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Newsletter of the Ecological Consultants Association of NSW

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Above: *Diuris flavescens* (see page 34).
 Photo courtesy of Isaac Mamott



Above: The Wildlife Acoustics Song Meter 2 with microphones attached at sides and cover removed showing internal features (see page 14).
 Photo courtesy of Paul Burcher



Above: Red-eyed Tree Frog *Litoria chloris* observed at the Frog and Tadpole Workshop, Smiths Lake (see page 11). Photo courtesy of Michelle Toms.

Editor: Jason Berrigan newsletter@ecansw.org.au

Front Cover Photo: Ewing's Tree Frog *Litoria ewingii*- Sheltering in the heart of a grass tree *Xanthorrhoea* sp. at Point Dangar near Portland, South West Victoria. *Photo Courtesy and Copyright of Colin Bower.*

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Message from the President

Mark Couston

January 2011

Dear members

A new year begins and with fading memories of the 2010/11 festive season & holidays, it's back to work in a year with significant potential for change in both the natural and political environments.

In terms of the natural environment, the year has begun with La Nina rainfall and extensive flooding in south east Queensland and northern NSW which has brought suffering and hardship to many rural communities. Back in March 2010 there was torrential rain falling in the desert and channel country in far western Queensland and Northern Territory, with rivers flowing in the Simpson Desert and down to Lake Eyre. The Darling River experienced substantial flows in March 2010. In early 2011 we saw major flooding in several areas of NSW affecting towns such as Hay and Mullgarina, and with the 2011 flooding in south east Queensland and northern NSW, it may take a few months before we see these flood waters flowing down the Darling River. With the Murray Darling system being considered already "wet" from previous rain events, it will be interesting to see how much water reaches the mouth of the Murray River. In Queensland however we have seen television footage of sediment laded waters and all sorts of debris flowing down the Brisbane River. Although this isn't the first time this has happened the impacts on biota in Moreton Bay are likely to be considerable. It would be interesting to see how the Moreton Bay ecosystem responds in both medium & long term.

With these episodic events occurring, for argument sake, on a 10-20+ year average, the temporal scale of many of our ecological assessments is evidently questionable. Some species populations or ecological communities will no doubt be favoured by such episodic events (including exotic species such as the Cane Toad), whilst others will be negatively impacted upon. For those species that are negatively impact upon, they are faced with finding suitable refuge, surviving inundation events or recolonising affected areas after the event in a landscape consisting of fragmented habitats.

For many members, flora & fauna surveys and development impact assessments are large components of our work. Although the legislative process, Part 1 section 5a of the *Environmental Planning & Assessment Act 1979* (NSW) (Assessment of Significance), has not changed since 2005 the lists of threatened species, communities and populations grows ever longer. In 2010, the NSW Scientific Committee made a number of determinations listing an additional 48 species, ecological communities or populations in the schedules of the *Threatened Species Conservation Act 1995* (NSW). To make things more interesting, some interpretations relating

to the Assessment of Significance have also evolved: for example, the recognition that individual trees in developed landscapes provide an ecological contribution and therefore are part of an endangered or critically endangered ecological community. Side stepping the Assessment of Significance process, several BioBanking projects/agreements have been successfully completed or are in the process of negotiation, and the latest figure is that there are currently 68 accredited assessors.

With episodic events such as the recent floods, influences of longer term climate change, together with the growing lists of threatened species and the current statutory impact assessment processes: the ecological consultant needs to be aware and informed of current science based knowledge and legislative processes. We too, need to constantly adapt and evolve as professional scientists. Part of this evolution is undoubtedly a certification system for ecological consultants.

Over the last few years, the ECA Council and many members have been discussing the need for an accreditation scheme to recognise and maintain a professional standard in our work and give status to the term *Certified Practising Ecological Consultant* (CPEC). In 2010, a draft of the accreditation scheme was developed by the ECA's Accreditation Committee consisting of Martin Denny (chairperson), Rebecca Hayes, Alison Hunt and Belinda Pellow, and the draft scheme was sanctioned at the ECA's annual general meeting in September 2010. Several meetings regarding the scheme have been held with staff of DECCW, with the latest being held in November 2010 with myself, Martin Denny and DECCW staff: Tom Grosskopf (Director Landscapes and Ecosystems Conservation), Lucien McElwan and Linda Bell. The draft accreditation scheme was presented and discussed at the November 2010 meeting, and overall the scheme was well received and supported by the department. Based upon the meeting, the department saw the ECA as being the appropriate body to develop and administer the scheme, and DECCW was willing to provide support such as legal advice, temporary office accommodation and access to departmental

information relating to accreditation of ecologists and training.

One of the main aspects of maintaining the accreditation of Certified Practising Ecological Consultant (CPEC) is to undertake ongoing professional development: an essential process to ensure the sound application of scientific principles within the legislative framework. Whilst continuing professional development is likely to be achieved through a number of mechanisms, it highlights the need for the ECA to continue to develop and run the existing technical workshop program.

This year, the ECA is taking a few new steps particularly towards implementation of the Certified Practising Ecological Consultant (CPEC) scheme as well as an increase in the level of administrative support. The ECA also looks forward to continuing to provide the technical workshops, newsletters, the web site forum and

PHOTO COMPETITION

Congratulations! to *Colin Bower* of FloraSearch for winning the last photo competition with his photograph of the Ewing's Tree Frog, featured on the front cover.

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

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

information emails. I would especially like to mention the efforts and diligent work of *Amy Rowles*, (ECA's Administrative Assistant) who keeps the association ticking over in this regard. Long term members will certainly acknowledge the significant benefit to the ECA's evolution that Amy's engagement has led to in relatively short period of time.

On a final note, with State Government elections this year, it will be interesting to see the outcome of this key event, and its potential implications for our industry. There may or may not be some shift in direction on environmental issues and assessment processes (who knows?). Two things I am confident about is that we will be hearing some discussions on Part 3a State Projects and I would not be surprised if there were at least more departmental name changes. It will certainly not be dull.

ACCREDITATION LOGO COMPETITION

WIN one years free membership!

A logo to symbolise accreditation as an ecological consultant is required as part of the new accreditation scheme currently being devised by the ECA of NSW. We are running a competition which invites members to submit a design for this logo.

The winner will be selected by the ECA council and announced at the 2011 Conference and AGM.

Entries close 30th June

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.

Unusual Roosting Habits of the Greater Broad-nosed Bat *Scoteanax rueppellii*

Ray Williams
Ecotone Ecological Consultants
ECA Council Member

The Greater Broad-nosed Bat is primarily regarded as being a tree hollow roosting species, with a preference for larger trees in a forest stand or mature paddock trees. This species has also occasionally been found roosting in the roof space of buildings.

In April 2010, I investigated the report of a bat roosting on the external wall of the Regional Art Gallery in Newcastle. To my surprise there was a Greater Broad-nosed Bat sitting out in the open on a wall near a doorway where the light intensity was at least reduced. I was able to climb a ladder and closely examine the bat without disturbing it from its roost site (the sex and age of the bat was not determined). The bat roosted in this location for a week before disappearing.

In October 2010 I was called to the Jetstar maintenance hanger at Newcastle Airport where a bat had been apprehended. Sure enough, it was a male Greater Broad-nosed Bat that was found in the tool bag of one of the aircraft mechanics. Recently an Eastern Broad-nosed Bat *Scotorepens orion* was rescued from the same hanger. Why any bat would frequent this area is a mystery to me, given the incredible noise of FA18's frequently conducting night exercises.

Upcoming Events in 2011

ECA Events

- **2011 ECA CONFERENCE and AGM**

Title: Impacts of Invasive Species

Date: Monday 25th July 2011.

Venue: Central Coast Leagues Club, Gosford

Cost: \$110 members, \$140 non-members.

Contact: admin@ecansw.org.au or

ph. Amy on (02) 4995 6190.

- **PROPOSED ECA WORKSHOPS 2011**

- **Rainforest Plant ID**
- **Bat Identification and Survey Techniques**

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

Non - ECA Events

- **BASNA AGM and Symposium**

Theme: Australia – Land of Honeyeaters

Date: 26th March 2011

Venue: Sydney Olympic Park

Cost: members \$35, students \$20,
non-members \$40

Details: www.birdsaustralia.com.au

Contact: basna@birdsaustralia.com.au

- **Birds Australia Campout**

Date: 6-9th April 2011 (registration closes 18th March)

Venue: Scottsdale Reserve, near Bredbo, ACT

Cost: \$25 per person, plus \$5 per night camping fee. \$20 BBQ on 6th.

