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Newsletter of the Ecological Consultants Association of NSW

Osprey - see page 30 *(Photo courtesy of Emma Rawling)*

VOLUME 30 February 2013

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(Photo courtesy of Jason Berrigan)

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Small flower Grevillea (*Grevillea parviflora subsp parviflora*) - see page 35. *(Photo courtesy of Isaac*

Editor: Jason Berrigan

Design and Layout: Amy Rowles

Front Cover Photo: This underwater scene with Grey Nurse Sharks was captured by Harry Engel.

ECA Office Bearers 2012-2013

President:
Mark Couston
president@ecansw.org.au

1st Vice-President:
Stephen Ambrose
stephen@ambecol.com.au

2nd Vice-President:
Alison Hunt
alison@ahecology.com

Secretary:
Deryk Engel
secretary@ecansw.org.au

Treasurer:
Public Officer:
Paul Burcher
treasurer@ecansw.org.au

Councillors:
Liz Norris
liz.norris@bigpond.com
Judith Rawling
jrawling@urbanbushland.com.au
Toby Lambert
toby.lambert@rpsgroup.com.au
Rhidian Harrington
rharrington@niche-eh.com
Rebecca Hogan
rhayes@hayesenv.com.au
Belinda Pellow
bpellow@urbanbushland.com.au
Steve Sass
steve@envirokey.com.au
Elizabeth Ashby
e.ashby@keystone-ecological.com.au
Matt Richardson
mrichardson@niche-eh.com
John Travers
bushfire@travers.com

Administration Assistant:
Membership Officer:
Amy Rowles
admin@ecansw.org.au
39 Platt St, Waratah, NSW, 2298

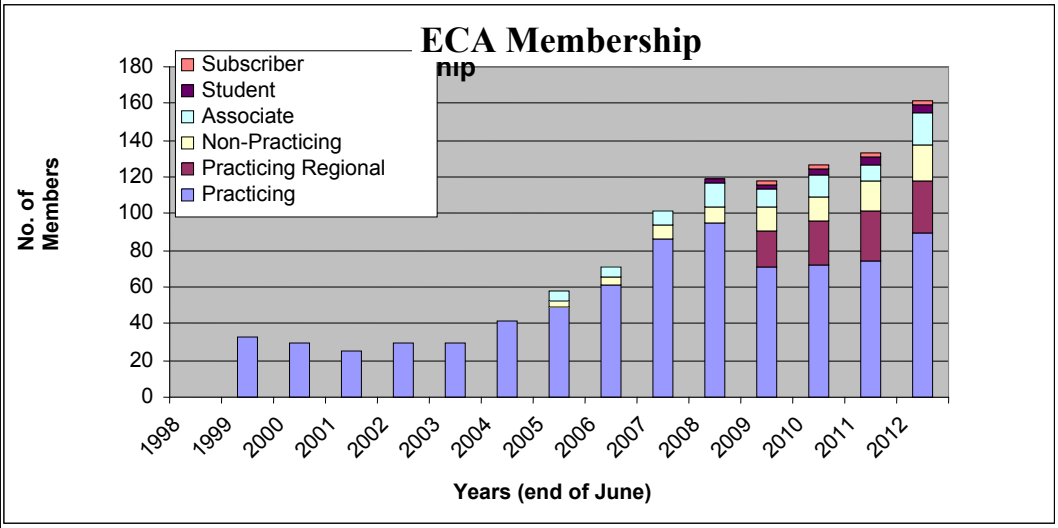
Web Master:
Stefan Rose

Newsletter Editor:
Jason Berrigan

Message from the President

Dear members,

Welcome to the first issues of *Consulting Ecology* for 2013. As shown in the graph below, the Association continues to grown in terms of the number of members, financial responsibility, and administrative functions. To improve the services to members, the ECA is establishing formal links with universities in NSW and we continue to maintain the contacts with the Office of Environment & Heritage. These links are important to our industry and they allow the ECA to pass on the science and policy to members to improve the standard of our ecological surveys and assessments. These links also provide work opportunities through tenders and positions vacant advertising.



The issue of Accreditation/Certification of Ecological Consultants is still a matter that needs to be finalized, and we are currently in the last stages of dealing with financial models to ensure the scheme is financially sustainable. Basically it comes down to:

- There are fixed costs with running a certification scheme, and,
- Variable costs associated with the numbers of participants in the scheme.

The fact that we are a relatively small industry in numbers means that the number of participants will have to cover, as a minimum, the fixed running costs. Despite trying to reduce the scheme's fixed running costs, the fees for becoming a Certified Ecological Consultant are likely to be higher than many other industries. Having said this, I am optimistic that certification scheme will become a standard industry requirement for ecological consultants.

In this issue of *Consulting Ecology* you will find articles ranging from the use of camera traps, Lymes Disease, a Scottish Osprey program, a novel way to inspect nest boxes and the latest From the Botany Desk, which are well worth reading and not to mention the 2013 Conference 'Offsets: Determination, Assessment and Management' to be held on the 2nd of August at Fairmont Resort, Leura in the Blue Mountains.

Yours sincerely
Mark Couston
President, Ecological Consultants Association of NSW

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.

Cuddles or Combat?

Gerry Swan
Cygnet Surveys & Consultancy

I read with interest the item in Volume 29 of Consulting Ecology by Narawan Williams "An X-rated Surprise in the Grass". I suspect what Narawan observed was not a mating but rather two males engaged in ritual combat. This event has been well documented over the years and exhibited by most elapids, pythons and colubrid snakes. Listed below are a few of the more recent papers documenting this event. All of these papers cite numerous other references relating to male combat in Australian snakes.

Clemann, N., Lyon, J., Trembath, D.F., Talbot, N. & Boulton, T. (2010) Observations of combat in the eastern brownsnake *Pseudonaja textilis* (serpentes: elapidae) from south-eastern Australia. Herpetofauna 40(2).

Loyd, R. & Trembath, D. F. (2010) Male combat in the Mulga snakes *Pseudechis australis* (serpentes: elapidae): a series of observations from northern Australia. Herpetofauna 40(1).

Turner, G. & James, B. (2009) Field observations of male combat in brown tree snakes *Boiga irregularis* (Colubridae) from northern Queensland. Herpetofauna 39(2).

Trembath, D. F., Rowley, J. L. & Jensen, O. (2006) An observation of male combat in the Dugite *Pseudonaja affinis* (serpentes: elapidae) from Grey, Nambung National Park, Western Australia. Herpetofauna 36(2).

Further Taxanomic Changes in the Reptile Fauna of NSW

Gerry Swan
Cygnet Surveys & Consultancy

Following on from Steve Sass' notes in Volume 26 and 27 concerning recent taxonomic changes and additions to the reptile fauna of NSW, here are a few more to ponder on.

The Beaked Gecko (*Rhynchoedura ornata*) has now become 6 species. *R. ornata* is now confined to Western Australia and there are two new species in New South Wales, *R. ormsbyi* (Eastern Beaked Gecko) and *R. angusta* (Border Beaked Gecko). *R. ormsbyi* occurs from north-western Victoria to the interior of Queensland including the Murray-Darling basin, Cobar peneplain and Mulga lands bioregion. *R. angusta* occurs in a narrow band of floodplains of the Bulloo-Bancannia drainage. Sorting them out morphologically is very difficult, so you need to get the locality very precisely or take a tissue sample for DNA.

The Velvet Geckos (genus Oedura) have been carved up. Lesueur's Velvet Gecko (*Oedura lesueurii*) is now *Amalosia lesueurii* & the Northern Velvet Gecko (*Oedura rhombifer*) is now *Amalosia rhombifer*.

The Robust Velvet Gecko (*Oedura robusta*) is now *Nebulifera robusta*.

Underwoodisaurus is now confined to the Barking Gecko (*Underwoodisaurus milii*) and a new species from the Pilbara, with the Granite Thick-tailed Gecko (*Underwoodisaurus sphyrurus*) now *Uvidicolus sphyrurus*.

But it isn't over yet. There is a new species for NSW. The Golden-tailed Gecko (*Strophurus taenicauda*) from Queensland now comprises three subspecies with *Strophurus taenicauda taenicauda* recorded from the Pillaga in NSW.

The Nobbi Dragon (*Amphibolurus nobbi*) is now *Diporiphora nobbi*, with the subspecies *nobbi* and *coggeri* being doubtful.

Hemiergis decresiensis comprised four subspecies: *decresiensis, continentis, talbingoensis* and *davisi*. These have now been re-organised with *talbingoensis* being split from *decresiensis*. So we now have *Hemiergis decresiensis decresiensis* and *Hemiergis decresiensis davisi* that are confined to SA; *Hemiergis talbingoensis talbingoensis* from Victoria to mid eastern NSW; and *Hemiergis talbingoensis davisi* north of the Abercrombie River NSW.

The Eastern Water Dragon is no longer *Physignathus*. It is now *Intellagama lesueurii.*

References:

Pepper, M., Doughty, P., Hutchinson, M.N., & Keogh, J.S. (2011) Ancient drainages divide cryptic species in Australia's arid zone: Morphological and multi-gene evidence for four new species of Beaked Geckos (*Rhynchoedura*). Molecular Phylogenetics and Evolution 61 (2011) 810-822.

Brown, D., Worthington Wilmer, J., & MacDonald, S. (2012). A revision of *Strophurus taenicauda (Squamata; Diplodactylidae)* with a description of two new subspecies from central Queensland and a southerly range extension. Zootaxa 3243:1-28.

Oliver, P.M., Bauer, A.M., Greenbaum, E., Jackman, T., & Hobbie, T. (2012). Molecular phylogenetics of the arboreal Australian gecko genus *Oedura* Gray 1842 (Gekkota: diplodactylidae): Another plesiomorphic grade? Molecular Phylogenetics and Evolution

Reeder, T.W., & Reichert, J.D. (2011).Phylogenetic Relationships within the Australian Limb-Reduced Lizard genus *Hemiergis* (Scincidae: Squamata) as Inferred from the Bayesian Analysis of Mitochondrial rRNA Gene Sequences. Copeia 2011, 1: 113-120

Edwards, D.L., & Melville, J. (2011). Extensive Phylogeographic and Morphological Diversity in *Diporiphora nobbi* (Agamidae) Leads to a Taxonomic Review and a New Species Description. Journal of Herpetology 45 (4) 530-546.

Amey, A.A., Couper, P.J., & Shea, G.M. (2012). *Intellagama lesueurii* (Gray, 1831), the correct binomial combination for the Australian Eastern Water Dragon (Sauria, Agamidae). Zootaxa 3390: 65-67.

Oliver, P.M., & Bauer, A.M. (2011). Systematics and evolution of the Australian knob-tail gecko genus (*Nephrurus,* Carphodactylidae, Gekkota): Plesiomorphic grades and biome shifts through the Miocene. Molecular Phylogenetics and Evolution, 59, 664-74.

PHOTO COMPETITION

Congratulations! to ***Harry Engel*** on winning the last photo competition with his photograph featured on the front cover of a fabulous underwater scene whilst diving.

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

Win your choice of one year free membership (current members only) or; one year free subscription to Consulting Ecology or; free entry into the next ECA annual conference. The winner will be selected by the ECA council. The winning photo will be reproduced in the ECA's Consulting Ecology along with Runners up

By submitting photos to this competition, the ECA reserves the right to use and reproduce the photo, with acknowledgement, in any ECA promotional material including the ECA website, newsletter, free of any charges or royalties.

www.ecansw.org.au

The ECA website has recently undergone an upgrade.

Please visit the site to access:

- Member contact list
- Membership application and renewal forms
- Photo Gallery
- ECA Newsletters - *Consulting Ecology*
- Jobs Vacant / Wanted
- ECA Discussion Forum
- ECA History
- Upcoming ECA Events
- ECA Council and Sub-committee details

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.

WANTED: Flora of NSW.

Please contact Cassandra Thompson, cthompson@emgamm.com, ph: 94939500.

Upcoming Events in 2013

ECA Events

- **ECA 2013 ANNUAL CONFERENCE AND AGM**

Date: 2nd August 2013
Venue: Fairmont Resort, Leura (Blue Mountains)
Theme: Offsets: determination, assessment and management
Cost: $155 Members; $200 Non-members
Details: See Page 15
Contact: admin@ecansw.org.au

- **GRASS IDENTIFICATION WORKSHOP**

Date: Thursday 13- Friday 14th June
Venue: Bowden Centre, Mount Annan Botanic Gardens
Cost: $200Members; $250 Non-members
Details: See Page 14
Contact: admin@ecansw.org.au

- **PROPOSED ECA WORKSHOPS**

Shorebirds (October 2013 at Bundeena)

The dates and venue for this workshops is yet to be determined. You may register your interest in any of these workshops by emailing admin@ecansw.org.au.

