues in the consulting community who will be able to assist you with advice or provide you with services that are out of your area of expertise?
- ◇ What type of business do you want to have? Do you want to be a sole trader or do you want to employ other ecologists?

On a more personal note you need to be honest about your ability to be self-motivated, your ability to work independently and to meet deadlines on time and on budget. If you need direction from above to identify requirements for a project and to spur you on to get the project completed then perhaps you aren't ready for working independently.

Keep in mind that you won't necessarily earn a 'steady wage' each week, especially during the development of your business, and this may present challenges if you have a mortgage and dependents. Have a definite plan in place to procure work and remember that chasing the next job should always be an ongoing process even when you are busy on your current project load. Cash flow can only be guaranteed if you diligently invoice and chase timely payment so unless you are confident enough to do this you should reconsider working for yourself. You must ensure that you have best-practice business systems in place to protect you and your clients. This advice can best be provided by an accountant and solicitor with experience in setting up small business. It is also essential for your business to have adequate insurance cover (professional indemnity, public liability and workers' compensation insurance) from the outset.

Additional advice can be sought at various websites and by talking to colleagues in the ECA, e.g.

<http://www.business.gov.au/Pages/default.aspx>

<http://www.ato.gov.au/businesses/content.aspx?doc=/content/69534.htm>

Remember you are setting up a business that will provide advice that your client is going to rely on either personally or within their business. It can be a very challenging experience that requires long working hours as you will be responsible for all facets of the ecological work and running a business. However, if you strike out on your own with sufficient expertise it can be richly rewarding and one that is well worthwhile.

8. Relevant professional societies/associations

There are number of professional organisations to which consultants can belong. These organisations provide valuable information on recent research, conferences and training options. Some relevant organisations are:

Ecological Consultants Association of New South Wales – <http://www.ecansw.org.au/>

Ecological Society of Australia - <http://www.ecolsoc.org.au/>

Australian Systematic Botany Society - <http://www.anbg.gov.au/asbs/>

Royal Zoological Society of New South Wales - <http://www.rzsnsw.org.au/>

Environmental Institute of Australia and New Zealand - <http://www.eianz.org/>

Australian Marine Sciences Association - <http://www.amsa.asn.au/>

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did they know that?" "I wasn't dead."

They give me a much needed pain killer, and I get the ambulance ride to the hospital. I'm seen by a very lovely young English doctor, and she takes out the last of the stings. I recite the story many times to nurses, doctors and wardsmen: I'm the hospital celebrity for the day. Fortunately no-one had mobile phone footage of the incident or it would be on Youtube (many asked if someone did).

They stop counting the stings at 40, and that's before they get to my head. I get a few hours observation, a tetanus shot, and eventually, get to go home. I terrify my children with my disfigurement (my hand looks like a club, and my face is gruesome), and simply go to bed. Its been a long day.

Saturday is a day to forget as my body feels like it has been run over by a truck, and looks like it. I have a migraine like a power drill in my head, and look like I've been beaten by Mike Tyson using 3 foot of copper pipe. And then the bites start itching. I thought sandflies were bad.

Fortunately an understanding chemist provides a great anti-histamine and Stingose, and I can pass for human by lunch time Sunday, and close my right hand again by dinner. Monday, I am back to normal, and the butt of jokes at the toolbox.

The moral of this story is that clear communication in a workplace where there is danger is essential.

This is an accident that should have never happened for a range of reasons, as you can see. Another good idea is if you're working on a site where a feral bee hive is present – MARK IT CLEARLY so that everyone and anyone can recognise it. These and other protocols now apply on this job and I've updated our SWMS as well.

So once you stop laughing at my misfortune, I hope you learn a lesson too.

From the Botany Desk

This section is dedicated to sharing of observations, descriptions and any information such as flowers of threatened plants for the purpose of benefiting the science of Botany, especially in its application to ecological consulting and management of threatened species.

This issue, Isaac Mamott shares his valuable insights into two threatened species he's been working with.