Details: <http://canberrabirds.org.au/>

Contact: bacampout@canberrabirds.org.au

- **Birds Australia Twitchathon 2011**

Date: 29-30th October 2011

Details: www.birdsaustralia.com.au

Contact: basna@birdsaustralia.com.au

- **Australian Mammal Society 57th Scientific Meeting**

Date: 24-29th June 2011

Venue: Portland, Oregon, USA

Details: <http://asm2011.research.pdx.edu/> or

<http://www.australianmammals.org.au/Conference2011.htm>

- **Ecological Society of Australia 2011 Annual Conference**

Theme: Ecology in Changing Landscapes

Date: 21st-25th November 2011

Venue: Wrest Point, Hobart, Tasmania

Details: <http://esa2011.org.au/index.asp?IntCatId=414>

Contact: esa@conlog.com.au ph. 02 6281 6624

Ecological Items For Sale

Hair Funnels

Funnel c/w base, bait chamber and pegs - 55 sets: many unused. New price \$11.60 each: sale price \$7.50 each. Apply Judie Rawling phone 0414 886 2198 or ubmc@urbanbushland.com.au

Waders

Two (2) pairs, as new. Medium to large size \$60 each. Apply Judie Rawling phone 0414 886 2198 or ubmc@urbanbushland.com.au

Summagraphics SummaSketch III A3 digitising tablet

It is connected via a 9-Pin serial port to the computer. \$100.00 + postage and handling. Contact Michael Murray ffs@westnet.com.au

Ecological Items Wanted

Flora of NSW, Volume 4. Harden.

Please contact Kath Chesnut on 02 8925 5563 or kathryn_chesnut@urscorp.com

Plants of Western New South Wales. by G.M. Cunningham, W.E. Mulham, P.L. Milthorpe and J.H. Leigh (1992), Inkata Press, Australia. Please contact Jason Berrigan on 65590075 or jason@darkheart.com.au.

Field Guide to the Orchids of New South Wales and Victoria. By A. Bishop (1996) UNSW Press, Sydney. Please contact Jason Berrigan on 65590075 or jason@darkheart.com.au.

ECA ANNUAL CONFERENCE and AGM 2011

‘Impacts of Invasive Species’

Monday, 25 July 2011

Central Coast Leagues Club
(Gosford)

Cost: **\$110** (ECA Member) **\$140** (non-member)
(Cost includes morning tea, buffet lunch and afternoon tea and coffee break)

Commences: Registration 8:30am - 8:50 am.

Close: 5:00pm

Conference Drinks and Dinner: from 5:30pm (\$16)

(Detailed program of presenters to be advised)

Conference enquiries should be directed to Amy, ECA Administration Assistant at admin@ecansw.org.au or Phone 0418 451 488

The Central Coast Leagues Club is located on Dane Dr, Gosford and is within walking distance of the railway station.

A **post-conference dinner** will be held in the evening at the **Shoreline restaurant** (Gosford Sailing Club) at a cost of \$16. This venue is in walking distance of the Leagues Club, where finger food will be served, providing a great opportunity to exchange experiences, talk shop or just catch up with long lost colleagues over a drink and dinner. The conference dinners in the past have been well attended and are an entertaining night out.

REGISTRATION NOW OPEN: forms available on the ECA website or by contacting the admin assistant at admin@ecansw.org.au

Recent Literature and New Publications

Recent Journal Articles / Literature

- Claridge A. et al (2010). Detection of medium-sized ground-dwelling mammals using infrared digital cameras: an alternative way forward. *Australian Mammalogy* **32** (2): 165-171.
- Goldingay R. (2010). Direct male parental care observed in wild sugar gliders. *Australian Mammalogy* **32** (2): 177-178.
- Goldingay R. et al. (2010). Variation in the home-range size of the squirrel glider (*Petaurus norfolcensis*). *Australian Mammalogy* **32** (2): 183-188.
- Sapphire J. et al (2011). Fungi and fire in Australian ecosystems: a review of current knowledge, management implications and future directions. *Australian Journal of Botany* **59** (1): 70-90.
- Hughes N. and Banks P. (2011). Heading for greener pastures? Defining the foraging preferences of urban long-nosed bandicoots. *Australian Journal of Zoology* **58** (6): 341-349.
- Norton M. et al. (2011). Population biology of the long-nosed potoroo (*Potorous tridactylus*) in the Southern Highlands of New South Wales. *Australian Journal of Zoology* **58** (6): 362-368.
- Norton M. et al. (2011). Habitat associations of the long-nosed potoroo (*Potorous tridactylus*) at multiple spatial scales. *Australian Journal of Zoology* **58** (5): 303-316.
- Ruibal M. et al. (2011). Socio-seasonal changes in scent – marking habits in the carnivorous marsupial *Dasyurus maculatus* at communal latrines. *Australian Journal of Zoology* **58** (5): 317-322.
- Valentina S. et al. (2011). Predator odour does not influence trappability of southern brown bandicoots (*Isodon obesulus*) and common brushtail possums (*Trichosurus vulpecula*). *Australian Journal of Zoology* **58** (5): 267-272.
- Phillips R. (2010). Eradications of invasive mammals from islands: why, where, how and what next? *Emu* **110** (4): i-vii.
- Arved C. et al. (2011). A macroinvertebrate index to assess stream-bed stability. *Marine and Freshwater Research* **62** (1): 30-37.
- Beatty S. et al. (2011). Salinity tolerances of endemic freshwater fishes of south-western Australia: implications for conservation in a biodiversity hotspot. *Marine and Freshwater Research* **62** (1): 91-100.
- Kruschel C. and Schultz S. (2010). Lure-assisted visual census: a new method for quantifying fish abundance, behaviour, and predation risk in shallow coastal habitats. *Marine and Freshwater Research* **61** (12): 1349-1359.
- Read J. and Eldridge S. et al. (2010). An Optimised rapid detection technique for simultaneously monitoring activity of rabbits, cats, foxes and dingoes in the rangelands. *The Rangeland Journal* **32** (4): 389-394.
- Winning G. and Saintilan N. (2009) Vegetation changes in Hexham Swamp, Hunter River, New South Wales, since the construction of floodgates in 1971. *Cunninghamia* **11**(2): 185-194.
- Benson D. and Picone D. (2009) Monitoring vegetation change over 30 years: lessons from an urban bushland reserve in Sydney. *Cunninghamia* **11**(2): 195-202.
- Beckers D. and Offord C. (2010) Waratah theft in Brisbane Water National Park – An analysis of the blue paint poaching reduction program. *Cunninghamia* **11**(3): 287-293.
- Payne R. et al (2010) Coastal sandplain vegetation at Brisbane Water and Broken Bay – reconstructing the past to plan for the future. *Cunninghamia* **11**(2): 295-317.
- Tozer M. et al. (2010) Native vegetation of southeast NSW: a revised classified and map for the coast and eastern tablelands. *Cunninghamia* **11**(3): 359-406.
- Hourigan C. (2010) The diversity of insectivorous bat assemblages among habitats within a subtropical urban landscape. *Austral Ecology* **35**(8): 849-857.
- Nichols P. et al (2010) Testing a facilitation model for ecosystem restoration: Does tree planting restore ground layer species in a grassy woodland? *Austral Ecology* **35** (8): 888-897.
- Arthur A. et al (2010) Influence of revegetation on predation rates by introduced red foxes (*vulpes vulpes*) in south-eastern Australian farmland. *Austral Ecology* **35** (8): 919-928.

Recent Book Releases

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

Title: Frogs and Toads

Author: Chris Mattison

RRP: \$49.95

No. Pages: 192

Publisher: The Natural History Museum, London

Date: February 2011



Title: Reptiles of the NSW Murray Catchment: A guide to their identification, ecology and conservation

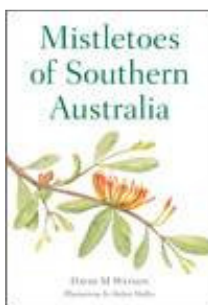
Author: Michael Damian and David Lindenmayer
RRP: \$39.95
No. Pages: 248
Publisher: CSIRO Publishing
Date: April 2010



Title: Australia's Remarkable Trees
Author: Richard Allen and Kimbal Baker
RRP: \$44.99
No. Pages: 272
Publisher: The Miegunyah Press
Date: November 2010

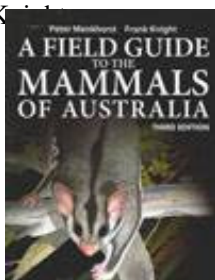
Title: Native Plants of the Sydney Region: from Newcastle to Nowra and West to the Dividing Range
Author: Alan Fairley and Philip Moore
RRP: \$59.99
No. Pages: 640
Publisher: Allen and Unwin
Date: September 2010

Title: Mistletoes of Southern Australia
Author: David Watson
RRP: \$49.95
No. Pages: 200
Publisher: CSIRO Publishing
Date: February 2011