Non - ECA Events

- **National Koala Conference**

Date: 17th-19th May 2013
Venue: Westport Conference Centre, Port Macquarie
Cost: $270 for 3 days; $100 for 1 day
Details: http://www.koalahospital.org.au

- **Nature Conservation Council of NSW 9th Biennial Bushfire Conference**

Date: 4-5th June 2013
Theme: Fire and healthy landscapes: resilient environment, resilient people
Venue: NSW Teachers Federation Conference Centre, Surry Hills, Sydney.
Contact: bushfireconf2013@nccnsw.org.au
(02) 9516 1488

- **Australian Mammal Society Conference 2013**

Date: 8th-10th July 2013
Venue: University of NSW
Cost: $300 (member), $350 (non-member) for 3 days; $120 for 1 day
Contact: mammals2013@unsw.edu.au
Details: http://www.bees.unsw.edu.au/ams-conference-2013

- **Systematics Without Borders**

Date: 1st-6th Dec 2013
Venue: Eastern Avenue Auditorium and Theatre Complex, University of Sydney
Cost: $500, $220 (student / retiree)
Details: http://www.systematics2013.org

February 2013 ECA Membership Report

Amy Rowles
ECA administrative assistant

In total we have 166 members. We have had seven new members and one current applicant over the last six months. The new members are introduced below:

- Renae Baker
- Joel Stibbard
- Rowan Murphy
- Craig Faulkner
- Peter Monsted
- Tanya Bangel
- Jacqui Coughlan

Recent Literature and New Publications

Recent Journal Articles / Literature

The following two articles from ECOS magazine, written by Bianca Nogrady may interest you.

Do environmental assessments protect the environment?

Are environmental impact assessments (EIAs) achieving what they were designed to achieve? Do they do a good job of protecting Australia's diverse environments and their inhabitants for future generations? If not, what can be done to improve them?
http://www.ecosmagazine.com/paper/EC13029.htm

Environmental law reform: how much is too much?

Would reform of Australia's key environmental law – referred to by industry as 'cutting green tape' – safeguard our natural resources for current and future generations, or put them at higher risk?
http://www.ecosmagazine.com/paper/EC13030.htm

An interesting article on feral cats taking advantage of wildfires to capitalize on prey concentration is available on the following link.
http://www.australianwildlife.org/images/file/WILD322361_Wildlife%20Matters_Summer%202012_13%20SP.pdf

Volker Janssen (2012): Indirect Tracking of Drop Bears Using GNSS Technology. *Australian Geographer* **43 (4):** 445-452
http://dx.doi.org/10.1080/00049182.2012.731307

The following link to an overseas article on the effect of a single dwelling in a rural area on birds.

http://www.sciencedaily.com/releases/2013/02/130225131535.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily+%28ScienceDaily%3A+Latest+Science+News%29&goback=%2Egde_3741400_member_217873261

Serena M. and Williams G. (2013) Movements and cumulative range size of the platypus (Ornithorhynchus anatinus) inferred from mark-recapture studies. *Australian Journal of Zoology* - http://www.publish.csiro.au/paper/ZO12121.htm

Vanderduys E. and Kutt A. (2013) Is the Asian house gecko, *Hemidactylus frenatus, really a threat to Australia's biodiversity. Australian Journal of Zoology* - http://www.publish.csiro.au/paper/ZO12077.htm

Crane M., Lindenmayer D. and Cunningham R. (2013) Use and characteristics of nocturnal habits of the squirrel glider (Petaurus norfolcensis) in Australian temperate woodlands. *Australian Journal of Zoology* - http://www.publish.csiro.au/paper/ZO12080.htm

Lee K. et al. (2013) Genetic diversity in natural and introduced island populations of koalas in Queensland *Australian Journal of Zoology* http://dx.doi.org/10.1071/ZO12075

Ellis W. at al., (2013) Koala habitat use and population density: using field data to test the assumptions of ecological models. *Australian Mammalogy* - http://dx.doi.org/10.1071/AM12023

Paul D. (2013) Refuge sites, activity and torpor in wild common dunnarts (Sminthopsis murina) in a temperate heathland. *Australian Mammalogy* - http://dx.doi.org/10.1071/AM12016

Law B., Chidel M. and Britton A. (2013) High predation risk for a small mammal: the eastern pygmy -possum (Cercartetus nanus). *Australian Mammalogy* - http://dx.doi.org/10.1071/AM12034

Hohnen R. et al., (2012) Individual identification of northern quolls (Dasyurus hallucatus) using remote cameras. *Australian Mammalogy* - http://dx.doi.org/10.1071/AM12015

Waite E. et al (2013) Resource availability and foraging of Silvereyes (Zosterops lateralis) in urban trees. *Emu* 113(1) 26-32 http://dx.doi.org/10.1071/MU11093

Binder D. et al (2013) Emergence, growth, ageing and provisioning of Providence Petrel (*Pterodroma solandri*) chicks: implications for translocation *Emu* 113(1) 33-44 http://dx.doi.org/10.1071/MU11051

Eguchi K. et al (2013) The effects of nest usurpation and other interference by the Blue-faced Honeyeater on the reproductive success of the Grey-crowned Babbler. *Emu* 113(1) 77-83 http://dx.doi.org/10.1071/MU12044

Carter C. and Luck G. (2013) Fox baiting in agricultural landscapes: preliminary findings on the importance of bait-site selection. *Wildlife Research* - http://dx.doi.org/10.1071/WR12169

Movement re-established but not restored: Inferring the effectiveness of road-crossing mitigation for a gliding mammal by monitoring use

Soanes K, Carmody Lobo M., Vesk P., McCarthy M., Moore J. and van der Ree R. (2013). Biological Conservation **159:** 434 -441.

Abstract

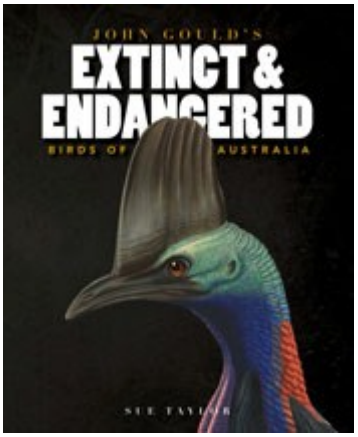
Wildlife crossing structures are commonly used to mitigate the barrier and mortality impacts of roads on wildlife. For arboreal mammals, canopy bridges, glider poles and vegetated medians are used to provide safe passage across roads. However, the effectiveness of these measures is unknown. We investigate the effect of canopy bridges, glider poles and vegetated medians on squirrel glider movement across a freeway in south-east Australia.

We monitored structures directly using motion-triggered cameras and passive integrated transponder (PIT) scanners. Further, post-mitigation radio-tracking was compared to a pre-mitigation study. Squirrel gliders used all structure types to cross the freeway, while the unmitigated freeway remained a barrier to movement. However, movement was not restored to the levels observed at non-freeway sites. Nevertheless, based on the number and frequency of individuals crossing, mitigation is likely to provide some level of functional connectivity.

The rate of crossing increased over several years as animals habituated to the structure. We also found that crossing rate can be a misleading indicator of effectiveness if the number of individuals crossing is not identified. Therefore, studies should employ long-term monitoring and identify individuals crossing if inferences about population connectivity are to be made from movement data alone.

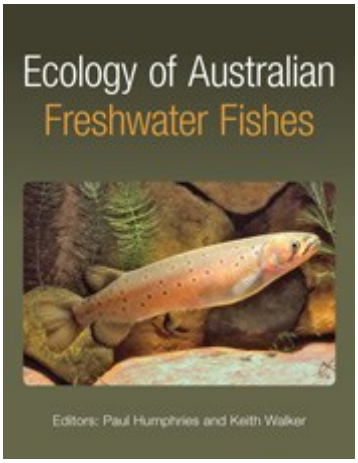
Recent Book Releases

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



Title: John Gould's Extinct and Endangered Birds of Australia
Author: Sue Taylor
RRP: $49.95
No. **Pages**: 256
Publisher: National Library of Australia
Date: November 2012

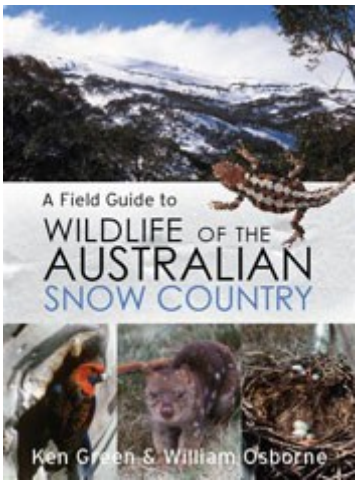
Title: Australasian Nature Photography
Author: South Australian Museum
RRP: $39.95
No. **Pages**: 112
Publisher: CSIRO Publishing
Date: October 2012



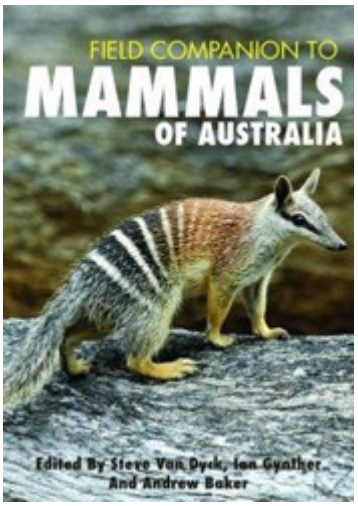
Title: Ecology of Australian Freshwater Fishes
Author: Paul Humphries and Keith Walker
RRP: $130
No. **Pages**: 440
Publisher: CSIRO Publishing
Date: April 2013

Title: Fur Seals and Sea Lions
Author: R. Kirkwood and S. Goldsworthy
RRP: $39.95
No. **Pages**: 160
Publisher: CSIRO Publishing
Date: June 2013

Title: A Field Guide to Wildlife of the Australian Snow Country
Author: K. Green and W. Osborne
RRP: $34.95
No. Pages:304
Publisher: New Holland
Date: August 2012



Title: Field Companion to Mammals of Australia
Author: S. Van Dyck, I. Gynther and A. Baker
RRP: $45.00
No. Pages: 512
Publisher: New Holland
Date: April 2013



Title: Field Guide to the Frogs of Queensland
Author: E. Vanderduys
RRP: $45.00
No. Pages: 208
Publisher: CSIRO Publishing
Date: November 2012

Title: Australian Lizards: A Natural History
Author: S. Wilson
RRP: $49.95
No. Pages: 208
Publisher: CSIRO Publishing
Date: October 2012

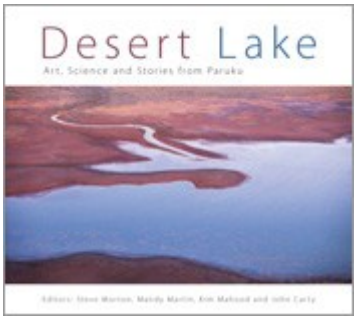
Title: The Kingdom of Rarities
Author: E. Dinerstein
RRP: $44.95
No. Pages: 336
Publisher: CSIRO Publishing
Date: January 2013

Title: Linking Australia's Landscapes: Lessons and Opportunities from Large-scale Conservation Networks
Author: J. Fitzsimons, I. Pulsford and G. Wescott
RRP: $89.95
No. Pages: 320
Publisher: CSIRO Publishing
Date: June 2013

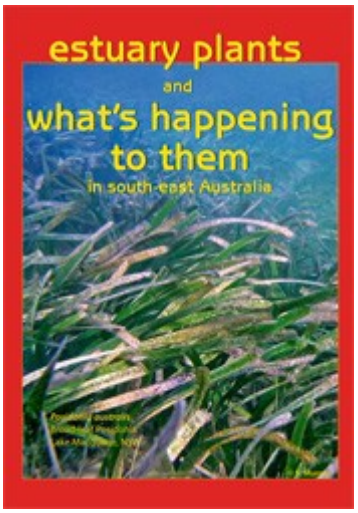
Title: A Field Guide to the Birds of Australia
Author: G. Pizzey and F. Knight. Ed. S. Pizzey
RRP: $45.00
No. Pages: 624
Publisher: Harper Collins
Date: September 2012

Title: Grassfinches in Australia
Author: J. Foreshaw, M. Shephard and A. Pridham
RRP: $185.00
No. Pages: 336
Publisher: CSIRO Publishing
Date: August 2012

Title: Desert Lake: Art, Science and Stories from Paruku
Author: S. Morton, M. Martin, K. Manhood and J. Carty
RRP: $59.95
No. Pages: 312
Publisher: CSIRO Publishing
Date: March 2013

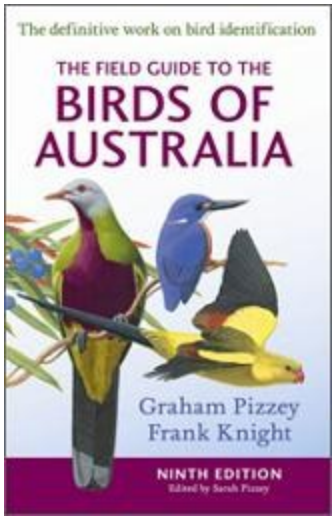


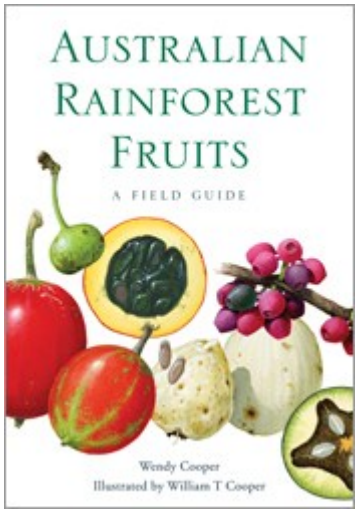
Title: A Traveller's Flora: A Guide to Familiar Plants, Along Roadsides, in Fields and Forgotten Places
Author: B. Auld
RRP: $29.95
No. Pages: 180
Publisher: Samara
Date: May 2013



Title: Estuary Plants and What's Happening to them in South-east Australia
Author: G. Sainty
RRP: $85.00
No. Pages: 656
Publisher: Sainty & Associates
Date: July 2012

Title: Australian Rainforest Fruits: A Field Guide.
Author: Wendy Cooper and William Cooper
RRP: $59.95
No. Pages: 272
Publisher: CSIRO Publishing
Date: March 2013





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 emails generated by in-house chat within the membership.*
- *To provide a means of archiving information shared within the membership for future reference.*

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

If you haven't had time to log on and catch up, here's a summary of some of the recent topics. See the forum at www.ecansw.org.au for details.