Notes on a Threatened (Vulnerable) flora species on the NSW North Coast. Part of a series of articles on NSW North Coast Threatened plants that aim to provide specific habitat, ecology and distribution data to aid the consultant ecologist (with a bias towards those lesser known taxa where no detailed species profiles exist).

Nabiac Casuarina (*Allocasuarina simulans*)

Description

Dioecious shrub to 4 metres tall with smooth bark. Branchlets yellowish/green and ascending to 22 cm long; 1-1.5mm wide. Articles (being the portion of the branchlet between whorls of teeth) up to 16 mm long; each branchlet consists of 6 prominent ridges, with conspicuous, dense white hairs between each ridge (furrows) running the length of the article. Leaves are reduced to a ring of six tiny teeth at the nodes (joints) of each branchlet. Inter-article whorls have 6 teeth with each tooth having an acute, darkened apex and slightly overlapping bases (refer Harden Volume 1 for a decent sketch of the teeth). The teeth apices point to the hairs that occur between the angled ridges. A decent 10x hand lens used in the field will be sufficient to view the teeth and angled ridges (which are a key diagnostic feature for Casuarinaceae). I have included a macro photo of the teeth and ridges for reference. Cone body is roughly cylindrical-shaped to 40mm

long, 15 mm wide, often with an acuminate or pointed apex. Peduncles are generally 14-mm long, 2-3mm wide (photo of cones also attached).

Distribution

Restricted to the Pleistocene Nabiac Sandbeds and Holocene dunefields in Booti Booti National Park on the NSW mid north coast. Floristics detailed below based on surveys undertaken by the author in recent years.

Habitat Type 1

Banksia dry shrubland on coastal sands of the North Coast

Occurrence

This vegetation type was recorded on free draining Pleistocene sands on beach ridges with a relatively deep water table on the Nabiac Sandbeds as well as on Holocene dunes in Booti Booti National Park north of Forster.

Floristics and Structure:

Emergent Stratum (height to 8 m; projected foliage cover <5%)

Canopy emergents dominated by *Eucalyptus racemosa* var *racemosa*.

Upper Stratum (height to 7 m; projected foliage cover to 41%)

Moderately dense small tree/tall shrubs dominated by *Banksia aemula*, *Melaleuca nodosa* and *Leptospermum trinervium*.

Mid Stratum (height to 3 m; projected foliage cover to 53%)

Dense heathy shrub stratum dominated by *Acacia ulicifolia*, *Eriostemon australasius*, *Boronia pinnata*, *Zieria laxiflora*, *Persoonia katerae*, *Tetratheca ericifolia*, *Gompholobium latifolium*, *Leptospermum polygalifolium* subsp. *cismontanum*, *Dillwynia retorta*, *Dillwynia floribunda*, *Leucopogon ericoides*, *Leucopogon virgatus*,

Isopogon anemonifolius, *Banksia oblongifolia*, *Conospermum taxifolium*, *Leucopogon appressus*, *Hibbertia obtusifolia*, *Epacris pulchella*, *Pimelea linifolia*, *Leptospermum semibaccatum*, *Calytrix tetragona*, *Pimelea linifolia*, *Persoonia katerae*, *Ricinocarpus pinifolius*, *Eriostemon australasius*.

Lower (Ground) Stratum (height to 1.0 m; projected foliage cover to 92%)

Dense groundcover dominated by grasses, sedges, sub shrubs and graminoids including *Baeckea imbricata*, *Hibbertia linearis*, *Astroloma pinifolium*, *Euryomyrtus ramosissima* subsp. *ramosissima*, *Bossiaea ensata*, *Caustis recurvata* var. *recurvata*, *Tricoryne elatior*, *Ptilothrix deusta*, *Hypolaena fastigata*, *Leptocarpus tenax*, *Xanthorrhoea* sp.

Habitat Type 2

Scribbly Gum heathy open forest on coastal lowlands of the North Coast

Occurrence

This vegetation type was recorded on free draining Pleistocene dunes and beach ridges with a relatively deep water table on the Napiac Sandbeds.