Title: Scientific Writing = Thinking in Words
Author: David Lindsay
RRP: \$29.95
No. Pages: 128
Publisher: CSIRO Publishing
Date: February 2011

Title: A Field Guide to the Mammals of Australia (3rd Edition)
Author: Peter Menkhorst and Frank Knight
RRP: \$39.95
No. Pages: 296
Publisher: Oxford University Press
Date: November 2010



Title: What Makes a Good Farm for Wildlife?
Author: David Lindenmayer
RRP: \$39.95
No. Pages: 176
Publisher: CSIRO Publishing
Date: February 2011

Title: Floodplain Wetland Biota in the Murray-Darling Basin: Water and Habitat Requirements
Author: Kerrylee Rogers and Timothy Ralph
RRP: \$99.95
No. Pages: 360
Publisher: CSIRO Publishing
Date: November 2010

Title: Desert Channels: The Impulse to Conserve
Editors: Libby Robin, Chris Dickman and Mandy Martin
RRP: \$59.95
No. Pages: 352
Publisher: CSIRO Publishing
Date: September 2010

Title: Steve Parish: 50 Years Photographing Australia
Author: Steve Parish
RRP: \$79.95
No. Pages: 304
Publisher: Steve Parish Publishing
Date: September 2010



Title: A Bush Capital Year: a natural history of the Canberra region
Author: Ian Fraser and Peter Marsack
RRP: \$49.95
No. Pages: 232
Publisher: CSIRO Publishing
Date: February 2011

Title: Care of Australian Wildlife: for gardeners, landholders and wildlife carers
Author: Erna Walraven
RRP: \$24.95
Publisher: New Holland
Date: December 2010

Title: The Kimberley: Australia's Last Great Wilderness
Author: Victoria Laurie
RRP: \$59.95
No. Pages: 304
Publisher: University of Western Australia Press
Date: October 2010

February 2011 ECA Membership Report

Amy Rowles
ECA administrative assistant

In total we have 133 members and four applicants.

2011 Annual Subscription Is Now Due

Subscriptions unpaid by the 1st
of April will be cancelled.
Membership may be re-instated
at anytime, provided yearly
subscription is paid in full.

If you did not receive your
subscription renewal in the post
please contact administration
admin@ecansw.org.au

We have had twelve new members over the last six months. The new members are introduced below:

Name: Stephanie Horton
Membership Status: Practising
Qualifications: Grad Dip Env. M/ment
Position: Principal
Location: Lowanna

Name: Cameron Radford
Membership Status: Associate
Qualifications: B. Env. Sc.; Masters Wildlife Health and Population Mgmt; B. Sc. (Exercise Sc)
Company: Urban Bushland Management Consultants
Position: Fauna Ecologist
Location: Bella Vista

Name: Katy Wilkins
Membership Status: Associate
Qualifications: B. Sc. Biodiversity and Conservation
Company: Urban Bushland Management Consultants
Position: Junior Ecologist
Location: Bella Vista

Name: Michael Hallinan
Membership Status: Associate
Qualifications: B App. Sc.; Assoc. Dip. Horticulture
Company: Michael Hallinan Flora & Fauna Consulting
Position: Principle
Location: Alstonville

Name: Brendan Ryan
Membership Status: Practising
Qualifications: B Sc., M Sc.

Name: Aaron Troy
Membership Status: Associate
Qualifications: B. Sc. (Env Mgt and Ecology) (Hons)
Company: Biosis Research
Position: Consultant Aquatic Ecologist
Location: Alexandria

Name: Aleksei Atkin
Membership Status: Student
Qualifications: B Natural Science (Nature Conservation)
Location: Annandale

Name: Andrew Carty
Membership Status: Practising
Qualifications: B. Env. Sc.
Company: Sinclair Knight Merz
Position: Ecologist / Botanist
Location: Newcastle West

Name: Melina Budden
Membership Status: Practising
Qualifications: B. Env. Sc.; B. Sc. In Biodiversity and Conservation

Name: Kazz Bowland
Membership Status: Practising
Qualifications: B. Biological Science (Ecology)
(Hons - environmental management and ecology)
Company: Ecobiological
Position: Ecologist
Location: Gateshead

Name: Simon Tweed
Membership Status: Practising
Qualifications: B Env. Sc.
Company: Niche Environment and Heritage
Position: Senior Ecologist
Location: Concord

Name: Nathan Garvey
Membership Status: Practising
Qualifications: B Sc. Grad. Dip. (Bio. Sci)
Company: Biosis Research
Position: Resource Group Manager / Zoologist
Location: Wollongong

The ECA Council has decided that annual fees for practising regional members should be raised from \$120 to \$140. This was based on forecast costs for administrative services and the consideration that over the past few years the gap is closing between the level of services we are providing to metropolitan and regional members. A large part of the services to members are provided via email or the web and many of the workshops are held in regional areas. The annual conference also shifts between Sydney and locations more accessible to members from regional areas (e.g. Newcastle in 2009). In light of this, we trust that our regional members will understand the need for an increase in fees.

The ECA Forum

Compiled by Amy Rowles

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

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

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

If you haven't had time to log on and catch up, here's a summary of some of the recent and most commented on topics up to the 27th January 2011. See the forum at www.ecansw.org.au for details.

Alternative to GoogleEarth and SIX viewer: Near map.

Jason Berrigan: Jason notified ECA members of a link <http://www.nearmap.com/> to a website that enables you to view maps, with features such as high resolution, aerial photos, free use of photos, regular updates (with an option to view photos at different dates). Some disadvantages include limited coverage and no street view. Stephen Ambrose tested this package on a site in Sydney, where he could use photos of different dates to compare and verify recent clearing. Elizabeth Ashby commented that she uses this package frequently and that there is a measurement function (right click on the view). This also gives you a lat and long. Cassandra Thompson added a

comment, warning that 'from talking with NearMap, the use of the PhotoMaps for private sector clients is OK under the licence as long as it is NOT excessive, competitive material OR for any government clients that don't have a NearMap licence. You would need to check with your government clients to see if they have a licence before this can be used'. Nick Skelton noted that you can use Near Map as a live backdrop under some GIS packages (not ArcView or Arc GIS).

EPIRBs.

Stephen Ambrose: Stephen requested advice from anyone who has experience with Personal Locator Beacons. See article on page 32 for details.

A Reviewer's Comments

Deryk Engel: Deryk commented that his client (a government department) on review of his report by an ecologist doubted his positive identification of both the Eastern Bentwing Bat (*Miniopterus schreibersii*) and Cumberland Plain Land Snail (*Meridolum corneovirens*), despite the habitat being highly suitable with records of both species known within a 10km radius. In contrast, he was also given comments stating that he was not precautionary enough. The case is discussed in more detail on the forum. Stephen Ambrose has found that sometimes discussing the comments with the reviewer over the phone or in person, will alleviate the changes required. Elizabeth Ashby has also experienced such scrutiny, but found that communicating through a meeting improved the situation.

Equipment

Kath Chesnut has asked for recommendations of a supplier for a nice mobile, fairly lightweight plant press. Erin Roper suggested making one with thin timber, cardboard, paper and straps. Stephen Ambrose advised that there are some good instructional videos for constructing a plant press on youtube. Elizabeth Ashby suggested using a sturdy wire mesh instead of timber as this breathes better and plants are less likely to rot.



Photo courtesy of Deryk Engel

What Am I? Competition

Question in August 2010 Issue: I was found on a highway south of Sydney, this road being surrounded by woodland that is typical of those found on the underlying Hawkesbury Sandstone. The pen is 14cm long. What Am I or should it be what was I?

Answer: Red Fox

Environmental consultant convicted of causing damage to koala habitat at Taylors Beach, Port Stephens

Orogen Pty Ltd and its director Anthony Fish have been convicted in the Land and Environment Court of causing damage to habitat of threatened species, namely the Koala, knowing that the land concerned was habitat of that kind. Orogen and Mr Fish provided a developer with advice on what vegetation could be lawfully cleared on the property but failed to advise that damaging the habitat of the Koala was unlawful under the National Parks and Wildlife Act. Both Orogen and Mr Fish were aware that the property contained habitat of the koala and koala movement corridors. Vegetation containing Koala habitat was subsequently cleared. The offences occurred at a proposed development site at 60 Port Stephens Drive, Taylors Beach, at the intersection with Sky Close.

Orogen and Mr Fish both pleaded guilty. Orogen and Mr Fish were fined a total of \$15, 000. The company was also ordered to pay the prosecutor's costs and investigation expenses.