Volunteer Positions in Africa

Elvira Lanham enquired about any legitimate ecological volunteer opportunities in Africa - email is elanham@ecosure.com.au. Jason Berrigan replied with 'try the LinkedIn website forums. There's a lot of international groups there that may be relevant'.

General

David Charley thought members would be interested in a recent paper by Andrew Baker, Thomas Mutton and Steve Van Dyke on a new Antechinus species (Antechinus mysticus) for south east Qld and potentially NE NSW - A new dasyurid marsupial from eastern Queensland, Australia: the Buff-footed Antechinus, Antechinus mysticus sp. nov. (Marsupialia: Dasyuridae)" in Zootaxa 3515: 1-37 (2012).

Jason Berrigan notified forum readers that Nearmaps is now a paid service. For a 1-5 user license, full price is over $6000. He didn't subscribe, preferring to use Bingmaps, GoogleEarth and maps.nsw as they remain free.

Jason Berrigan had difficulty finding a replacement battery for their Behringer EPA40 portable PA. He only found one, US site selling a battery that appears to fit: Zhongshan Kewei/Tempest Battery 6fm2.6-e04 http://www.batteryspec.com/cgi-bin/cart.cgi?action=link&product=238. The batteries only cost about $20, but the freight is $60. Renae Baker replied to Jason, stating that they got one pretty easily from Bava's Music City in Liverpool.

Jason Berrigan warned Reconyx sensor camera users to be careful using the CODELOC function in Reconyx cameras ie DONT forget the code. He had a mental blank which cost him time trying to call it (something 'simple') and googling did not come up with any good news other than possible rebooting via software which only comes with the Professional series. The other option for a locked camera is to send it back to Reconyx (for US users) who will hold it till its verified that it's not stolen via a serial number check (so ensure you register your camera!). A word of caution thus to buying a 'used' camera off Ebay – ensure it comes unlocked or you may be buying yourself a stolen camera which may be unusable.

Lymes Disease

Jason Berrigan has continued his Lymes Disease update with the following:

- A peaceful and successful protest was held last Friday at NSW Health's Mosman office. Some coverage here: http://mosman-daily.whereilive.com.au/news/story/emotionally-charged-lyme-disease-protesters-outside-nsw-ministry-of-health-in-north-sydney/
- Scary comments about the implications of recent Works Comp changes: http://www.melbournetimesweekly.com.au/story/311619/lyme-disease-sufferers-rally-for-recognition/
- A great ABC story (read the text and watch the video): http://www.abc.net.au/news/2012-09-14/victims-demand-lyme-disease-recognition/4262580?section=nsw
- Interesting in regards to Workers Comp. http://www.unionsnsw.org.au/unionnet/circulars/lyme-disease-protest-rally-friday-14th-september
- Don't forget the Aeroguard

Letter Sent to the NSW Premier in Response to Amendments to the *Game and Feral Animal Control Act 2002.*

The following letter dated 12th March 2013, has been sent to the NSW Premier , as well as Cate Faerhmann (NSW Greens), David Shoebridge (NSW Greens) and Luke Foley (ALP Shadow Minister for the Environment) to represent the ECA's views on the increased risk to consultants due to the recent amendments to the Game and Feral Animal Control Act 2002.

Dear Mr O'Farrell,

Re: 2012 Amendments to the *Game and Feral Animal Control Act 2002*

The Ecological Consultants Association of NSW Inc. (ECA) is the principal industry group that represents ecological consultants in NSW. Many ecological consultants conduct day-time and night-time field work (wildlife, botanical and aquatic surveys) within or adjacent to national parks and nature reserves throughout NSW.

The ECA opposes hunting of animals in all NSW national parks and nature reserves by amateur shooters on the following grounds:

- **Inability for government authorities to adequately police the new hunting laws.**

We understand that areas within national parks and reserves will be divided into three zones to accommodate the new hunting laws:

Zone A Areas where hunters will only be allowed while "fully embedded" in official National Parks and Wildlife shooting programs.

Zone B Areas, classified as low visitor use and will be controlled and directed by National Parks and Wildlife staff.

Zone C Areas where there is no visitor use and where hunters will be allowed unaccompanied.

There is an assumption that all hunters will be law-abiding by participating in shooting programs organised or directed by National Parks and Wildlife staff (Zones A & B) or informing National Parks of Wildlife staff where and when they would be hunting in Zone C areas. However, many ecological consultants and other field biologists have, in the past, encountered people who have been hunting in national parks and reserves illegally. Media accounts of alleged illegal hunting in a national park by two senior staff of the NSW Game Council in recent weeks is another apparent indication that not all hunters will follow the rules set by the new hunting laws. We believe that the new hunting laws will encourage more amateur shooters to enter national parks and reserves illegally and without informing National Parks and Wildlife staff. There are simply not enough National Parks and Wildlife staff, and many national parks and nature reserves are too large, to adequately police illegal hunting in these areas.

- **Increased injury and mortality risks to field researchers (e.g. environmental consultants, field biologists, citizen scientists), national parks and nature reserves staff, and the general public.**

The increased risks to the safety of field researchers and other park users are real. There does not appear to be any recognition or acknowledgement under the current NSW legislation, or its administration, of these increased risks.

In New Zealand, reported statistics collected since 1979 show that, on average, one hunter is accidentally shot dead by another hunter every nine months.

In North America, where there are many more hunters, there are about 100 human fatalities and 800 reported significant injuries each year as a result of hunting.

In both New Zealand and North America, hunting-related human deaths have been due entirely (in the case of New Zealand) or mostly (in the case of North America) to hunters shooting at people who were mistaken for game or feral animals.

Some of the victims were reportedly wearing fluoro safety vests at the time of being shot by hunters. This is because hunters rely on their quick reflexes to shoot an animal and, under certain light conditions, the colours of fluoro vests resemble the colours of game or feral animals (e.g. deer species). This demonstrates that this type of protective clothing does not guarantee individual safety when hunters are present in an area.

Moreover, field researchers (e.g. ecologists, botanists, zoologists and other field scientists) usually conduct their research in national park and nature reserve areas that have no or limited visitor use (i.e. possible Zone C Areas). Therefore, their field work may be in areas where hunters are not accompanied by National

Parks and Wildlife staff. Nor would these staff necessarily be aware that hunters are present in these areas at the same time as field professionals, especially if there is illegal hunting underway. We believe that this places an unacceptable risk to the safety of field professionals working in national parks and reserves.

Ecological consultants and other field researchers also conduct day-time and night-time surveys on private land adjoining national parks and nature reserves. These surveys may be in relation to proposed land subdivisions, other rural developments, or for the purpose of designing and implementing vegetation and ecological management plans. By allowing amateur shooters to hunt in national parks and reserves, the total numbers of shooters and hunting expeditions are likely to increase. This also increases the chances of stray ammunition injuring or killing people, including ecological consultants and landowners, on private land adjoining national parks and reserves.

Therefore, human fatalities and injuries occur from hunting, even if strict workplace health and safety (WH & S) rules are in place. We also believe that it will be more difficult to enforce or police these rules among amateur hunting parties.

- **Potential for Workers' Compensation Premiums of Field Professionals to Increase.**

An increased WH & S risk to field researchers arising from amateur hunting is likely to push up the cost of workers' compensation premiums.

Many ecological consultants are employees or owner-employees of small businesses (i.e. less than 10 employees). Increased insurance premiums would increase financial pressures on small businesses, especially in the current under-performing global financial environment.

- **The new hunting laws will not eradicate feral animal populations from NSW national parks or nature reserves.**

We recognise that **professional shooters** who are contracted and supervised by the National Parks and Wildlife staff perform an important role in controlling feral animal populations in national parks and reserves.

However, **amateur hunting groups and individuals** want to be involved in ongoing recreational hunting over the long-term. Therefore, it is against the interests of amateur hunters to completely eradicate game and feral animals from national parks and nature reserves. Consequently there will be continued adverse impacts from feral animal populations on the biodiversity and habitat quality of these areas.

RECOMMENDATIONS

- The ECA urges the NSW Government, as a matter of urgency, to repeal the 2012 amendments to the *Game and Feral Animal Control Act 2002* (G&FAC Act) so that hunting in NSW national parks and nature reserves is no longer open to amateur shooters.

- Tighten existing WH & S legislation to further protect field professionals, parks staff and other members of the public from injury or death that may otherwise result from activities permitted under the 2012 amendments to the G&FAC Act.

If you wish to discuss these issues with the ECA, then I can be contacted on 9918 8877 or 0407 888 770.

Yours sincerely,

Mark Couston

ECA President

ECOLOGICAL CONSULTING: THE BUSINESS ASPECTS

This is a new section where the ECA Council encourages members to ask questions which relate to aspects of consulting that may not be addressed in a scientific paper.

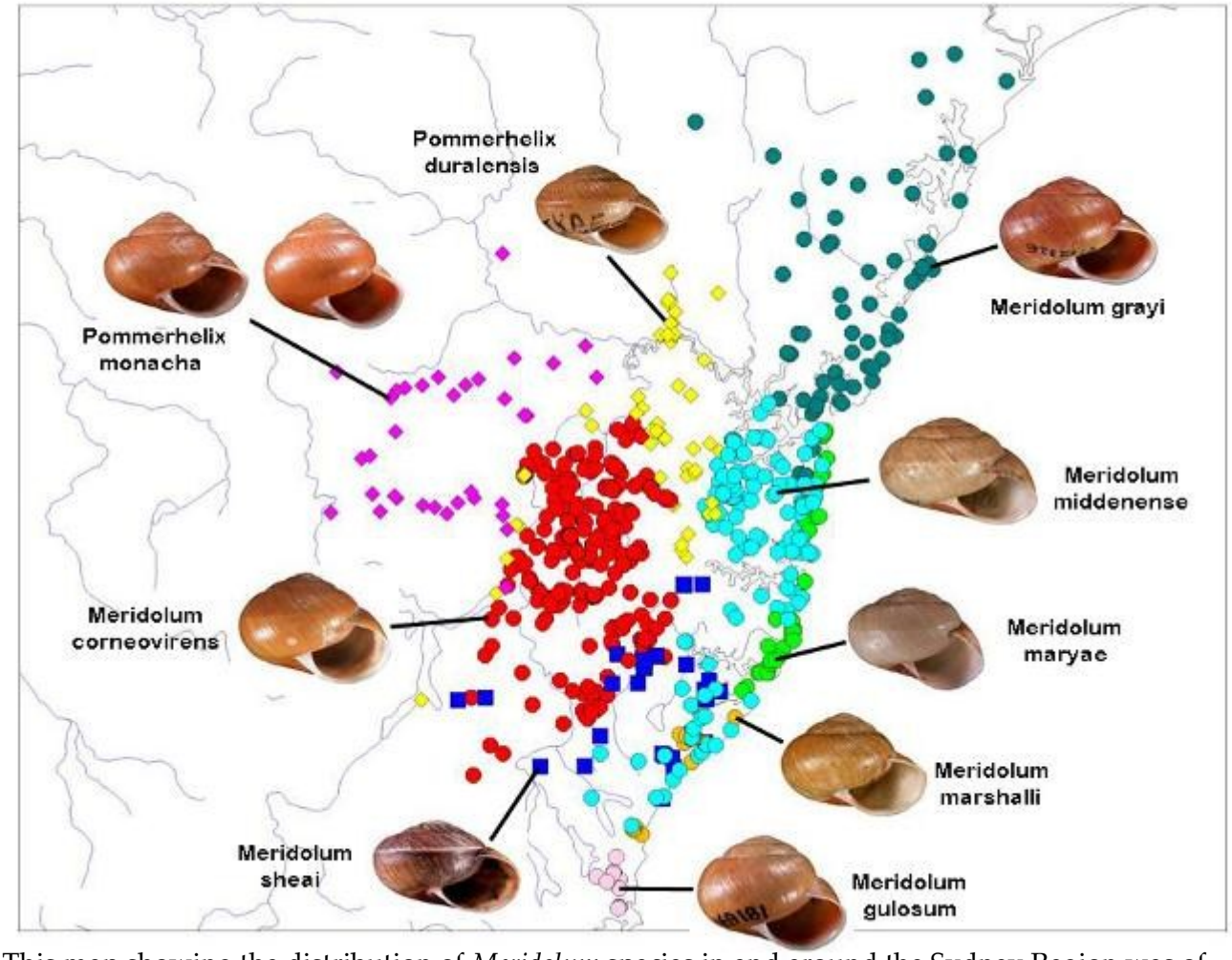
It is intended that answer/opinions for this column will be sought from appropriate professionals (e.g. lawyers, accountants) where applicable. If you'd like to ask a question, please email the Administration Officer at admin@ecansw.org.au, and allow sufficient time for an answer to be obtained.