Floristics and Structure:

Upper Stratum (height to 10 m; projected foliage cover to 32%)

Eucalyptus racemosa var. *racemosa* recorded as the dominant canopy species with *Eucalyptus pilularis*, *Corymbia intermedia* and *Angophora costata* recorded as associate to minor subsidiary canopy species.

Mid Stratum (height to 7 m; projected foliage cover to 83%)

Moderately dense sub-canopy dominated by *Banksia serrata* and *Banksia aemula*. Dense heathy shrub stratum dominated by *Acacia ulicifolia*, *Eriostemon australasius*, *Boronia pinnata*, *Zieria laxiflora*, *Persoonia linearis*, *Tetratheca ericifolia*, *Aotus ericoides*, *Gompholobium latifolium*, *Leptospermum polygalifolium* subsp. *cismontanum*, *Leucopogon lanceolatus* var. *gracilis*,

Dillwynia retorta, *Dillwynia floribunda*, *Acacia brownei*, *Bossiaea heterophylla*, *Monotoca elliptica*, *Brachyloma daphnoides*, *Leucopogon ericoides*, *Leucopogon virgatus*, *Acacia suaveolens*, *Acacia quadrilateralis*, *Isopogon anemonifolius*, *Banksia oblongifolia*, *Conospermum taxifolium*, *Leucopogon appressus*, *Persoonia katerae*, *Actinotus helianthi*, *Styphelia* sp., *Hibbertia obtusifolia*, *Leptospermum trinervium*.

Lower (Ground) Stratum (height to 1.0 m; projected foliage cover to 76%)

Dense groundcover dominated by grasses, sedges and sub shrubs *Euryomyrtus ramosissima* subsp. *ramosissima*, *Lepyrodia scariosa*, *Leptocarpus tenax*, *Hypolaena fastigata*, *Caustis recurvata* var. *recurvata*, *Lomandra filiformis* subsp. *filiformis*, *Platysace ericoides*, *Monotoca scoparia*, *Pteridium esculentum*, *Lomandra longifolia* subsp. *longifolia*, *Petrophile pulchella*.

Rare Associates: *A. simulans* co-occurs with the regionally rare shrubs, *Acacia quadrilateralis* and *Persoonia katerae*.

Life history/Ecology

- *Growth Form* – small tree to 4 metres in height.
- *Vegetative spread* – Unlikely.
- *Lifespan* – no data available.
- *Primary juvenile period* (plant age at first flowering) – no data available but likely to be between 3-9 years based on other related *Allocasuarina* taxa.
- *Flowers* – Male and female flowers on different plants. Flowering period March-June. Likely wind pollinated.
- *Seed storage, dispersal and germination cue* – Thought to be serotinous (temporary seedbank on plant) with seed release following fire; unlikely to have a persistent soil seedbank. Winged seed (samara) thought to be wind dispersed.

- *Fire response* – Reported to be a facultative resprouter. That is, plants can both die following fire and release seed in canopy stored cones while others have been shown to resprout from the basal stem (Griffith and Wilson 1997).

- *Population Size* – population in the low hundreds estimated by the author on the Nabiac Sandbeds based on surveys in suitable dry heathland habitats. Unconfirmed number recorded by Steve Griffith in Booti Booti National Park (not a large population based on the author’s observations).

- *Hybrids* - Yes. Reported *A. simulans* x *A. defungens* on Wallis Island, Forster and Limeburners Creek Nature Reserve (April 1997 records). *A. defungens* typically occurs in Intermediate Dry Heathland where the water table is a bit higher than in pure Dry Heathland. A close inspection of the branchlets, flowers/cones and growth form is necessary to see if a specimen holds any intermediate characteristics between the two taxa. The Botany Desk will feature *Allocasuarina defungens* in a future newsletter issue.

Conservation Status: Vulnerable (TSC and EPBC Acts); ROTAP 2VCa.