Smiths Lake Frog and Tadpole Workshop: 29-31st October 2010

Ray Williams

Ecotone Ecological Consultants

ECA Council Member

Workshop Leader

Arthur White



Arthur White (centre) instructing his students in the swamp. Photo Courtesy of Adam Greenhalgh

Following on from the highly successful fauna survey techniques workshop in October 2008 it was once again decided to use the facilities at the University of NSW Smiths Lake Field Station. In addition the workshop leader, Arthur White knows the area like the proverbial back of his hand and has recorded a large number of frog species in the area. Vicki Johnston again provided the excellent catering.

The workshop kicked off after lunch on the Friday with the 24 attendees setting up camp, etc, prior to afternoon tea and an introduction and presentation on frog hygiene protocols.

Arthur explained that the amphibian chytrid fungus is now widespread across eastern Australia and is known to affect most frog species, and can be found in tadpoles as well as adult frogs. In an attempt to restrict movement of the disease, a frog hygiene protocol has been established as part of the TSC Act and of particular interest to consultants, it is a criminal

offence not to implement the recommended hygiene practices, particularly where more than one site in different catchments are to be visited over a short period. Therefore consultants should make sure that they are fully aware of the hygiene protocol requirements. The most likely form of transmission of the disease is via footwear, and therefore Arthur made sure that we all disinfected our gumboots in a bucket of bleach (horrible smell but effective) before entering into the field. In some cases it may be necessary to disinfect the wheels and underside of vehicles.

After a lovely roast dinner, with full bellies, we staggered into a convoy of vehicles and headed to Arthur's favourite frogging spots in nearby Wallangat State Forest. However, the combination of a Friday night, a full stomach, new acquaintances and unfamiliar surroundings led to a rather humorous mix up.

The idea (apparently) was that Arthur would lead the convoy in the RTA's 'Prius' (driven by RTA attendees with Arthur navigating), and that I would bring up the rear. I observed the cars leaving and started to follow the last exiting car, but paused when I noticed a vehicle still manoeuvring near the bunk rooms: it was Arthur in the Prius. The other four vehicles had already gone, following a wild goose.

Unfortunately Vicki Johnston (the caterer) was on her way home at the same time and in a 4 wheel drive, so the other vehicles took off after her thinking it was Arthur. I can only wonder what she was thinking about these four cars following her home.

We headed up to the first frogging site hoping that the others would soon discover the error of their ways, but no one else was to be seen. Eventually one vehicle joined us after Arthur returned back to the Lakes Way intersection, but the other three vehicles ended up at Pacific Palms before realising that something was wrong. Ultimately we all arrived at the first frogging site: a disused quarry on the side of the road.

Despite its apparent disturbance level, there was plenty of frog activity and with Arthur's help all calling frogs were identified and then hunted down by torch light. Eight frog species were recorded at the quarry (see table), as well as a Golden Crowned Snake (*Cacophis squamulosus*) and Leaf-tailed Gecko *Saltuarius moritzii*, which Arthur charmed off a nearby quarry wall. Of most interest to me was being able to differentiate between *Limnodynastes peronii* and *Adelotus brevis* as both were calling from the same pond and the difference in egg-masses could be observed.

We then moved further into the forest to some man-made dams where *Litoria peronii*, *L. tyleri* and *L. fallax* were calling profusely. The characteristic *wauk wauk* call of *Mixophyes fasciolatus* was heard nearby, and after triangulation and much competitive searching (one may have thought Easter eggs were hidden) of the leaf litter by various ecologists, the offender was finally apprehended for closer inspection. On the way home, a Death Adder (*Acanthophis antarcticus*) was encountered crossing Horse Point Road.



Broad-palmed Frog *Litoria latopalmata*.
Photo courtesy of Simon Tweed.



Giant Barred Frog *Mixophyes fasciolatus*.
Photo courtesy of Aleksei Atkin



Dwarf Tree Frog *Litoria fallax*, illustrating the two colour forms. Photo courtesy of Michelle Toms.

Next morning, it was back to the lecture room for a discussion on the findings of the previous night, frog identification and frog habitats. Unfortunately our workshop coincided with a burn off of part of the National Park and the helicopter water bomber was based next to the lecture room which caused some short term halts to the proceedings. Following lunch, we ventured out into the adjoining swamp where a habitat assessment (particularly for *Crinia tinnula*) was carried out at various points along a transect (a well used pathway through the swamp). The habitat at each point was assessed for its suitability as breeding (water presence and depth), foraging (ability to move through more open areas in the vegetation) and shelter habitat (dense vegetation on higher ground). This impressed upon many seasoned ecologists an understanding of the complex use of various habitats by frogs depending on their life cycle stage and habitat conditions. The rest of the afternoon was spent discussing tadpole habitat requirements and key points for species identification, based on Marion Anstis' *Guide to Tadpoles of SE Australia*.

After dinner it was off to the forest once more (without the loss of vehicles) in search of frogs not dependant on large bodies of water, and it wasn't long before we found a patch of calling Red-backed Toadlets (*Pseudophryne coriacea*) and by triangulation, frogs with egg masses were soon



Red-backed Toadlets *Pseudophryne coriacea*. Photo courtesy of Michelle Toms.

uncovered. This was followed by a walk through Sugar Creek Reserve, however frog activity was low with only more Red-backed Toadlets calling from the ephemeral creek bed. On return to camp, a search along Horse Point Road adjacent to the swamp revealed several calling *Litoria freycineti*, with *Crinia tinnula* calling from deep within the swamp.

The final morning consisted of practical tadpole identification and a lecture on threatened frog species. Live tadpoles collected during the workshop and dead specimens supplied by Arthur were identified using dissecting microscopes (dead specimens only) and the tadpole identification key (from Anstis). The main features looked for were the shape and size of the tail, pigmentation, dental formula, and the position of the mouth parts and eyes on the head. Most of the live tadpoles were identified as *Litoria tyleri*, *L. latopalmata* and *L. revelata*.



David Paull using a microscope to identify tadpoles. Photo courtesy of Adam Greenhalgh.

The final lecture discussed threatened species. Twenty-eight frog species (eleven Hylidae and seventeen Myobatrachidae) are listed as threatened in NSW, three of these being listed as Critically Endangered. In addition, Arthur revealed that the Giant Burrowing Frog (*Heleioporus australiacus*) is likely to be split into two species.

Arthur also impressed upon attendees that in order to conserve threatened frog species, all of the required habitat features must be present, and dispersal corridors to similar areas of nearby habitat need to be retained. Arthur used the Green and Golden Bell Frog (*Litoria aurea*) as an example to illustrate, and showed images of artificial habitat and corridors created for this species in suburban Sydney.

By the end of the workshop, a very respectable total of fourteen frog species had been recorded, although there were some notable omissions from the list, particularly *Crinia signifera*, *Paracrinia haswelli*, *Litoria caerulea* and *Litoria dentata*, species that are often encountered at Smiths Lake.

On behalf of all the participants, I wish to convey many thanks to Arthur for a very informative and enjoyable workshop – one of the best so far as voiced by many attendees.

Also thanks to the caterer, Vicki Johnston, for providing a great menu and making sure that we were all well fed (and for unwittingly leading most the field party astray on the first night).



Above: Red-eyed Tree Frog *Litoria chloris*. Right: Tyler's Tree Frog *Litoria tyleri* Photos courtesy of Michelle Toms.

Frog Species Recorded During the Workshop

* = Quarry ponds

= Fire dams

FAMILY: MYOBATRACHIDAE

*#Tusked Frog	<i>Adelotus brevis</i>
Wallum Froglet	<i>Crinia tinnula</i>
*#Striped Marsh Frog	<i>Limnodynastes peronii</i>
#Barred Frog	<i>Mixophyes fasciolatus</i>
Red-backed Toadlet	<i>Pseudophryne coriacea</i>
*#Dusky Toadlet	<i>Uperoleia fusca</i>

FAMILY: HYLIDAE

*Red-eyed Tree Frog	<i>Litoria chloris</i>
#Dwarf Tree Frog	<i>Litoria fallax</i>
Freycinet's Tree Frog	<i>Litoria freycineti</i>
#Jervis Bay Tree Frog	<i>Litoria jervisiensis</i>
*Broad-palmed Frog	<i>Litoria latopalmata</i>
*#Peron's Tree Frog	<i>Litoria peronii</i>
*#Whirring Tree Frog	<i>Litoria revelata</i>
*#Tyler's Tree Frog	<i>Litoria tyleri</i>

Initial Thoughts on the Use of the Song Meter 2 and Associated Software

Paul Burcher
Aquila Ecological Surveys
ECA Council Member

Recently Alan Campbell of Bernview Consulting kindly loaned me an automated call recording device, the "Song Meter SM2" manufactured by Wildlife Acoustics in the USA. The standard unit consists of a programmable recorder enclosed in a weatherproof case with two external weatherproof microphones. Optional features are external power port and sensors for logging temperature or water levels. There are four SD card slots for the recording of sound files. The main power for the device is derived from 4 D-size batteries with the clock requiring two AA batteries. Cost from the manufacturer at the time of writing was \$US699.