Will the Snail Cross the Road? An Overview of the ECA Snail Workshop

Belinda Pellow
ECA Councillor and AMBS

On the 24th January this year the ECA ran a workshop on the identification of the Cumberland Land Snail (*Meridolum corneovirens*). Dr. Stephanie Clark an expert on Australian land snails who offered to run the workshop, was on a return visit to Australia from the Field Museum in Chicago where she has been working for 6 years. Stephanie completed her PhD on *Meridolum* of the Sydney Region at the University of Western Sydney and provided attendees of the workshop with a wealth of knowledge on the identification and habitat of *Meridolum corneovirens* and other related taxa. The workshop was held in the Bowden Centre at the Australian Botanic Gardens, Mt Annan, Western Sydney. Attendees were generally from ecological consulting companies but council employees and staff from UNSW also attended.

Photos courtesy of Belinda Pellow



This map showing the distribution of *Meridolum* species in and around the Sydney Region was of great interest.

The morning consisted of presentations on the identification of *Meridolum corneovirens* and other closely related species and a general discussion ranging from preferred hiding spots and food sources of *Meridolum corneovirens* to questions such as - *Will the snail cross a road*?

In the afternoon we went out into the Cumberland Plain Woodland that surrounds the Centre to look for snails.

Within five minutes a number of snails had been discovered under logs and in deep litter. As well as *Meridolum corneovirens,* four other land snails were found which gave Stephanie a great opportunity to point out the similarities and differences between *Meridolum* and other snails found in similar habitat.

An excellent source of snail shells was found at the end of a hollow log in which we assumed a Blue Tongue lizard lived.

Two easily observed characteristics of *Meridolum corneovirens* are the yellow mantle and the white lip of the shell. Stephanie pointed out however that in transition zones between the distribution of *Meridolum corneovirens* and other *Meridolum* species, the lip may be a darker colour. Also, the lip of the shell in other snails which is coloured when they are alive will turn white once the snail is dead.

Stephanie also described a particular fly species with a large yellow head (*Amenia chrysame)* that lays its larvae in living *Meridolum corneovirens.* During the walk in the Cumberland Plain Woodland an observant participant located one of these flies.

Stephanie has provided a list of some of her publications that may be of use to members:

Clark, S.A. and Richardson, B.J. 2002. Spatial analysis of genetic variation as a rapid assessment tool in the conservation management of narrow range endemics. *Invertebrate Systematics* **16(4)**:583-587.

Clark, S.A. 2004. Native snails in an urban environment – conservation from the ground up. In Urban wildlife: more than meets the eye, Eds Lunney, D. and Burgin, S., Royal Zoological Society of New South Wales, Mosman, NSW, Australia, 78-81.

Lydeard, C., Cowie, R.H., Ponder, W.F., Bogan, A.E., Bouchet, P., Clark, S.A., Cummings, K.S., Frest, T.J., Gargominy, O., Herbert, D.G., Hershler, R., Perez, K.E., Roth, B., Seddon, M., Strong, E.E. and Thompson, F.G. 2004. The global decline of non-marine mollusks. *Bioscience* **54(4)**:321-330.

Clark, S.A. 2005. Systematics, spatial analysis and conservation genetics of *Meridolum corneovirens* and related forms (Gastropoda: Camaenidae) from the Sydney Region of Australia. Ph.D. Thesis, University of Western Sydney, Richmond, Sydney, New South Wales. 256 pp.

Clark, S.A. 2009. A review of the land snail genus *Meridolum* (Gastropoda: Camaenidae) from central New South Wales, Australia. *Molluscan Research* **29 (2)**:61-120.

GRASS IDENTIFICATION WORKSHOP

13 - 14th June

Royal Botanic Gardens, Mt Annan

Cost: $200 member, $250 non-member

The ECA is presenting a two-day grass identification workshop at the Bowden Centre, Royal Botanic Gardens, Mt Annan on Thursday 13th and Friday 14th June this year. The workshop will be conducted by Van Klaphake an expert on grasses of the Sydney region. Using his Key to the Grasses of Sydney (covering the Central Coast botanical division) Van will guide participants through the taxonomy of this often problematic plant group. Time will also be spent in the gardens identifying species in the field. The cost for an ECA member is $200 and the cost for a non-member is $250 which includes the grass key and a basic morning and afternoon tea. Delegates will need to bring their own lunch or purchase food from the café at the gardens.

REGISTRATION OPEN 20th APRIL

Background photo taken from http://vro.dpi.vic.gov.au

ECA 2013 Annual Conference

Offsets: determination, assessment and management

Photo taken from the Fairmont website

Friday 2nd August

Venue - The Fairmont Resort, Leura in the Blue Mountains

Cost - $155 Members; $200 Non-members

Registration Open - May 2013

*Increasingly biodiversity offsets are being proposed in ecological assessments and adopted by consent authorities as a condition of approval. There is however a deal of confusion and controversy about how offsets should be formulated; whether they are adequate in terms of their size and location; the significance of the species and communities/habitats targeted; responsibility for management and how they should be dealt with in the long-term. Perhaps we should also be asking the question 'are offsets really viable, or are they just another way to circumvent the environmental legislation'? Our members responded to a survey at last year's AGM asking for suggestions for this year's Conference theme, and the topic of offsets was by far the most popular. To this end, the ECA is presenting its 2013 conference "**Offsets: determination, assessment and management**". The topics will range from the broader legislative side to on-the-ground management – successes and failures. A range of speakers has been arranged from relevant regulatory authorities, academia and the ecological consulting industry. The venue is the Fairmont Resort at Leura in the Blue Mountains on Friday 2nd August 2013. A conference dinner will also be held in the evening.*

Remote Sensor Cameras

Monitoring nest boxes with remote cameras

Andrea Sabella
EcoLogical Australia

A nest box program was installed in remnant woodland with few hollow-bearing trees to provide habitat for a known population of Squirrel Glider (*Petaurus norfolcensis*), listed as Vulnerable under Schedule 2 of the Threatened Species Conservation Act 1995. The glider nest boxes were monitored with a Faunatech Wireless Inspection Camera, and evidence of glider nests was observed.

As it was necessary to know if the nests were used by Squirrel Gliders, or by the more common Sugar Glider (*Petaurus breviceps*), remote cameras were installed at glider nest boxes containing glider nests. The remote cameras were set up to record images over 13 nights, taking three images with each motion trigger. Two different Reconyx remote camera models were used: HC600 HyperFire Covert IR and PC850 HyperFire Professional White Flash LED.

Two angles of camera installation were tested (Figure 1):
The camera at least 1m above the glider nest box, facing down towards the rear entrance.

The camera on a tree opposite the glider nest box, facing across towards the box and trunk.

More images were recorded from the camera positioned above the glider nest box (Figure 2), than the camera positioned opposite. Images from both camera types were suitable for species identification and behaviour analysis, although the white flash provided clearer images.

The images allowed an analysis of Squirrel Glider activity, including movement between glider nest boxes and timing of Squirrel Gliders entering and exiting the glider nest boxes (Figure 3 and Figure 4). Images of other native fauna also using the glider nest boxes were recorded including Feathertail Glider (*Acrobates pygmaeus*) and Brown Antechinus (*Antechinus stuartii*).

Squirrel Gliders were recorded at all five glider nest boxes, moving in and out of the entrances; moving up and down the tree trunks on which the boxes were mounted; and landing on the trunks or on top of glider nest boxes. An uneven pattern of usage was observed, with nights of Squirrel Glider activity recorded at a given glider nest box ranging from two to eleven nights. Squirrel Glider activity at the glider nest boxes was recorded between 4:30pm and 5:30am.

Evidence to support the glider nest box design was also obtained when a Common Brushtail Possum (*Trichosurus vulpecula*) was recorded investigating a glider nest box for approximately two minutes, moving around the top of the box and looking down into the entrance. Due to its size, and the design of the box, it could not enter the glider nest box. Seven

Figure 2: A remote camera installed one metre above a glider nest box

minutes after this event, a Squirrel Glider was recorded arriving at the box, entering and then exiting one and a half minutes later.

The remote cameras were found to be an informative, non-evasive technique to monitor Squirrel Glider use of glider nest boxes.

Figure 3: Squirrel Glider moving down trunk and into glider nest box at 7:21 pm

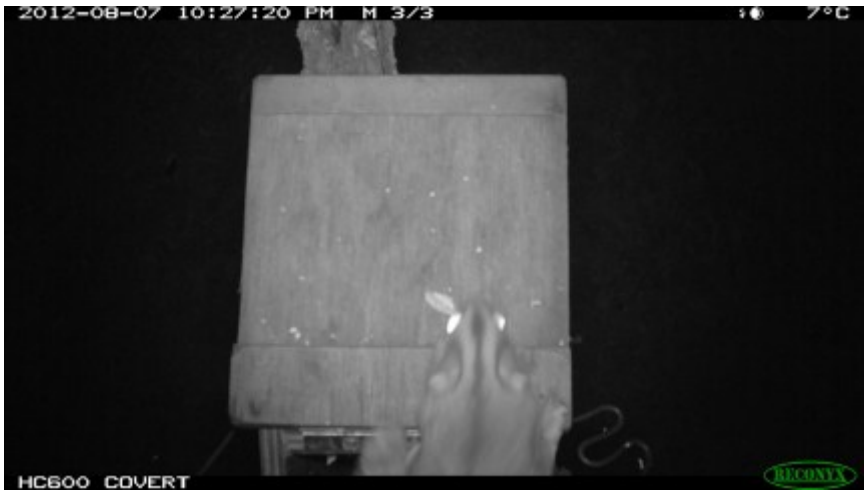


Figure 4: Squirrel Glider climbing out of Glider nest box at 10:27 pm

Figure 1: Two angles of remote camera installation

Monitoring Spotted-tailed Quoll with remote cameras

Andrea Sabella
EcoLogical Australia

Remote cameras were used to investigate a potential Spotted-tailed Quoll *(Dasyurus maculatus)* den site in a log jam along a riparian corridor. The targeted survey was initiated after a sighting of a Spotted-tailed Quoll moving along the creek and running into the log jam. Inspection of the log jam indicated five entrances that potentially could be used by Spotted-tailed Quoll. Six remote cameras were installed around the potential den site including facing the entrances of the den site and facing the fauna tracks that run along the riparian zone. The remote cameras were installed between 1m and 1.5m from the ground, attached to a tree trunk or star picket to obtain the required angles. The cameras were set to take five images with each motion trigger and were left on site for 18 nights. Two different Reconyx remote camera models were used: HC600 HyperFire Covert IR and HC500 Hyperfire Semi-Covert IR.

The images obtained by the cameras recorded activity from an adult pair and two juvenile Spotted-tailed Quolls. The adult Spotted-tailed Quolls were recorded moving towards and away from the den site, and moving through the creek line. The juveniles were recorded moving towards and away from the den site, and playing together in front of the den site. The majority of the activity was recorded during the

Figure 5: Adult and juvenile Spotted-tailed Quoll leaving den site at 4:05 pm

Figure 6: Juvenile Spotted-tailed Quolls playing outside of den site at 4:34 am

Figure 7: Juvenile Spotted-tailed Quolls playing outside of den site at 4:03 pm

evening, although images of the adults and a small number of images of an adult and juvenile together were recorded during the day (Figure 5). The diurnal activity was not limited to just prior to dusk or just after dawn, as activity was recorded up to 11am and from 4pm. The majority of the images that recorded the juveniles playing together were from between 4am and 5:30am, prior to sunrise (Figure 6 and Figure 7).

Although no bait was necessary for this particular work, previous remote camera monitoring at the same location has recorded Spotted-tailed Quoll activity

Figure 8: Remote camera facing closed cage trap baited with fresh leatherjacket.

along the riparian zone using raw fish bait (fresh leatherjacket) in a closed cage trap (Figure 8). The cage trap was positioned in a high fauna activity area along a fauna track to increase the possibility of attracting fauna to the bait.

What to do with your camera when you're not working with it.

Amy Rowles
ECA Administration
Ecotone Ecological Consultants

We all know that feeding wildlife is not an ideal situation, but essentially that is what happens every time we dump our daily bucket of scraps on our compost heap, which seems to be well used by mystery fauna. Interested to find out what I was feeding, I positioned a camera trap (Bushnell – Trophy Cam-model 119467) set on a series of 3 still shots on our compost heap for a period of 23 days.

Due to the sprawl of the compost, the width of the detection zone didn't seem to be too much of an issue. With the camera facing east, sun first thing in the morning caused an issue, making the images unclear but having an open background meant that there were few false triggers.

We detected Common Brushtail Possum, Northern Brown Bandicoot, Bush Rat, Red-Necked Wallaby, Lace Monitor, Magpie, children and my husband on his motorbike (mmm….I thought he was at work that day).

Lace Monitor

Children 'feeding' the wildlife

Northern Brown Bandicoot

Brushtail possum defending the compost from a bandicoot

Red-necked wallaby joey. The wallabies were not photographed eating any of the scraps.

I am longing to find evidence of quolls living on my property, so I put some bait (left over meat and other enticing scraps) under a basket near the edge of our cliff, which drops away into a steep rainforest gully. A week later we also found a dead red-necked wallaby joey in our orchard. It had a broken leg – our only guess is that it had been caught in the fence and had broken its leg when breaking free. After checking with my husband that my idea was not too morbid, I placed the carcass in front of this camera to enhance the bait station. Nothing appeared to visit the carcass until it was covered with flies and exuding an odour. I left the site alone for a week, and when I went back, there was no sign of the carcass. I grabbed the camera – all my hopes on a glimpse of a quoll, but alas this is what we saw.

Again I did not have many false triggers. The rock in the background provided a solid surface and there was no vegetation in the detection zone of the camera.

Next time I will have to try the ultimate lure – a chicken carcass.