References:

1. NSW National Parks and Wildlife Service (2002) NSW Flora Fire Response Database version 1.3a December 2002.
2. Griffith and Wilson (1997) Plants of Coastal Heathlands In Northern NSW. Botany Department, University of New England, Armidale.



Narrow leaved Red Gum (*Eucalyptus seeana*)

Description

A medium sized tree up to about 12 metres height with a spreading habit. Bark is smooth, cream with dark grey, rust or grey green mottling. **Juvenile leaves are narrow (narrow lanceolate), pendulous, about 1cm wide and up to 10 cm long (juveniles leaves on the often co-occurring *E. tereticornis* are usually broad lanceolate to ovate).** Adult leaves are also narrow lanceolate, 1-2 cm wide and 10-20 cm long. Buds pedicellate; calyptra horn-shaped. Inflorescence an auxillary umbel which is 7-11 flowered. Fruit is pedicellate, hemispherical, 4-7mm diameter, **disc ascending steeply (ie. almost vertically) and does not smoothly grade to the 4 exerted valves (as does *E. tereticornis*).**

Occurrence in the Taree LGA

Generally restricted to alluvial soils (eg. clay loams) on the floodplain of the Dawson River north of Taree on the NSW mid north coast. The species occurs on alluvial flats that are subject to episodic flooding for

LEFT: *A. simulans* (macro shot of teeth and angled ridges along the branchlets). Note darkened teeth apices and slightly overlapping teeth bases. BELOW: *A. simulans* (typical woody cone shapes)



short durations, situated marginally upslope from permanently inundated Swamp Forests. Floristics and vegetative structure of habitat types are detailed below and are based on field surveys undertaken by the author in recent years in Brimbin Nature Reserve and on other publicly held lands at Brimbin.

Known Habitat Type in Taree LGA

'Moist' Sclerophyll Forest (transition between Dry and Wet Sclerophyll Forest)

Floristics and Structure:

Upper Stratum (height to 15 m; projected foliage cover to 53%)

E. seeana occurs in association with a floristically variable canopy including *Eucalyptus propinqua*, *Eucalyptus microcorys*, *Eucalyptus siderophloia*, *Eucalyptus eugenioides*, *Eucalyptus carnea*, *Angophora floribunda*, *Corymbia intermedia*.

Mid Stratum (height to 8 m; projected foliage cover to 65%)

Moderately dense to dense small tree/shrub stratum dominated by a mix of sclerophyllous and dry rainforest taxa, including *Allocasuarina littoralis*, *Duboisia myoporoides*, *Melaleuca nodosa*, *Acacia leiocalyx* x *concurrans* intermediate, *Breynia oblongifolia*, *Acacia ulicifolia*, *Ozothamnus diosmifolius*, *Notelaea longifolia* forma *intermedia*, *Alphitonia excelsa*, *Glochidion ferdinandi* var *ferdinandi*, *Jacksonia scoparia*, *Pultenaea villosa*, *Melaleuca styphelioides*, *Clerodendrum tomentosum*, *Melia azedarach*, *Myrsine variabilis*, *Dodonea triquetra*, *Persoonia linearis*, *Exocarpos cupressiformis*, *Acronychia oblongifolia*.

Lower (Ground) Stratum (height to 1.5 m; projected foliage cover to 90%)

Sparse to dense groundcover dominated by grasses, graminoids, forbs, ferns and sub shrubs including *Cheilanthes sieberi* subsp *sieberi*, *Entolasia marginata*, *Aristida vagans*, *Echinopogon caespitosus* var *caespitosus*, *Imperata cylindrica* var *major*, *Panicum simile*, *Leucopogon juniperinus*, *Brachyscome* sp., *Pseuderanthemum variabile*, *Oplismenus imbecillis*, *Lagenifera gracilis*, *Lomandra*

filiformis subsp *filiformis*, *Lomandra multiflora* subsp. *multiflora*, *Morinda jasminoides*, *Pratia purpurascens*, *Pandorea pandorana*, *Galium liratum*, *Lomandra longifolia* subsp. *longifolia*, *Brunoniella australis*, *Desmodium gunnii*, *Digitaria parviflora*, *Dianella caerulea*, *Ottochloa gracillima*, *Lepidosperma laterale*, *Oxalis perennans*, , *Hibbertia obtusifolia*, *Dichondra repens*, *Gahnia aspera*, *Cheilanthes sieberi*, *Gonocarpus teucroides*, *Pteridium esculentum*, *Cymbopogon refractus*, *Centella asiatica*, *Dichondra repens*, *Solanum prinophyllum*.