Programming for call recording sessions is done by a LCD interface within the device or via software on your PC to one of the SD cards. The device's programming interface is quite straightforward though the buttons are small, a little clunky and appear fragile. There are also advanced controls to allow triggering of recording and recording levels. The latter allows you to target certain frequencies to screen out unwanted calls. For example if you were after a frog species that calls at a high pitch you can set the device so it does not record calls below a certain frequency. The microphones have a good distance range with sounds from distance away being recorded. Whilst this is good for getting some species not in the immediate vicinity of the device, it means you get a deal of extraneous noise, which in Sydney bushland areas means a lot of planes and cars. However, these do not interfere much with other sounds, are easily recognisable and thus ignorable when using sonogram software to view the sound files.

Calls are recorded as .WAV or .WAC files: the latter being Wildlife Acoustics' reversible compression of the .WAV file. They are therefore of high quality but large size. I left the Song Meter at one bushland site for ten nights recording calls for 1.5 hours each morning, 2.5 hours each evening and two one-hour sessions during the night. This use resulted in the production of 12GB of data. Alan had supplied me with four 8GM cards so that was about 40% of potential memory used. It would have used less memory had I used the .WAC option, but that would have used more power. There was also a problem with the initiation of recording times using the .WAC option, which the manufacturer attributed to power reduction. You can also use larger SD cards to increase recording capacity.

Analysing and listening to the sound files can be done using a number of sonogram software programmes, some of which can be downloaded for free (e.g. RavenLite and Cool Edit Pro), though these usually have session times limited and some functions disabled in order to motivate you to purchase the full version. Using the sonogram and listening to the calls familiarises you with

common species on your recording, so in time, you can start looking for the signature soundwaves of species so far not encountered.

Wildlife Acoustics also has a software programme for analysing calls called Song Scope, which is available as a 14-day free trial or \$495 for the licensed version. With this, one can “teach” the software a specific species’ call (either using calls from the recordings you have made or from standard survey CDs) as “recognisers” and then search the sound files you have generated for that species. The resulting file can then be observed and/or listened to, checking for accuracy. Wildlife Acoustics claims the system is “80% accurate for even complex and highly variable vocalizations in even somewhat noisy environments. However, results may vary depending on a number of factors.”

As a test, Jonathan Crowther (a software consultant) and I used this feature, and had the software search for Eastern Whipbird (*Psophodes olivaceus*) calls on our files. We used a number of calls from one of the files to generate the recogniser. The software, although not very intuitive, worked efficiently generating numerous instances of the species calling. However, when checked many of these were found to be Golden Whistler calls, as the Whipbird call frequency encompasses that of the Whistler. To overcome this, we narrowed down the Whipbird’s call to a far narrower range with some success.

Whilst this is bound to be a common problem with Passerines (songbirds), it may be possible to overcome it with better targeting of the diagnostic part of a species’ call. Furthermore, we didn’t contact Wildlife Acoustics to iron out these problems which may have helped. Someone with an in-depth knowledge of acoustics might get better results from the software, as this would help when adjusting some the parameters such as Fast Fourier Transform (FFT) settings.

I think the software would be very useful when searching files for those species with low frequency calls such as pigeons, owls, bitterns etc. Even if it did generate some false positives, it

would be quicker than scanning the sonograms yourself. We have not tested it on analysing frog calls which I think would also be more successful. Overall I think the SM2 is a very useful addition to the field survey repertoire. It can be deployed for long periods, records calls clearly, is easily programmable and is demonstrably weatherproof. Whilst the associated software has some glitches, it too has its uses and will probably be replaced with improved versions over time. Wildlife Acoustics also offers a version that can record bat calls, the SM2Bat for \$US999. The prospect of replacing the rain-sensitive Anabat with this far cheaper and more user -friendly device is very attractive, though I have not used the SM2 bat to date.



The Wildlife Acoustics SM2 with microphones attached (at sides) and cover removed showing internal features (photo courtesy of Paul Burcher).

Taxonomic changes and additions to the lizard fauna of New South Wales: A synthesis

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Introduction

Since the 'Complete Guide to the Reptiles of Australia' was first published in 2003, more than 80 reptile species have been added to the list of described reptile species in Australia bringing the total number to 923 in the third, and most recent addition (Wilson & Swan 2010). These additions being the result of newly discovered species, naming of previously undescribed species and taxonomic reviews of various species and genera. This has resulted in significant changes to the reptile fauna in NSW previously detailed within the most recent NSW field guide 'A field guide to reptiles of New South Wales' (Swan *et al.* 2004).

This short paper provides an outline of these changes with regard to lizards documented within Swan *et al.* (2004) and additions to the lizard fauna of NSW based on Wilson & Swan (2010), with the objective of ensuring both clarity and accuracy for future biodiversity surveys and assessments.

The Families

Geckkonidae

A total of four new species have been described within NSW and a number of others reassigned to another genus.

The Eastern Stone Gecko, known as *Diplodactylus vittatus* has been split into multiple species across Australia after a review of 'stone geckos' by Hutchison *et al.* (2009). In NSW, two species are now known. These being the Eastern Stone Gecko

(*Diplodactylus vittatus*) and a new species, the Ranges Stone Gecko (*Diplodactylus furcosus*).

A revision of the *Diplodactylus* genus by Oliver *et al.* (2007) resulted in four species of gecko being removed and reassigned to the *Lucasium* genus. These being the Gibber Gecko, (formerly *Diplodactylus byrnei*, now known as *Lucasium byrnei*), Beaded Gecko (formerly *Diplodactylus damaeus*, now known as *Lucasium damaeus*), Box-patterned Gecko (formerly *Diplodactylus steindachneri*, now known as *Lucasium steindachneri*) and Sand-plain Gecko (formerly *Diplodactylus stenodactylus*, now known as *Lucasium stenodactylum*). The latter species is listed as Vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act) and still remains on the DECCW threatened species website as *D. stenodactylus* at the time of writing.

An extensive revision of the *Gehrya variegata* complex resulted in a split of this 'single' species into two species for NSW; *G. variegata* and a new species, *G. lazelli* (Sistrom *et al.* 2009).

Couper *et al.* (2008) after a revision of the 'leaf-tailed' geckos, split *Saltuarius swaini* into three species: *S. swaini* and two new species for NSW: *Saltuarius kateae* and *S. moritzi*.

Pygopodidae

There have been no changes to Pygopods in NSW.

Agamidae

One additional species of Agamid is now expected to occur in NSW (Wilson & Swan 2010) that is not detailed within Swan *et al.* (2004). This being the Smooth-snouted Earless Dragon, *Tympanocryptis intima*.

Varanidae

There have been no changes to Varanids in NSW.

Scincidae

Many changes have occurred within Scincidae with the two most significant within the genera *Egernia* and *Cryptoblepharus*.

Two additional genera (*Bellatorias* and *Liopholis*) have resulted from taxonomic revision of the NSW members of the *Egernia* genus from various works including Donnellan *et al.* (2002), Chapple (2003), Chapple *et al.* (2004) and Chapple *et al.* (2006). Two species have been removed from the *Egernia* genus and have been reassigned to *Bellatorias*. These being the Land Mullet (formerly *Egernia major*, now known as *Bellatorias major*) and Major's Skink (formerly *Egernia frerei*, now known as *Bellatorias frerei*). Five species have been reassigned to *Liopholis*. These being the Desert Skink (formerly *Egernia inornata*, now known as *Liopholis inornata*), Tan-backed Rock Skink (formerly *Egernia montana*, now known as *Liopholis montana*), White's Skink (formerly *Egernia whitii*, now known as *Liopholis whitii*), Snowy Mountains Rock Skink (formerly *Egernia guthega*, now known as *Liopholis guthega*) and *Egernia modesta*, now known as *Liopholis modesta*.

Centralian Rock Skink (*Egernia margaretae*) was known from a single population in western NSW (Swan & Bonnett 2001), and is also now part of the *Liopholis* genus. However, *L. margaretae* is no longer considered to occur in NSW and individuals within this isolated population are now regarded as *L. whitii*.

The snake-eyed skinks (*Cryptoblepharus*) have also undergone significant changes largely based on the work of Horner (2007). Individuals previously assigned to *C. carnabyi* across inland NSW are now either *C. pannosus* or *C. australis*. *Cryptoblepharus virgatus* is no longer considered to occur within NSW, with those records now assigned to *C. pulcher*.