A fox visited both during the day and the evening, both of these photos taken after the carcass had been dragged outside the view of the camera.

A Lace Monitor having a feed

Red-necked wallaby inspecting the bait station after the carcass had been dragged away by ???. The wallaby must have been moved head first and the culprit was not snapped.

Jason Berrigan
Darkheart Eco-consultancy

Like Amy, I also attended the Colloquium and was most inspired after it, to duly compare the strengths and weaknesses of these cameras. I've been undertaking some trials using both road kill and traditional rolled oats to refine my survey techniques with my Reconyx and Scoutguard cameras

I live adjacent to a large forested property, with a track running on the boundary and a small creek nearby, hence I have the benefit of easy access to a study area. I mainly set my cameras on the tracks for tick-free access, and later set them up along animal trails (also targeting quoll like Amy).

I set both cameras facing the same targets, and set the Scoutguard on photo and later video. The first thing I quickly learnt is that trigger speed is everything, and this is the weakness of the Scoutguards. You will miss a lot with these cameras without a bait station to hold the fauna. On the other hand, nothing has that "WOW" factor like video. It certainly makes you feel like your working on a David Attenborough special when you catch some interesting behaviour, like a bandicoot working out how to pull that peg holding the hair tube down so he can then roll it 20 metres away to baffle you; or some teenage lads doing some 'bush gardening'.

The second thing I noticed is that the Reconyx gives great quality photos without the 'burn' factor of the Scoutguards. Some animals I only got in one shot from the Scoutguard, but as it was blurred by the flash, I had no idea what it was. In general, the Reconyx gave me more than I needed to identify the animal.

The third thing I noticed was the Reconyx reliably picks up way more fauna than the Scoutguards. Even after I tested the target zones, the Scoutguards would completely fail to record fauna presence in many instances, whereas the Reconyx was giving me a stop-motion video as I had it set at 5 shots per second with 1 second delays. While I love the video option, I would not buy anymore Scoutguards. Saying that, the Reconyx are almost too sensitive – you don't want Bladey Grass in the background on a windy day.

"Bright light"

I highly recommend using cameras to test fauna interest with traps and hair tubes. I noted wild dogs to completely ignore meat-baited hair funnels, but readily investigate road kill. I also watch a bandicoot investigate a hair tube like he was about to defuse a bomb, and another return to it night after night after night. It was really interesting to see how they stuck their head into a tube – informing me of the optimal placement of tape from now on. Understanding this behaviour will certainly help with refining survey design where a mix of techniques can be used to maximise effectiveness.

"Blue steel"

Apart from thrilling my kids with some great fauna shots and learning a lot about the limitations of various survey techniques, I also answered one scientific question: what eats a Lace Monitor? A convenient road kill helped me test this question, and verify that I have not one but two wild dogs using the tracks within 100m of my house.

The answer is: *nothing*. Not even other Lace Monitors or wild dogs. They all inspected it, and I'm sure the expression on their face was "I'm not THAT hungry".

"That's the wrong end!"

Camera Trapping Colloquium in Wildlife Management and Research – A Summary

Amy Rowles
ECA Administration
Ecotone Ecological Consultants

On the 13th and 14th of September 2012, I attended the '*Camera Trapping Colloquium in Wildlife Management and Research*', which was held at Taronga Zoo. Overall I found the two days very interesting, and it included the use of remote sensor cameras worldwide which gave an insight into the varying applications of camera trapping. The focus was mostly on research projects, from smaller scale studies through to the larger scale, with less relevance to use in consulting surveys than I had hoped.

The concept behind the colloquium was to bring together a group of camera trap users from around the world to share their experiences and knowledge of the technology, which is rapidly expanding in its use in Australia over the last 10 years. The Colloquium presenters reinforced the fact that camera traps have predominantly been designed for the hunting industry and current features and camera design are not necessarily ideal for scientific research purposes, but the the manufacturers are listening to feedback.

Camera Trap Technology and Methodology

Paul Meek outlined some of the current problems including false triggers, image blurring, pixilation, slow trigger, moisture and temperature extremes, battery life, lack of flexibility of settings, and flash types (White flash vs Infra-red). White flash is important for small mammal identification as it gives colour which helps considerably with identification; however the white flash also disturbs the animal and alters behaviour. Robley (2012) found this to be the case when targeting the feral cat and red fox, as the type of flash influenced detection rates.

It was clear that Reconyx was the camera of choice for most – so why doesn't everyone just use Reconyx? Predominant reason (especially for NGOs and government agencies) was price – this camera is the most expensive: so in many cases with budget constraints, there is a compromise to be made between sample size and camera quality. This was well demonstrated by a study in Victoria which compared three different camera models (Reconyx HC-500 Hyperfire (infrared flash); Scoutguard DTC 565 (white flash); Pix Controller Digital Eye (white flash) Urlus *et al* 2012). This study, as well as several others found that Scoutguard was not as good at detecting the smaller size class of mammals (Urlus *et al*., Swan 2012). Conversely, Smith *et al* (2012) found no significant difference between Scoutguard and Reconyx cameras in their study, however this was targeting medium size class animals. Similarly Lethridge (2012) found Scoutguard suitable for studying med-large species such as the Southern Brown Bandicoot, Fox and Feral Goats. Taylor and Goldingay (2012) also found Reconyx brand cameras more effective in their study of gliders as it has a faster trigger response. Moseby and Read (2012) used four different brands of cameras in their study and similarly found Reconyx were the most reliable; had the longest battery life; fastest trigger; and the clearest photos. Another difference noted by some is that the main Reconyx cameras used for research don't record video, which the Scoutguard do. This can be an advantage if recording behaviour is an objective eg activity at a feeding station. Hence depending on the research question and the target species, the choice of camera may not be as influential as for others.

False triggers are common when vegetation is being blown in the wind. Moseby and Read (2012) found that having no plants in the background gave a clearer image and less false triggers. However creating a disturbance at the camera site by clearing vegetation can potentially create a bias in the data by either detracting or attracting species.

Some researchers have experimented with the orientation of the camera. Harley *etal* (2012). found a greater detection rate of Leadbeater's Possum when the camera was positioned in a horizontal position so that the detection beam ran vertically up the tree trunk: however this reduced waterproofing, and therefore a shelter was required for the camera. Smith et al (2012) compared vertical and horizontal position of the cameras. In this case, horizontal is the usual orientation of a camera and vertical is looking face down to the ground. An advantage of the vertical position was less vegetation removal and modification. In this study, vertical camera position had a higher detectability than horizontal for medium sized mammals. The authors recommend the use of both horizontal and vertical positions where possible.

Welbourne (2012) successfully used camera traps to detect reptiles, which was an extremely interesting application of this technique, as the passive infrared sensors in the camera detect a change in temperature between the background temperature and something

moving across the foreground. This is a problem for detecting reptiles for obvious reasons. Welbourne overcame the difficulty of cool blooded reptiles by placing a cork tile along a drift fence, and mounting a camera at key points. The cork tile warmed up in the sun and when a reptile passed over, a temperature contrast resulted. The cameras detected 6 species including one as small as a *Lampropholis*. He found that positioning the cameras face down was suitable for the smaller species, however a profile position was more suitable for the larger species.

It was clear that there will be further advances with this technology in the near future, and ecologists will increasingly adopt this technique, particularly given its animal welfare benefits (though care has to be taken, as demonstrated by a Tasmanian Devil abandoning her young to reach a bait). A particularly helpful component of the Colloquium was to provide manufacturing companies with some insight into what ecologists would like to be able to do with remote sensor cameras and what features would be desirable. Powers (2012) presented a poster on a camera with new technology allowing a user to remotely access the data collected as well as change settings on the camera. Researchers working on large scale projects have been working on automated software programs to aid in processing large data sets (e.g. Falzon et al 2012). Lethbridge (2012) has developed software to automatically remove the images set off by false triggers to reduce the time taken to process data. Data from the software can be imported into access ready for analysis.

Kays *et al* (2012) discussed storing the digital images making it analogous to a museum specimen with a digital voucher photo, a location, time and date. A discussion session was devoted to data storage and dissemination and sharing of this data.

Claridge and Paull(2012) discussed how camera trapping methodology is question dependent. They note that it is very important to define exactly what your question is; acknowledge the flaws and imperfections of the camera trapping technology; and understand that wildlife populations vary in space and time. For example, baited camera traps may be used to determine presence and abundance of a species; however to determine density, survey design requires deploying a high number of unbaited cameras positioned randomly. Rowcliffe *et al* (2012), developed a random encounter model to apply to his data set to estimate density. An example of a targeted survey design was provided by Nelson and Scroggie (2012) who are aiming to develop a camera-trap protocol to detect Spotted-tailed Quoll. As a result of their surveys, they have suggested that 2 widely spaced cameras (500m apart) per site be left in place for at least 3 weeks on 24hr operation. It is also suggested that maximising the number of sites as opposed to the number of cameras at each site is advantageous.

A variety of baits and lures were used. Antos (2012) found that a meat lure was more effective than an oat lure over a range of species. Harley (2012) found that the type of bait was critical for the Leadbeaters Possum and was more important the further away from the den site.

Paul Meek discussed the complication of capturing incidental photos of people whilst conducting wildlife surveys, which could have privacy implications. He recommends keeping yourself out of trouble by destroying any photos of people and definitely don't put them on the internet. He suggested that you could put a sign out saying that cameras are being used, although this may increase the chance of theft. Privacy laws vary in the different states and territories in Australia and it is a good idea to understand those applicable to your state.

Below are some general tips when using camera traps:

- Remember that detection probabilities varies between species.
- The camera should always be tested before and after for functionality (i.e. walk in front, wave hand in front).
- Avoid facing the camera lens directly north, east or west if your target species includes those with diurnal activity.
- Have a clear background, with minimal moving vegetation to reduce false triggers.
- A longer battery life may be acquired by connecting an external battery source such as a motorbike battery.

Research Questions and Answers

Despite all of the discussion about the pitfalls involved with this methodology, camera traps have been successfully used to investigate a variety of questions ranging from large scale inventories to small scale behavioural studies.

Jansen (2012) from the Smithsonian Tropical Research Institute spoke about a large scale project across the Neotropics, Africa and South East Asia, resulting in 30,000 trap nights annually. A five year camera trap project researching feral camel and wildlife interactions

at remote desert wetlands in Central Australia gathered 500,000 images including 6 reptiles, 50+ birds and 15 mammals (Box *et al* 2012). These waterbodies are a hot spot of activity, especially when surrounding areas start to dry out. The videos captured interesting behavioural information such as: dingoes fighting with a Euro for 12 hours before finally getting their feed; and the domination of camels at waterholes, with aggressive behaviour towards other animals, and drinking large amounts of water and soiling the water with faeces. An amazing photo of a Reconyx knocked into the water and still working was the highlight of this particular presentation.

Cameras have been innovatively used to monitor Devil Facial Tumour Disease. With a lure placed in a position that make the devil stretch and expose the most commonly affected part of the face to the camera, Thalmann (2012) was able to use this data to help determine the rate of spread of the disease, population abundance and prevalence of disease.

Other examples of camera traps being successfully used to investigate behaviour include: micro-habitat use by the Swamp Wallaby (Hradsky 2012); diurnal activity of the Bare-nosed Wombat, with cameras positioned on den sites (Storey *et al* 2012)); and interactions between the bush rat and black rat (Bytheway *et al* 2012).

Taylor and Goldingay (2012)used cameras to monitor the use of glide poles and rope bridges. Squirrel Gliders were found to use these structures, as were Brushtail and Ringtail possums. By comparing cameras on both sides, they were able to determine some complete crossings and use of the structures in both directions. Similarly Soanes et al (2012) used cameras and pit-tag scanners to intensively monitor road-crossing structures over a long period of time, gaining valuable information on the timing, direction and frequency of crossing as well as demographic data. There were however logistical and technical issues involved with the technology (eg ability to access cameras on a busy highway). Amongst other results, they found that use of the canopy bridge was low in the first year, but increased in the 2nd and 3rd year, highlighting the importance of long-term monitoring projects.

Camera traps were demonstrated to be particularly useful in the detection of rare or cryptic species that are not easily detected using other methods (e.g. Lewins Rail). A prime example of this from overseas, Sangay (2012) presented a project using camera traps to survey remote areas of Bhutan, showing photos of various species of big cats. Camera trapping methodology had also added to the Northern Territory Biodiversity inventory via increasing the detection of species and added 30% of species that don't normally get caught in traps (Hill *et al* 2012).

In logged areas where tree hollows have been depleted, Eastern pygmy-possums will den in hollows on the ground and radio-tagged individuals were found to suffer high rates of predation (Doege *et a*l 2012). As a result Doege *et al* (2012) are using cameras to monitor: Eastern pygmy–possum known den sites in logs on the ground to monitor predator visitation; baited stations to compare general predator activity in different logging treatments; and pygmy-possum visitation to nest boxes before and after the addition of scent clues to test for behavioural avoidance of predators.

Many examples of the use of cameras to monitor introduced predator populations were presented at the Colloquium. For example, cameras positioned on known fox den sites to gather behavioural information (O'Conner 2012). Greenville *et al* (2012) presented a poster on their study using cameras to monitor dingo, feral cat and fox populations in central Australia and how they respond to the boom and bust of prey populations. Walsh (2012) presented a poster on the use of cameras to monitor if predators have entered the Arid Recovery reserve where predators have been eradicated.