Climbers and twiners (2 or more strata)

Parsonsia straminea, *Glycine microphylla*, *Hardenbergia violacea*, *Billardiera scandens*, *Geitonoplesium cymosum*, *Passiflora herbertiana* subsp *herbertiana*, *Clematis aristata*

Epiphytes

Dendrobium linguiforme

Weeds

Lantana camara

Life history/Ecology

- *Growth Form* – medium sized tree to 15 metres in height.
- *Vegetative spread* – No.
- *Lifespan* – some specimens known to be between 50-100 years.
- *Primary juvenile period* (plant age at first flowering) – no data available.
- *Flowers* – bisexual. Flowering period November -December. Pollinated by insects, Grey headed Flying Fox.
- *Seed storage, dispersal and germination cue* – Unlikely to have a persistent soil seedbank. Thought to be wind dispersed.
- *Fire response* – Thought to resprout by epicormic buds. Lignotuber?
- *Population Size* – Small areal extents generally restricted to floodplain habitats on the lower

and middle reaches of the Dawson River corresponding to a small population size in the low hundreds.

- *Hybrids* – *E. seeana* occurs just downslope from the slightly drier dry sclerophyll forests that support the closely related *Eucalyptus tereticornis* and thus intermediates between the 2 taxa are possible but have not been recorded by the author to date.

Conservation Status – Listed as an Endangered Population in the Taree LGA. The vegetation type or habitat that the species forms part of, contains elements of the Subtropical Coastal Floodplain Forest EEC (TSC Act). In general, Lowland Redgum Forests on the NSW North Coast are considered poorly reserved and have been largely cleared for agriculture and development (author's pers. obs.).

Equivalent Vegetation Type - Forest Type 93 (Forestry Commission of NSW 1989).



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\$200 for a banner

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If you wish to advertise, please contact the ECA administrative assistant on

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Contributions to the Newsletter, Volume 32

Contributions to the next newsletter should be forwarded to the administration assistant Amy Rowles admin@ecansw.org.au by the

15th of January 2014.

- 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
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- 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 review)
- ◇ Photographs

ECA Photo Gallery

Photo Competition Entries

Left: Flame Robin, Tumut, NSW.
(photo courtesy of Steve Sass).

Right: Eastern Bearded Dragon,
Gunning, NSW (photo courtesy of
Steve Sass).

Below Left: Bandy Bandy (photo
courtesy of Laura Worthington).

Below Right: *Oedura lesueurii* (photo
courtesy of Laura Worthington).



Right: A Greater Glider, one of eleven seen over 300m section of track to the Pinnacles Lookout, Coolah Tops NP 16th April 2013 (photo courtesy of Chris Charles).

Below Centre: *Litoria aurea* female from the Port Kembla Population (photo courtesy of Kylie Reed)

Below Left: Green Tree Frog (photo courtesy of Laura Worthington).



ECA Photo Gallery

Photo Competition Entries



Left: Runner Up. Ocellated Velvet Gecko taken near Coppabella, QLD (photo courtesy of Kurtis Lindsay).

Above: Calling *Litoria littlejohni* male within the Sydney Metropolitan Catchment (photo courtesy of Kylie Reed).

Below Right: Powerful Owl (photo courtesy of Leslie Engel).

Below Centre: *Pogona barbata* taken near Coppabella, QLD (photo courtesy of Kurtis Lindsay). **Below Left:** A Spotted Bowerbird attending to its bower, Bourke, NSW (photo courtesy of Steve Sass).