Hutchison (2008) revised the Three-toed Lerista (*Lerista muelleri*) to *L. timida* with the name *L. muelleri* no longer valid. In addition, *L. xanthura* is no longer considered to occur in NSW. These individuals are now assigned to *L. aericeps*. The

latter species is listed as Vulnerable under the TSC Act, and still remains on the DECCW threatened species website as *L. xanthura* at the time of writing.

Changes have also occurred within the *Carlia*, *Ctenotus* and *Nannoscincus* genera. The Litter Skink (*Carlia foliorum*) is now known as *Lygisaurus foliorum*. *Ctenotus brooksi* is no longer known to occur in NSW, and individuals are now assigned to *C. taeniatus*. This species is listed as Vulnerable under the TSC Act and remains on the DECCW threatened species website as *C. brooksi* at the time of writing. The Maccoy's Skink (*Nannoscincus maccoyi*) is now known as *Anepischetosia maccoyi*.

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Rainbow Lorikeets nesting at or below ground level

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It is not necessarily well-known that Rainbow Lorikeets (*Trichoglossus haematodus*) sometimes nest at or below ground level. In *The Field Guide to the Birds of Australia*, Pizzey and Knight (2006) tell us that Rainbow Lorikeets nest in tree-hollows, often high up. Most do; however, there are a few interesting records of this species nesting and/or roosting at or below ground level.

Over a period of a few days during late August and early September 2010, I personally observed two Rainbow Lorikeets spending time in a tunnel

beneath the stump of a dead tree in parkland near Dowse Lagoon, QLD (Figure 1). One of the birds at the entrance to the tunnel is shown in Figure 2. It seemed likely that the tunnel had formed after a tree root had decomposed. I could not readily establish why the Rainbow Lorikeets were using the tunnel.

Rainbow Lorikeets have been observed coming and going underground on at least two other occasions on mainland Australia. Taylor and Williams (2004) made a chance observation of Rainbow Lorikeets entering a gap between the ground and a concrete slab that supported a picnic table on the Gold Coast. Bright (2007) observed a pair of Rainbow Lorikeets nesting in an underground hollow beneath the stump of an old Red Bloodwood (*Corymbia gummifera*) in suburban Sydney. This pair nested there for three consecutive years between 2004 and 2006.

Overseas, there exists entire populations of Rainbow Lorikeets that nest and roost on the ground. Rainbow Lorikeets (*Trichoglossus haematodus flavicans*) nest and roost on the ground on at least three islets in the Admiralty Islands, Papua New Guinea (LeCroy *et al.*, 1992). These birds reportedly nest on bare areas at the base of trees, within rock crevices and in 'burrows' under rock overhangs. The trees on these islets are small and it is thought that the birds nest and roost on the ground because there is a scarcity of nesting opportunities in tree-hollows. It is interesting to note that no predators inhabit these islets. If they did, nesting on the ground may not be so prevalent.

Other out of the ordinary reports of parrots using tree-hollow substitutes have been compiled by LeCroy *et al.* (1992) and include Galahs (*Cacatua roseicapilla*) nesting in rabbit warrens and Sulphur-crested Cockatoos (*Cacatua galerita*) nesting in riverbanks.



Figure 1 I observed two Rainbow Lorikeets using a tunnel under this stump in parkland adjacent to Dowse Lagoon, QLD (Photo: D Gleeson, 2010).



Figure 2 A Rainbow Lorikeet appears at the entrance to a tunnel under the stump shown in Figure 1 (Photo: R Whitney, 2010).

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Is Life-History a Barrier to Dispersal? Contrasting Patterns of Genetic Differentiation along an Oceanographically Complex Coast

Alison Hunt

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Sherman C.D.H, Hunt, A., & Ayre, D.J, (2008). **Is Life-History a Barrier to Dispersal? Contrasting Patterns of Genetic Differentiation along an Oceanographically Complex Coast.** *Biological Journal of the Linnean Society* 95: 106–116.

Extreme variation in early life-history strategies is considered a moderately good predictor of genetic subdivision and hence dispersal for a range of marine species. At the extreme, poor dispersers such as the direct developing starfish, *Parvulastra exigua*, which is thought to only disperse through opportunistic rafting events, should have highly subdivided populations that are often individually lacking in genetic variation as a result of founder events and subsequent genetic drift. In contrast, good dispersers, such as the starfish *Meridastra calcar*, which is a broadcast spawner, should maintain large and relatively homogeneous populations with little or no genetic subdivision. The sea anemone, *Actinia tenebrosa* on the other hand reproduces clonally but has the capacity to produce larvae on occasion, suggesting that the genetic structure of populations may be midway between those of the contrasting starfish. However, this relationship is clearly complex, especially for marine organisms where the scale and pattern of larval dispersal is likely to be strongly influenced by the magnitude and direction of prevailing currents and fine-scale topographical variation.

To test the relationship between life-history and abiotic factors we used allozyme and microsatellite markers to investigate the large-scale genetic structure of the three intertidal marine species *Parvulastra exigua*, *Meridastra calcar* and *Actinia tenebrosa*. Populations of the three species were sampled over 2580 km, along the east coast of Australia. Over this length of coastline, there are remarkable levels of latitudinal and seasonal variation of the East Australian

Current (EAC) as it moves southward along the coast. The effect of the EAC, along with geographic barriers such as the 145 km extent of Ninety Mile Beach along the Victorian coastline, may combine to reduce the chance of gene flow even if a species' life-history suggests that widespread dispersal should occur.

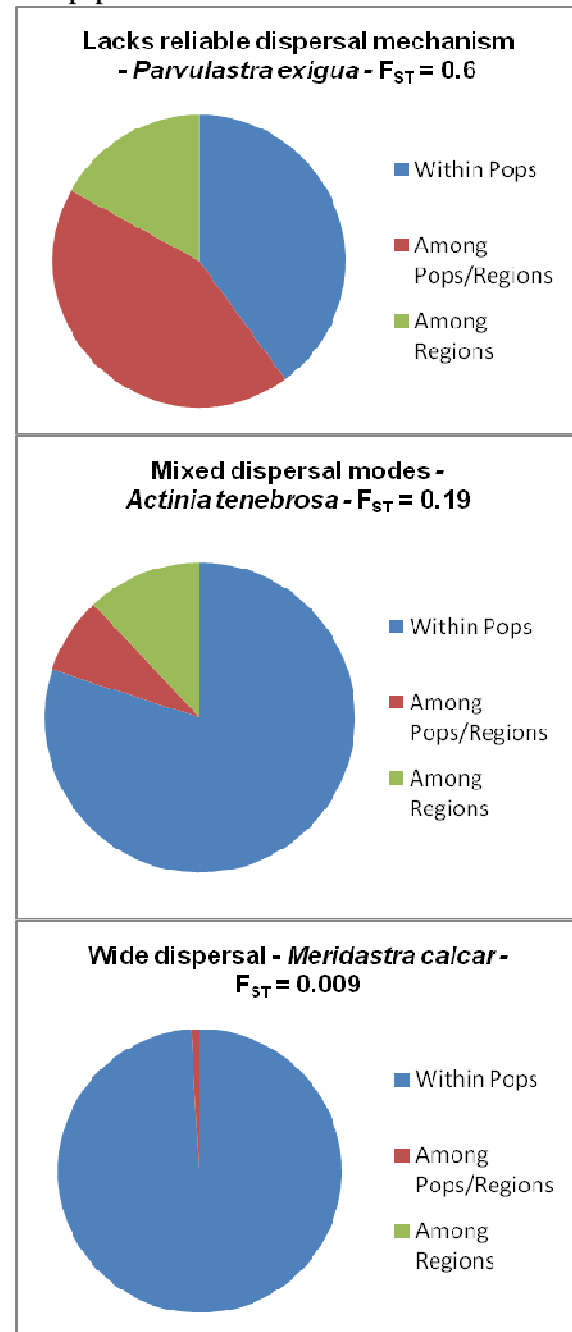
For the direct developer, *Parvulastra exigua*, we detected a large and significant degree of genetic structuring within and between populations and regions (mean $F_{ST} = 0.60$, $P < 0.01$; Figure 1). Up to 43% of the genetic variation could be attributed to differences among populations within each region, while 17% of the variation could be attributed to among region differences. The remaining variation (40%) was attributed to variation among individuals within each population. The level of genetic differentiation among populations within each of the two regions sampled for *P. exigua* was similar ($F_{ST} = 0.475$ for the central region cf $F_{ST} = 0.529$ for the southern region respectively).