Combining Survey Methodologies

Advantages of camera traps include, but are not limited to: the reduced number of person hours required in the field; it is a less invasive method, causing less stress and potential injury than to trapped individuals; and gaining behavioural information that could not be collected in any other manner. However a strong theme throughout the Colloquium was often the need for a combination of methods to complement each other for the most successful results. Some examples of where a combination of methods was necessary or preferable are given below.

- A study in Peru comparing camera trapping and line transects found that line transects were more successful for detecting arboreal mammals, and camera traps were more successful for detecting terrestrial mammals (Pettit 2012).

- Ballard *et al* (2012) found that due to camera limitations such as detection zones that make it difficult to capture smaller animals, sand plots

were still more effective for some survey questions. Ballard reinforced that it is important for camera users to understand the limitations of the technology so that the correct assumptions can be made from the data.

- Moseby and Read (2012) used cameras to compare bait uptake of target and non-target species. Camera sensitivity and delay caused problems with the analysis. Track plots were more successful than cameras to determine fox abundance, however there was no significant difference between the methodology for fox distribution. The cameras were however more successful than sand plots for determining cat distribution.

- Cameras were used successfully to improve population estimates of Quokkas when used in conjunction with trapping (capture and tagging) (Dundas *et al* 2012). Similarly, a combination of remote sensing cameras and microchip scanners have been successfully used to monitor Gilbert's Potoroo populations (Friend 2012).

- A comparison of camera-trapping and live-trapping in Tasmanian coastal heathland found that cameras resulted in detecting a greater number of species than trapping, as cameras are not restricted to a particular size class. In the size class suitable for the traps, there was no significant difference in the number of species detected (Driessen and Jarman 2012). Cameras were not as good for detecting the smaller mammals.

Community Engagement

Griffiths (2012) reported on a WWF project in WA using cameras to help educate farmers about wildlife such as Malleefowl on their land. Video was very effective at attracting peoples attention and educating land holders, and raising their enthusiasm to undertake measures to protect threatened species.

Ethics

Although camera trapping is generally considered a non-invasive survey method, there is still an ethical issue about whether an inaccessible bait station may potentially cause stress to attracted individuals. This I imagine would become a greater issue the longer it is left in position. As demonstrated via video and photos, the animals may expend a substantial amount of energy on trying to access this potential food resource instead of seeking food that they can access. Vegetation removal/modification for camera placement also creates a disturbance which could potential expose small fauna to predators.

I hope you have enjoyed reading this summary of a very interesting couple of days and I look forward to seeing where the camera trap technology will take ecological research in the future.

A depressing photo of a Boobook Owl highlighting the dangers of barbed-wire fencing to native wildlife. Photo taken by Kathryn Chesnut, east of Coonamble in central West NSW.

‘Sightings’ - A Review

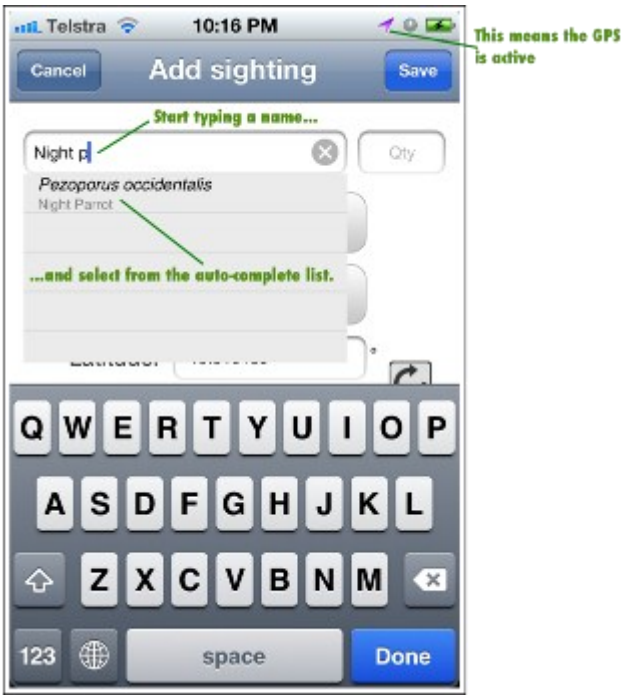
Steve Sass
Envirokey, PO Box 7231, Tathra NSW 2250

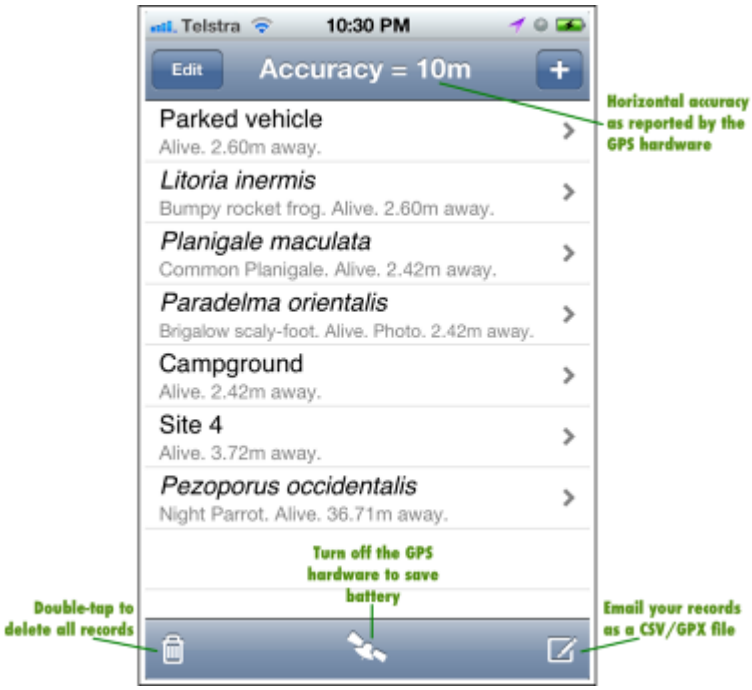
‘*Sightings*’ is an application available for both iPhone and iPad from the iTunes store. When I first heard about ‘*Sightings*’ I thought that my dreams had come true – and after several very busy months in the field, I can confirm that they have! Not only could I lighten my load by ditching my GPS, but I could also save lots of time in data entry post-field work. And as a side note, I could once again justify the purchase of that iPad for business purposes to my wife!

The application uses in-built GPS hardware within your device to record spatial data as accurately as most hand-held GPS. All of our mapping produced to date using the coordinates generated by ‘*Sightings*’ has been very precise. ‘*Sightings*’ is preloaded with the common and scientific names of all Australian terrestrial vertebrates which are taxonomically, up to date. It works very simply - so in the field, if you see a Superb Parrot, just start typing ‘superb’, select ‘Superb Parrot’ from the auto-complete drop down list, complete any of the other fields (or leave them blank) and save your record. You then have a waypoint with the sighting, as well as date, time, and any information you have typed into the notes field. ‘*Sightings*’ can also be used to record the spatial location of anything. For example, you could name a survey location ‘B1’ (being for Bird survey 1). Just type ‘B1’ into the species name field, then in the notes field type ‘Bird Survey 1’ and save the record. We continually use this function for mapping point data such as survey/trap/camera locations and HBT with great ease and success.

The best way to explain the functionality of this application is through a series of pictures (which I have conveniently taken from the ‘*Sightings*’ webpage for the purpose of saving even more of my valuable time). These will also make more sense once you download the application.

By far the easiest way to export your data is by emailing it to yourself in the available outputs (CSV and GPX files). You can email all of the data created in a single email, with no need to send individual waypoints/records. When you find yourself working in areas where network coverage is poor, there is also that added feature of being able to connect to your computer and download through iTunes. This can also be used as a handy backup for your field data – something that most ecologists have never had before with paper data sheets.





One additional feature that I haven't tried yet is the ability to upload additional species into the auto-complete list. The '*Sightings*' webpage (http://www.ugmedia.com.au/sightings/) claims that this is a relatively easy process and provides step-by-step instructions on how to do this. So for all those botanists out there, this application could also be for you.

There are a number of useful tips I can offer based on my use of the app over the last few months.

In the settings, turn on '*Enable GPS in BG*' (BG is background). This will allow your device to keep track of satellites and allow you to save a record quickly. The downside is battery life, but you can maximise this by manually turning off the GPS in the Sightings app by using the little satellite button at the bottom of the screen. Depending on how many emails and phone calls you get during your working day, this strategy will help maximise your already depleted battery power.

The other useful tip is the '*refresh*' location. This is great for when you spot a species of interest in the distance. Let's say we have just spotted a flock of Superb Parrots 100m away. Previously, you would have started to write this down on your species list and would be preparing to mark the waypoint on your arrival at the location with your GPS. Now you can create the record in *Sightings* as you see them, arrive at the location, then hit the refresh button to update the coordinates for the correct location.

For users of the iPhone 3, iPod touch, or iPad with only WiFi capability, these devices do not come with inbuilt GPS hardware, so think about upgrading if this application excites you. Unfortunately for Android users, this application is not available for you.

I am super impressed by this application. The developers of '*Sightings*' have put together a simple to use, yet extremely useful application for field ecologists. Ultimately, Sightings will save you time in handling your field data (it all comes in a CSV file easily opened as a spreadsheet), you can create a species list for your report quickly (by deleting multiple records in excel), and every entry is spatially located (allowing you to map all of your survey locations, or threatened and migratory species records, and copy and paste into your Wildlife Atlas yearly return). And for just $2.99 it will be the best value purchase you will ever make!

The Man-Box: A Method For Hollow-Bearing Tree Inspections and Pre-clearing Fauna Rescue

Jason Berrigan
Darkheart Eco-Consultancy

This was a method suggested by a client whose proposed dwelling on a rural-residential Lot required removal of 11 hollow-bearing trees. Apart from the contribution to the Key Threatening Process, the primary issue was the high probability of Squirrel Gliders and Brushtailed Phascogales being present (the site being located in South West Rocks, which has an extraordinary abundance of both), and the associated threat of direct mortality during felling.

Initially I had recommended the following options subject to OH&S practicalities:

- An arborist to climb the trees and remove hollows within accessible limbs.
- A crane to hold the tree, while it was sawn in sections and safely lowered to the ground for inspection.
- Use of a large excavator with a forest harvester head (rotating grapple fitted with a chainsaw).

Each of these methods has their own limitations, predominantly due to OH&S, and height and weight of the tree. These particular factors are the greatest constraint on using an arborist.

The client suggested the use of a man-box, which I had never heard of. Photo 1 shows what this structure is:

Photo 1: The man box.

The method consisted of an arborist, an ecologist and the 'dogman' riding in a man-cage. This cage was lifted by a crane capable of achieving a working height of 30m. This height was more than sufficient to access all parts of the subject trees on this site (about 28m high).

The crane was located in a position where stabilisers ('outriggers') could be set down on a level surface, and the boom rotated around to access more than one tree from a central location. This is preferable for the client as it saves down-time (and hence costs) from relocating the crane to multiple locations.

The man cage would then be lowered generally through the canopy (this may require some lopping of limbs and branches for access and safety, and removal of any dead wood for OH&S reasons). Further adjustment was made by extending or retracting the jib (the end section of the boom), and pulling on branches to draw the box closer to the subject limb or hollow. This enabled the ecologist to fully inspect the hollows as if they were on the ground.

Hollows were inspected by eye, with a torch, or snake-eye camera to ascertain hollow depth (hence habitability), and if fauna were present.

If no fauna were found but the hollow had some potential to be occupied, it was blocked with a rag to prevent future entry, or removed by the arborist. The latter is best for hollows within limbs, whereas trunk hollows should be blocked unless safe felling on the same day is an option.

When a rag was inserted, a section was left dangling to enable it to be seen from the ground. This enabled potential for a final inspection (from the ground) prior to clearing ie if the rag had been removed, fauna may be present and when the tree is fallen, the hollow is to be inspected again.

Photo 2: An indication of the height of the crane. Both stags were inspected – inspection from the air clearly showed stubs in the tree on the right did not contain cavities which negated the need for close-up inspection and nest box offsets.

Photo 3: View from the man-box. Not a job for those afraid of heights

Photo 4: Removing an inspected hollow-bearing limb.

Photo 5: Rag-blocked hollows

If fauna were encountered, the objective was to remove them if possible unless they were nesting birds in which case clearing would be delayed until young have fledged.

Removal consisted of reaching in to gently pick up the animal with a gloved hand covered with a bag; or if access was not feasible or final inspection was not able to be completed, the entrance was blocked with a rag, and a section of the hollow-limb lopped to shorten the hollow. Some skill is required to block off the new entrance before any fauna can potentially escape up into the canopy (a heavy hessian bag thrown and then dragged over the cut as it is being finalised works well).

Of the 11 trees inspected, which from ground-based survey were considered to potentially hold >30 hollows, only 6 currently habitable (none deeper than 1m) hollows were found. Two trees had no actual hollows at all. This clearly illustrates the limitations of ground-based hollow identification and counts.

Only one hollow-obligate animal was found. A single male Squirrel Glider was found in a nest constructed of Bracken Fern and bark in a surprising short and shallow hollow about 30cm deep and about 10cm wide within a short broken stub facing upwards on about a 60 degree angle, about 25m above ground.

This method was also surprisingly time efficient. Including moving the crane once from its initial starting point, all 11 trees were inspected within 3.5 hours, including a 15 minute morning tea-break.

The table on the following page summarises the pros and cons of this method.

Overall, I highly recommend this method for its effectiveness in minimising fauna mortality and injury during hollow-bearing tree removal, and will be recommending it to future clients to employ where practical. On top of this, I recommend it to fellow ecologists for the insights into fauna habits, the 'David Attenborough canopy experience', and the spectacular landscape views.

Table 1: Positive and negative attributes of the man-box method

Pros	Cons
Provides instant information on whether a hollow is present or not: The limitations of a ground-based observer in identifying actual formed hollows is well evidenced by this method, as demonstrated in this instance. The number of hollows was clearly over-estimated, as was the potential significance of these hollows ie with very few actually habitable. Most of the latter were uninhabitable by the subject threatened species, further indicating their value had been over-estimated. This supported the 7 Part Test conclusion that their loss, while a negative effect, was not likely to compromise the viability of a local population. The reduction in number of actual hollows also justified the client's request for a reduction in replacement nest boxes.	*OH&S risks*: Risk of falling is abated by proper use of safety harnesses, but other risks are posed such as: • *Trapping fingers between wire cable and tree limbs during box movement*: Keep your arms inside the box unless inspecting a hollow. • *Uncontrolled fauna within the box:* The ecologist must be experienced and skilled enough to handle any fauna – others in the box depend on it. • *Lightning/electrical strike*: Obviously, do not operate during storms or near power lines. • *Injury by falling dead wood*: This is a high risk and all dead wood should be removed before descent. • *Injury by removed limbs*: Only a qualified arborist should remove large limbs. Such limbs can suddenly break, whip, splinter, etc, hence stand back, and ensure there is no risk of the box or the crane below being struck.
Multiple hollows can be inspected at once: Height allows inspection with binoculars of multiple hollows within multiple trees. This allows targeting of the search to actual cavities, saves time and makes a client happy.	*Cost*: Crane hire is expensive, but comparable to other earthmoving machinery. Conversely, inspection may allow all hollows to be inspected prior to clearing, negating the need for an arborist to fell a tree section by section; ecologists to be present to supervise clearing; or use of other specialised equipment eg a harvester head.
Minimises risk of fauna injury during felling: Fauna mortality and injury rate during hollow-bearing tree is generally high (personal observations) due to collapse of the tree/hollow resulting in crushing or burial within detritus; or internal injuries via collision with the walls of the cavity or due to being thrown onto the ground. Eggs are usually crushed. Consequently, fauna rescue in these situations generally involves frequent euthanasia. This method minimises the risk of fauna being killed as they are either removed, prevented from accessing the hollow to be removed (via blocking or removing the hollow), or detected (eg birds) prior to felling. Consequently, this method has significant merit in terms of animal welfare.	*Some hollows may still not be able to be inspected*: Generally, almost any hollow should be accessible via this method. Crown trimming may be required to clear a line for the rope to follow, hence this method may not be practical if the tree is proposed to be retained. Hollows in trunks present the main problem. Deep hollows in this situation are difficult to inspect even via camera, making confirmed fauna absence difficult. These hollows will probably have to be left unblocked with either an alternative method used (unless the tree can be 'topped' safely to allow inspection) or the hollow inspected at clearing. The latter is practical where the hollow is located in the lower half of the trunk, and hence collapse or other injury-causes are a low risk.
Significantly less obligations on fauna welfare carers: Organisations such as FAWNA and WIRES are volunteer based with limited funding and capacity. As this method minimises fauna injury, this reduces the expectation on these organisations to take in fauna additional to those from other sources eg road kills and pet attacks.	

The Scottish Wildlife Trust Osprey Program

Emma Rawling

Working with the Scottish Wildlife Trust as the Perthshire Ranger is certainly a challenge, and as far removed from my native Australia as you can get. On the other hand, the ecology of the Scottish Highlands isn't too dissimilar to upland habitats in the Great Dividing Range or in Tasmania.

My job involves looking after five nature reserves for this charity; day to day habitat management; wildlife survey and data collection; as well as coordinating teams of resident and casual volunteers, and doing a lot of educational work with the local community. The Trust's reserves encompass everything from oak woodlands, heather moorlands and mesotrophic lochs: diverse plant communities supporting rare underwater flora, and upland orchid meadows. The local wildlife includes the threatened Red Squirrels and Pine Martens; recently reintroduced European Beaver; and specialist upland birds such as Black Grouse. Red Deer, Fallow Deer, Hedgehogs and Badgers are frequent visitors to the Reserve and to my house garden nearby – not all of these being welcomed by local farmers.

The most famous birds in our care are the Ospreys- probably the UK's best known conservation recovery story; with a dramatic return from local extinction in 1954. The UK population today stands at nearly 500 birds, thanks to a combination of physical protection from egg thieves and nest disturbance (we do 24hr nest protection watch in breeding season), and habitat enhancement such as artificial nest platforms.

At our Loch of the Lowes Reserve near Dunkeld in the Scottish Highlands, the Ospreys have nested on the Loch since 1970 (then only the fifth nest site in the country), and we have one famous bird who has nested here for 22 consecutive years. She is affectionately known as "The Lady of the Loch" and has become a great ambassador for her species. Amazingly Lady returns to the same Loch year after year, even though the average life span of an Osprey is only about 15 years. Last year she returned with a new 'toy boy' partner and three eggs were laid. Will she return this year?

"The Lady"

About 20,000 visitors a year come to the Loch of the Lowes to see the birds from the hides, and enjoy a close-up HD nest camera; as well as viewing our other resident wildlife. A worldwide audience of 1.8million people follow the nest online via our webcam at: http://scottishwildlifetrust.org.uk/things-to-do/wildlife-webcams/loch-of-lowes/

The most exciting recent development is that we have begun satellite tracking studies on Osprey migration. This is yielding fascinating results not just about the mechanics of migration to and from their North African wintering grounds, but also helping to identify problem hot spots for illegal persecution on route, and common stopover areas in need of conservation protection.

The satellite transmitter (SWT).

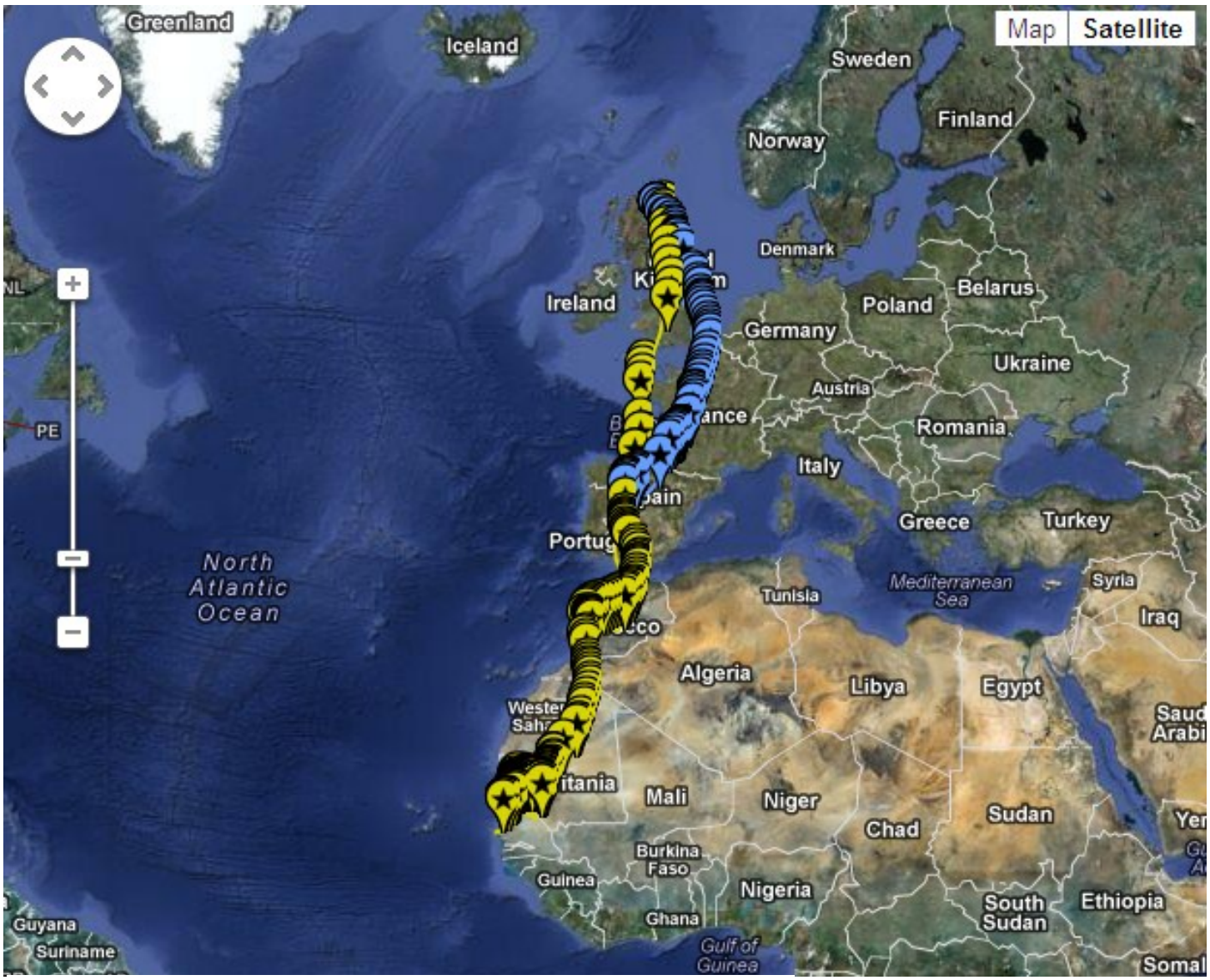
The story of our two chicks from 2012 (Blue 44 and Blue YD) can be followed online at: http://scottishwildlifetrust.org.uk/things-to-do/osprey/

My personal attachment to Blue 44 born in 2012 is very strong, as I was involved in the full time nest protection watch last year; was on duty when his parents arrived in the spring; and through their courtship and egg laying and the long incubation. I was also on duty when Blue 44 hatched and watched the whole process from the first hint of the egg tooth breaking the shell to his final emergence. I then watched him grow daily on his steady diet of raw fish, and was one of only two people to handle him at his ringing and tagging at 7 weeks of age. Blue 44 was the only one of the three eggs to hatch and naturally he grew very large, very quickly. My mother Judie dubbed him Godzilla.

Blue 44 a few hours old (SWT).

I then had my heart in my mouth when in July he fledged at 8 weeks old and promptly went missing for four days. Our team then spent two days in pouring rain searching and wading through impenetrable marshes looking for him in case he was grounded somewhere. Luckily he made a safe return to the nest (and did he ever get a bollicking from his mother), and went on to leave on migration in early September.

We followed his progress via GPS fixes all the way to Southern France and then onto Spain, where we lost track of him, possibly due to transmitter failure. As the young birds always have a 'gap' year in North Africa before returning to Scotland to breed, despite the transmitter problems, we hope to see Blue 44 again in 2014.



Blue 44 By Steve Gardner

Blue 44 by Tom Taylor

Maintaining Awareness of Lymes Disease

The Karl McManus Foundation recently hosted the 1st International Tick Borne Diseases Conference. The conference saw international speakers from Germany, USA, France, Asia and Australia presenting the latest research on tick-borne diseases. The conference was aimed at doctors, naturopaths and other health professionals, more than the general public, with a primary objective of raising awareness of Tick Borne Diseases in Australia, and dispelling the prevailing myth that diseases such as Lymes are not present.

The conference was professionally recorded and DVDs will be available for purchase. The ECA Council is maintaining a close watch on the latest research and developments in prevention of contracting a TBD, and will advise members via *Consulting Ecology* of any relevant information.

This helpful guide was provided by Judy Rawling via her daughter Emma, an ecologist in the United Kingdom. Every year around 3,000 people in the UK are affected by Lyme disease. The rate of infection in Australia is not yet known, but is expected to significant. Given treatment can be prolonged, expensive and uncomfortable, prevention is certainly better than cure. You may find the following information on the following pages useful for your OH&S practises.

SCOTTISH WILDLIFE TRUST

H&S AWARENESS BRIEF

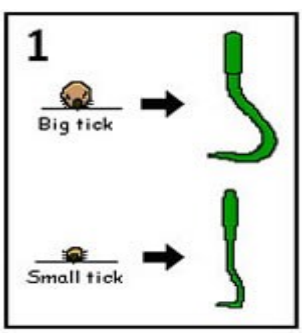
No 1	TICKS	October 2006 revised February 2009

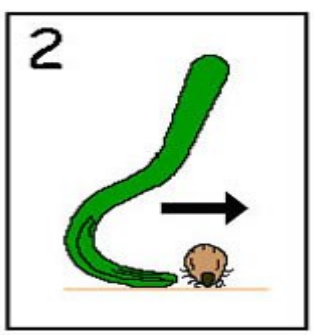
What is a tick?

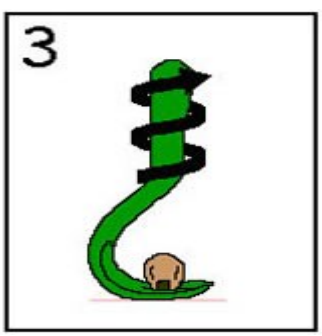
Ticks are tiny spider-like parasites which thrive on the blood of reptiles, birds, amphibians and mammals - including humans. The most common tick is the sheep tick, which is about the size of a sesame seed but can be as big as 3mm. They sit on most vegetation; such as grass stems, heather and bracken etc. and wait for a "host" to pass. They can attach themselves almost anywhere on the body, notably the legs (behind the knees), trunk, crotch and armpits. Ticks typically feed in places where the skin folds or creases and in obstructions caused by clothing and insert a probe into the skin before gorging themselves on blood Male ticks may leave after feeding for a short time, while the female may feed for up to ten days. Tick-borne infection is on the increase and can result in Lyme disease or other potentially serious medical conditions – e.g. Babesiosis, Ehrlichiosis, Anaplasmasmosis and Bartonellosis.