For the broadcast spawning/asexually viviparous sea anemone, *Actinia tenebrosa*, we detected a high degree of genetic differentiation among populations (mean $F_{ST} = 0.193$, $P = 0.01$; Figure 1). However, in comparison to *P. exigua*, populations of *A. tenebrosa* within each region showed much lower levels of subdivision with only 8% of the total variation being attributed to differences among populations within each region. Up to 12% of the variation could be attributed to among regions while the majority of variation (80%) was attributed to variation among individuals within each population. However, we found that genotypic diversity (the most obvious indicator of clonality) did not vary significantly among regions when measured either as Ng/N or Go/Ge (ANOVA, $F_{2, 16} = 0.17$, $P > 0.85$ and $F_{2, 16} = 1.33$, $P > 0.29$ respectively).

In contrast to *P. exigua* and *A. tenebrosa*, the broadcast spawner *Meridastra calcar* showed much lower (though still significant) levels of genetic structuring (overall $F_{ST} = 0.009$, $P < 0.01$; Figure 1). We detected no differentiation among regions (0% of the variation) and only 1% of the total variation

could be attributed to differences among populations within each region. Nearly all (99%) of the variation was attributed to variation among individuals within each population indicating a high degree of connectivity between even widely separated populations. This structure is consistent with high levels of dispersal both within and among regions.

Figure 1: Analysis of molecular variance for three marine species with contrasting life histories showing the partitioning of genetic variation among regions, among populations within regions, and among individuals within each population.



Our data supports the widely held view that marine species with widely dispersed larvae show little genetic structuring over large distances, while those with limited dispersal show genetic structuring over much finer spatial scales. Our data suggests that life-history is the major determinant of genetic structure of populations and that the complexity of oceanographic current and potential biogeographical barriers along the east coast of Australia do not appear to cause any obvious disruption of genetic connectivity.

The Noxious Weeds Act and Community Land: not an optional extra for public land managers

Judith Rawling

UBM Ecological Consultants

Community Representative Noxious Weeds Advisory Committee to the Minister DII

As most of you know, as an environmental consultant and ecological restoration specialist, I deal with local councils and large corporations with land management responsibilities on a day-to-day, week-to-week basis. Almost without exception, when the requirements of the *Noxious Weeds Act 1993* are brought to their attention, their representatives will refute any suggestion that their organisation is responsible for implementing the Act on their own properties. The worst offenders are in fact the large quasi-government corporations, although many local governments are equally reluctant to take action on noxious weeds issues, especially as it applies to public or community land.

Just to be clear, noxious weeds are those which have been gazetted under the *Noxious Weeds Act 1993* (as amended 2005) and nominated for each local government area in the State. Many introduced species are unwanted in bushland or farmland, but this doesn't mean that they are 'noxious weeds' (more like obnoxious weeds if they are seen to be a nuisance but are not declared).

Every landowner has a legal obligation to control noxious weeds gazetted for their local government area and to prevent them from spreading to other land. Local councils, corporations and other land management authorities also have a legal obligation to control noxious weeds: although unfortunately under the current legislation this means that they simply have to prevent them from spreading. Of course, this is almost impossible to implement without a regular control program, but it has been used as an 'excuse' for non-action for years. Hopefully this anomaly will be removed in the current revision of the Act (currently out for comment).

Why is the Act not being implemented on public land and how do some land managers get away with it?

Some public land managers may say that they employ bush regenerators to work in a number of sites. While this is commendable, there must be a distinction made between 'bush regeneration', which is not only expensive but a long-term option aimed at the restoration native bushland; and 'noxious weed control', which can be undertaken in a 'targeted manner' without damaging the vegetation in which it occurs. This point seems to be lost on the major land management authorities and on many council bodies as well.

Other frequent responses are 'we don't have the resources'; 'we don't have to do it unless we get a grant'; or 'the community will do it'. This last excuse is a cop-out as in the main, Bushcare and Landcare groups are too small in number; work only intermittently; and most groups are not trained to use the tools required to treat severe weed infestations (e.g. selective herbicides, power equipment), relying instead on low impact hand removal methods. Land management authorities should not rely on the good will of the community to do the job they are paid to do, and which is inherent in their corporate management plans.

Then there is the issue of the *Threatened Species Conservation Act 1995*. Worthy of note is that a corporation such as Sydney Water (for example)

'manages' vast areas of land along the larger creeks and drainage lines in the urban and peri-urban environment, especially in the new growth centres in north-west and south-western Sydney. Such land is zoned as 'trunk drainage'; and these watercourses extend into, and through, a number of endangered ecological communities, including the critically endangered Cumberland Plain Woodland. Many ecological communities and species now listed as 'threatened' under the legislation are directly impacted by the failure of land managers to control noxious weeds. It is not a major exercise to control these weeds if the right techniques are employed and the operator has been properly trained.

This approach (i.e. bush regeneration or nothing) means that few sites supporting noxious weeds ever get addressed. The presence of aggressive woody weeds such *Lantana camara* (Lantana), *Ligustrum* spp (Privets), *Cestrum parqui* (Green Cestrum), and increasingly *Cinnamomum camphora*, (Camphor laurel) and *Ludwigia peruviana* (among others); and major infestations of exotic vines¹ such as *Cardiospermum grandiflorum* (Balloon Vine) and *Anredera cordifolia* (Madeira Vine) on drainage lines is of serious concern as weed invasion does more to displace and destroy native vegetation and habitat than most other urban impacts.

Having said this, it is recognised that uncontrolled stormwater runoff and other pollutants encourage the weed growth, so arresting the source of the problem is the obvious answer to future management in new release areas, but it does not alter the fact that the noxious weeds that are already well established have to be controlled, and that this is unlikely to be a one-off exercise.

It also has to be stressed that noxious weed control is not dependent on receiving a financial grant from the government. Although *Industry and Investment NSW* does assist local government with matching grants to implement their noxious

weed control programs, the failure to obtain a grant, or where existing funding is reduced, does not remove their responsibilities under the Act. Noxious weed control is not an 'optional extra'. It is a legal requirement for both private and public land owners and land managers.

It is therefore imperative that ECA members working in the field of ecological survey and management reinforce the requirements of the *Noxious Weeds Act* in their various reports, and I would ask them to stress to their clients the importance of regular noxious weed control in biodiversity management and threatened species conservation.

For further information:

<http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed>



Woody weeds replacing the native understorey on trunk drainage land at Kellyville.
Photo courtesy of Judith Rawling.



Remnant trees: all that remains of the EEC Cumberland River-flat Forest, Warwick Farm. Photo courtesy of Judith Rawling



Noxious woody weeds and vines in the EEC Cumberland River Flat Forest on the Georges River. Photo courtesy of Judith Rawling.

¹ Note that exotic vines are listed as a 'key threatening process' under the **TSC Act**.

Macleean Flying-fox Management Strategy – GeoLINK’s Experience

Veronica Silver
GeoLINK

In April 2010, GeoLINK was engaged to work with the Maclean Flying-fox Working Group (WG) to prepare a Flying-fox Management Plan to manage conflict between humans and flying-foxes in the Maclean area.

In an attempt to engage all stakeholders, a working group (WG) was formed which included representatives from the Department of Environment, Climate Change and Water (DECCW), The Department of Education and Training (DET), Maclean High School (MHS), Department of Sustainability, Environment, Water, Population and Communities (DSEWPAC formerly DEWHA), Clarence Valley Council (CVC), Land and Property Management Authority (LPMA), Country Energy, NSW Health, residents and representatives from not-for-profit environmental groups such as Wildlife SOS and Valley Watch. Consultation beyond the WG also included several stakeholder meetings and workshops, a public information session and exhibition of the draft management strategy where public comment was sought.

One of the initial steps in preparing the strategy was to understand the detailed history of flying-foxes in the Maclean area which dates back to c1885 when flying-foxes were mentioned in a newspaper article. The following is a very simplified history of flying-foxes at Maclean:

- 1890: Flying-foxes were reported as a pest in the Reserve and 200 flying-foxes were killed and others wounded with government granted ammunition.
- 1941: Maclean Rainforest Reserve (MRR) was 7 ha.
- 1950-59: MRR reduced to 1 ha.

- 1960: MHS was built. The original school buildings were positioned approximately 80m from MRR.
- 1970s and 80s: MHS expanded further toward MRR, classrooms were still >50m from MRR.
- 1980: Floyd reported that MRR was in a healthy state.
- 1986: Influx of large number of Little Red Flying-foxes caused canopy damage to MRR and weed control required.
- 1992: MRR has good canopy.
- 1988-2000: Annual weeding undertaken within MRR.
- 1996: MHS expanded to 10m from MRR.
- 1999-2008: Dispersal attempts of varying scales and frequency were undertaken; mostly resulting in relocation to the western car park, CE substation area, and ‘gully’ area.
- 2008: DECC issued a s.95 certificate (with conditions) for another 12 month period allowing the disturbance of the first flying-fox arrivals only (<50 individuals).
- 28 October 2010: DET obtained approval from DSEWPAC to disperse Grey-headed Flying-fox from the spill over habitat area (western car park) of MHS. If required, dispersal can be undertaken between 1 August and 31 October for a period of five years in accordance with the approval conditions. DET will also require an approval from DECCW for any dispersal activities. The dispersal action by DET is separate from the Maclean Flying-fox Management Strategy.
- 2010: LPMA in partnership with EnviTE and CVC commenced vegetation monitoring program within MRR in preparation for rainforest restoration activities. Commenced preliminary rainforest restoration activities, consisting of manual and chemical weed control of exotic vines within MRR in line with an adopted Review of Environmental Factors.