How to remove a tick

- BADA (Borreliosis and Associated Diseases Awareness UK) recommends the Tick Twister for safe tick removal. The most important aspects of tick removal are;
- The mouth parts of the tick should be cleanly removed with the rest of its body.
- The body of the tick must not be compressed.
- The tick should not be stressed or injured as this can cause it to regurgitate its blood meal along with any infective organisms
- The tick should be removed without causing the host any discomfort
- Choose the correct size of twister for the tick being removed (each pack contains two sizes, one for adult ticks and a second for tiny nymph ticks)
- Engage the hook by approaching the tick from the side until it is held securely
- Lift the hook very lightly and turn it (screwing or unscrewing). The tick detaches after two or three turns
- After removing the tick, disinfect the bite area and wash your hands thoroughly
- Save the tick for identification in case you become ill within several weeks. Write the date of the bite in pencil on a piece of paper and put it with the tick in a sealed plastic bag and store it in a freezer. Your doctor can use the information to assist in making an accurate diagnosis. Although not every tick carries Borreliosis or any of the associated co-infections, immediate removal of an attached tick is recommended







DO NOT use petroleum jelly, liquid solutions, freeze or burn the tick. This can cause it to regurgitate its stomach contents, increasing the chance of infection.

(Continued on page 36)

The sooner a tick is removed the less chance it has of passing on any bacteria that can cause infection.

Avoiding tick bites

- Walk in the centre of woodland paths to avoid overhanging vegetation – where possible!!
- Wear long trousers and tuck them into socks, or wear gaiters
- Ticks find it difficult to attach themselves to clothing made from smooth or waxed material
- Light coloured clothing makes attached ticks easier to spot
- Drawstrings, elasticated wrists, ankles, waistbands etc., restrict access to the skin for the tick
- Insect repellants that contain *permethrin* can be sprayed on clothing – allow clothes to dry before wearing them and do not apply the chemical directly to the skin
- Insect repellants that contain 25% DEET can be applied but need repeated application – confine to small areas such as your arms, legs and neck

Symptoms of Lyme disease

Lyme Borreliosis generally occurs in stages, with remissions, exacerbations and different clinical manifestations at each stage. After exposure to the tick the incubation period for the first stages of the disease is 3 to 32 days but more usually 7 to 15 days. The early stages of the disease can be asymptomatic, and the patient can present with later more systemic manifestations of the illness. Later stages of Lyme disease are often difficult to diagnose because its symptoms are similar to many other diseases (i.e. joint and nerve problems).

In a third of cases a red rash may develop at the site of the bite. Classically it has the appearance of a reddened circle that expands away from the bite and clears in the centre. The skin may be warm but is not usually painful. Early localised disease may be associated with “flu-like” symptoms of fever, malaise, fatigue, lethargy, headache and joint and muscle aches. Other, more severe, early manifestations of the disease include arthritis of large joints, meningitis and myocarditis, all of which may occur without the rash.

Within weeks to months the spirochete may spread to many other sites, particularly the nervous system, joints, heart or other skin sites. Symptoms fluctuate and may last for months or may become chronic. Weeks to years after onset, swelling and pain in large joints may develop and recur for several years. In an individual patient, however, the infection is highly variable.

If you begin to display any of the symptoms, seek experienced medical advice immediately. Lyme disease can be treated most effectively in its early stages with antibiotics.

Tick Twisters

Tick twisters are available in bulk purchase of 16 packs of 2 from;

JAK marketing
Unit 2 The Industrial Estate
York Road
SHERIFF HUTTON
YORK, YO60 6RZ
www.jakmarketing.co.uk

Trust outdoor staff can obtain a pack of two tick twisters from the Health & Safety Manager at jboyce@swt.org.uk

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 Mid North Coast. Part of a series of NSW North Coast Threatened plants that aims to provide specific habitat, ecology and distribution data to aid the consultant ecologist (with a bias towards those taxa where no detailed species profiles exist).

In this edition, I have decided to discuss a species with which a species profile exists, but which is dated (NPWS 2002) and lacks information on recent field survey findings for the NSW lower North Coast.

Small flower Grevillea (*Grevillea parviflora subsp parviflora*)

Description: Low open to erect shrub 0.3–1 m tall. Major branches ascending to erect (mostly erect), angular, ribbed. Leaves crowded, mostly ascending; up to 52mm long and 2-2.5mm wide; sessile, entire, narrow linear, tapering at the base (attenuate), apex with a short, sharp point; margins recurved; central midvein conspicuous under a hand lens on both sides of the leaves. Leaf undersides often silky hairy with a mix of white and rust coloured hairs. Conflorescence erect, shortly pedunculate, terminal, well enclosed in foliage. Flower rachis 1-3 mm long, tomentose (mixed with scattered rust coloured hairs), pedicels up to 7 mm long. Perianth white with rusty brown hairs on limb and mixed white and brown hairs on remaining tube, up to 7mm long; style white up to 8mm long. Stigma and pollen presenter often a pale pink colour and up to 1mm long and 1mm wide.

Identification: *Grevillea parviflora subsp parviflora* is closely related to *Grevillea humilis subsp humilis*, and distinguishing between these two taxon in the Karuah locality can be difficult (and frustrating) particularly when specimens being inspected are sub-optimal. The two species are usually parapatric (having somewhat different microhabitats when occurring in close conjunction with each other) with hybrids or intermediates rarely recorded. In Karuah Nature Reserve, *Grevillea humilis subsp humilis* is generally associated with paperbark swamp woodlands rather than the drier open forests with which *Grevillea parviflora subsp parvifora* is typically found in (author's pers. obs.).

Some of the key diagnostic differences between the 2 taxa are listed below:

Branchlets: *Grevillea parviflora subsp parviflora* branchlets are generally strongly angular/ridged; *Grevillea humilis subsp humilis* branchlets are markedly less angular/ridged;

Leaves: Degree and angularity of margin reflection can sometimes be a helpful diagnostic to distinguish between the two taxa, but generally leaf characteristics are very similar (between the two taxa).

Flower buds: *Grevillea parviflora subsp parviflora* buds typically tightly clustered with individual buds nearly always entirely clad in chestnut brown hairs. *Grevillea humilis subsp humilis* buds (at comparable age to *Grevillea parviflora subsp parviflora* buds) are more loosely clustered with individual buds having mixed brown and pale hairs except on the terminal knob.

Pistil length: Pistil lengths overlap between the two taxon, but pistil lengths for *Grevillea humilis subsp humilis* are generally longer than that for *Grevillea parviflora subsp parviflora*.

Future phylogenetic studies may hopefully provide further clarity on the taxonomy of these taxa.

Distribution: The original 'core' distribution for this taxon has been previously reported as Appin-Picton-Bargo in southern Sydney (on the Woronora Plateau), with outlier populations in the lower Hunter and on the western side of Lake Macquarie on the Central Coast. In recent times (after the species profile for the taxon was prepared), three confirmed (sub) populations of this taxon have been recorded on the NSW lower North Coast: these being the Motorplex site at Eagleton; on private lands at Karuah on Nerong

Volcanics north of the Pacific Highway (recorded by the author); and on private lands south of the Pacific Highway, north of Carrington township. For the purposes of this note, confirmed records are defined as those that have been determined by Bob Makinson, NSW National Herbarium. The latter two (sub) populations are considered to be at the northern limit of the taxon. There are also unconfirmed records of this taxon in Karuah Nature Reserve (purchased as compensatory habitat by Roads and Maritime Services for the Pacific Highway upgrade) on the eastern side of the Highway, Tea Gardens, Medowie, and along Limeburners Creek Rd east of Karuah. These unconfirmed records will be inspected by the author during the 2013 flowering season (and submitted to Bob Makinson at the NSW National Herbarium) so that a determination can be made.

Habitat: The Karuah population (north of the Pacific Highway) was recorded on low undulating hills and flats on Nerong Volcanics-derived clay soils. Often found on track edges, although occasionally recorded in the open forest interior.

Structure and Floristics (Karuah, north of Pacific Highway subpopulation)

Upper (Tree) Stratum: To 22m height; 40-70% PFC. *Angophora costata, Corymbia gummifera, Eucalyptus acmenoides, Eucalyptus capitellata*. Canopy associates and minor subsidiary species comprised *Eucalyptus umbra, Eucalyptus microcorys, Eucalyptus globoidea, Eucalyptus piperita, Corymbia maculata*.

Small Tree Stratum: To 6-8m height; 15-20% PFC. *Allocasuarina littoralis*.

Shrub Stratum To 2-6 metres; 20-40% PFC. *Leptospermum polygalifolium subsp. polygalifolium (and subsp cismontanum), Acacia ulicifolia, Pultenaea daphnoides, Pultenaea euchila, Pultenaea paleacea, Pultenaea villosa, Hibbertia aspera, Acacia longifolia subsp longifolia, Persoonia levis, Gompholobium virgatum, Pimelea linifolia, Pultenaea retusa, Acacia myrtifolia, Isopogon anemonifolius, Polyscias sambucifolia, Persoonia linearis, Phyllanthus hirtellus*.

Groundcover: To 1.5m height; 60-80% PFC. Mosaic of grasses, forbs, graminoids and ferns dominated by *Doryanthes excelsa*, *Lomandra longifolia subsp longifolia*, *Lomandra obliqua*, *Lomandra filiformis sibsp filiformis*, *Gonocarpus tetragynus*, *Themeda australis*, *Entolasia stricta*, *Pratia purpurascens*, *Pseuderanthemum variabile*, *Dianella caerulea*, *Pteridium esculentum*, *Patersonia glabrata*, *Viola hederacea*, *Lepidosperma laterale*, *Xanthorrhoea sp.*, *Imperata cylindrica* var major, *Anisopogon avenaceus*.

Climbers: Multi-strataof *Geitonoplesium cymosum*, *Eustrephus latifolius*, *Glycine clandestina complex*, *Billardiera scandens*, *Hardenbergia violacea*, *Pandorea pandorana*.

Co-occurring Rare and Threatened Plant Species: *Tetratheca juncea, Macrozamia flexuosa*.

Life History/Ecology

Growth Form: Low, erect shrub to 1 metre in height.

Vegetative Spread: Rhizomatous suckering (often following disturbance) to yield clonal sub populations.

Lifespan/Longevity: 25-60 years (Benson and McDougall 2000).

Primary Juvenile Period (plant age at first flowering): No data.

Flowers: Bisexual, white, flowers August-November (with occasional flowering throughout the year).

Pollination: Insect pollinated (Makinson 2000); no further data available.

Dispersal, Recruitment: Reproduces by seed and dispersed by gravity and/or ants (Benson and McDougall 2000). Recruitment from soil seedbank and vegetative spread.

Fire Response: Killed by fire (Benson and McDougall 2000); can re-sprout (suckers) following fire.

Population Size: 100 'suckering stems' confirmed at Karuah from 10 patches; actual number of plants and clonal ramets unconfirmed.

Propagation: With pre treatment seed germinates readily; can also propagate from cuttings. Translocates reasonably well (if a salvage program is needed).

Conservation Status: Listed as Vulnerable under TSC and EPBC Acts.

References:

1. Benson, J. and McDougall, K. (2000) Ecology of Sydney plant species 7b Proteaceae to Rubiaceae. Cunninghamia Vol. 6(4). Royal Botanic Gardens, Sydney.

2. Makinson, R.O. (2000) Grevillea, Flora of Australia, Volume 17A.

3. NSW National Parks and Wildlife Service (2002) Species profile for *Grevillea parviflora subsp parviflora.*

4. NSW National Parks and Wildlife Service (2002) NSW Flora Fire Response Database version 1.3a December 2002.

5. Olde, P. and Marriott, N. (1995) The Grevillea Book, Volume 3. Kangaroo Press, Kenthurst, NSW.

Photos (flower; growth form) copyright Isaac Mamott

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Contributions to the Newsletter, Volume 31

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

30th of June 2013.

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

The following contributions are welcome and encouraged:

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

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If you wish to advertise, please contact the ECA administrative assistant on admin@ecansw.org.au.

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

ECA Photo Gallery

Photo Competition Entries

Top left: Spider web with a view. *Photo courtesy of Narawan Williams.*

Top Right: *Boronia serrulata*, this ROTAP listed species was recorded at a site in Terrey Hills. *Photos courtesy of Amy Rowles.*

Mid Left: Gang-gang Cockatoo. *Photo courtesy of Rebecca Hogan.*

Left: 'Freddie' the hand raised Galah enjoying Christmas. Although now free to come and go he is firmly attached to his human family. *Photo courtesy of Amy Rowles.*

Right: Common Wallaroo. *Photo courtesy of Narawan Williams.*

ECA Photo Gallery

Photo Competition Entries

Top left [runner up]: Apostlebird *Struthidea cinerea . Photo courtesy of Narawan Williams.*

Mid - right: *Delma plebia*. *Photo courtesy of Narawan Williams.*

Bottom Right: Loggerhead Turtle *Caretta caretta. Photo Courtesy of Harry Engel.*

Bottom Left: Waratah. *Photo courtesy of Belinda Pellow.*