The strategy analysed scientific literature relating to flying-fox biology, ecology and previous management experience and then identified issues that were of most concern to stakeholders. These were:

- noise
- odour
- faecal drop
- well-being
- perceived health risks
- reduced amenity; and
- vegetation damage.

A detailed assessment of all available options was undertaken including consideration of:

- do nothing
- cull the flying-foxes
- bulldoze MRR
- relocate MHS
- disperse flying-foxes
- modifications to MHS buildings and grounds
- manage special events
- trim vegetation within existing conflict areas
- modifications to residential buildings and community areas
- bush regeneration
- revegetation
- provision of alternative habitat
- health monitoring
- education
- ecotourism
- relocate powerlines
- modify Yaegl NR
- buffer areas for future development
- planning instruments
- re-evaluation of rates

From this assessment, a suite of preferred management actions was identified, including timeframes, performance indicators and priority rating. In summary, the preferred actions that when combined, constitute the management strategy include:

- revegetation and regeneration of identified areas;
- vegetation removal and modification in identified areas;

- identification and rehabilitation of alternative habitat areas;
- modifications to existing infrastructure;
- planning instruments and land use feasibility assessments;
- health monitoring; and
- education and ecotourism.

While some actions are more easily implemented than others, it is acknowledged that no one option provides a total solution. The final strategy will only be effective if a combination of the preferred management actions is implemented over the short, medium and long term.

Some of the challenges that were personally encountered during preparation of the strategy included:

- reviewing background information without bias;
- accommodating all stakeholders;
- interacting with community/ school members that have not yet embraced flying-foxes;
- identifying the community's real issues; and
- dispersal remains as an unresolved issue;
- understanding the misunderstandings that are held by many community members.

This strategy is regarded as an overarching document to guide further actions. It attempts to provide direction for the management of flying-foxes in Maclean which is intrinsically linked to flying-foxes in the broader region. Specific details for each of the preferred management actions are required to guide implementation. As an initial step in the implementation stage of the strategy, the WG has already identified specific areas for vegetation removal to alleviate conflict between the community and flying-foxes and identified potential alternative habitat sites.

The Maclean Flying-fox Management Strategy was completed in December 2010 and can be downloaded and viewed in full at <http://www.geolink.net.au> or by contacting DECCW Grafton.

Problems in the (Grassy) Woodlands?

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Introduction

One of the key tasks of consultant botanists and ecologists is the correct identification of occurrences of listed threatened plant communities. Incorrect classification of vegetation as a Threatened Ecological Community (TEC) can cause unnecessary angst and expense for the client, for example in the search for, and procurement of, scarce offsets; or other mitigation measures that may not be needed. The reverse error, misclassification of a TEC as non-TEC, may cause a similar waste of time and resources when challenged by regulatory authorities or conservation groups.

In volume 23 of *Consulting Ecology* (August 2008), the issue of TEC diagnosis was discussed in detail by Andrew Smith in relation to NSW Coastal Floodplain TECs listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act). The key conclusions I drew from Smith's analysis, which are consistent with feedback from the NSW Department of Environment, Climate Change and Water (DECCW), are that:

1. Vegetation does not belong to a TEC if it does not conform in all respects to the Final Determination of the NSW Scientific Committee for the TEC.
2. Not only must the floristics of the vegetation agree with that described in the Final Determination, but also its structural characteristics, and landscape, soil and geomorphological settings.

In the Commonwealth arena, the critical document under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the *Advice to the Minister for Sustainability,*

Environment, Water, Population and Communities (DSEWPC) from the *Threatened Species Scientific Committee on Amendments to the List of Ecological Communities under the Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), known as the Listing Advice. It needs to be said here that the Listing Advice is not often a concise community description that can be easily used for diagnostic purposes, in contrast to the Final Determinations of the NSW Scientific Committee. Consequently, practical interpretation of whether a particular patch of vegetation conforms to a Commonwealth TEC relies heavily on Policy Statements and other Information Sheets issued for the TEC by the Department.

In this article I will explore some of the reasons for difficulties surrounding the diagnosis of the Box-Gum Woodland TEC in NSW.

Box-Gum Woodlands

Box-Gum Woodland is the common name for woodland communities dominated by White Box (*Eucalyptus albens*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) that are distributed mainly on the tablelands and slopes of NSW. Box-Gum Woodlands occur on well-watered fertile soils and consequently have been extensively alienated for cropping and grazing throughout their range. After disturbance, the community is also prone to invasion by a large suite of introduced weeds that thrive on moist fertile soils. Examples of the community in close to pristine condition are rare.

The community is treated differently under NSW and Commonwealth legislation; being listed as Endangered in NSW and Critically Endangered nationally. This difference in listings is the reverse of what happens with many other species and communities that may be rare and threatened in one state or territory, but are more common in others and consequently are regarded as less threatened nationally. Prior to 2006, Box-Gum Woodlands were listed as Endangered in both jurisdictions. The upgrading of the Commonwealth listing to Critically Endangered in that year reflected a change in treatment of the

community, such that the Commonwealth sought to focus its protection efforts on those few remaining Box–Gum Woodland remnants that are in good condition, and which were thought at the time to amount to no more than a few hundred hectares in total (anon., pers. comm.).

The NSW Approach

In NSW, Box–Gum Woodland is listed under the TSC Act as the *White Box - Yellow Box - Blakely's Red Gum Woodland Endangered Ecological Community* (EEC). DECCW and its predecessors have produced three information documents on the Box-Gum Woodland EEC; a community profile (DEC 2005), identification guidelines (NPWS 2002a) and a fact sheet (NPWS 2002b). The most important of these for field ecologists is the identification guidelines, which interprets the Final Determination. The following summarises the key points from the identification guidelines with some comments.

There are five main features in the Final Determination that govern whether the EEC exists at a site (NPWS, 2002a):

1. *Whether the site is within the area defined in the Determination.*
2. *Whether the characteristic trees of the site are (or are likely to have been) White Box, Yellow Box or Blakely's Red Gum.*
3. *Whether the site is mainly grassy.*
4. *Whether any of the listed characteristic species occur (including as part of the seedbank in the soil).*
5. *If the site is degraded, whether there is potential for assisted natural regeneration of the overstorey or understorey.*

Specifically excluded from the EEC are shrubby White Box, Yellow Box or Blakely's Red Gum woodlands that generally occur on upper slopes with shallow soils. These woodlands have shrub-dominated understoreys and are particularly prevalent in the Nandewar and Brigalow Belt South Bioregions, but may also occur in other bioregions. The Final Determination indicates Box-Gum Woodland includes vegetation where

'grass and herbaceous species generally characterise the ground layer.... Shrubs are generally sparse or absent, though they may be locally common.'

The condition of Box–Gum Woodland remnants varies from highly degraded (most of the former area of the community) to relatively good (very scarce). The identification guidelines describe five condition classes for Box–Gum Woodland remnants. It is important to note that native grassland areas from which the original trees have been removed (derived grasslands) qualify as the EEC if the original understorey remains in reasonable condition.

It can be difficult for ecologists to determine whether degraded sites retain sufficient value to be part of the EEC. The identification guidelines state, *'Highly disturbed sites that have few if any native species in the understorey are specifically included in the community provided vegetation, either understorey or overstorey or both, would, under appropriate management, respond to assisted natural regeneration, such as where the natural soil and associated seed bank are still at least partially intact.'* The guidelines acknowledge the difficulty this poses for land managers and ecological practitioners: *'Determining whether the vegetation will respond to assisted natural regeneration will often be highly problematic.'* The guidelines then provide two examples of past disturbance sufficient to exclude remnants from the EEC:

1. trees under which intensive cropping of annual crop species has occurred and is ongoing and,
2. trees within urban backyards.

Oddly, the guidelines state that trees *'with exotic pastures underneath.....will generally be part of the community.'* Exotic pastures are usually established in the same way as annual crop species, although the frequency of cultivation is lower. Consequently, it can be expected, and is usually the case, that exotic pastures lack the seed bank of most of the original native flora. The exception may be volunteer exotic pastures and many roadsides, where uncultivated secondary native grasslands have been invaded by

introduced species, with much of the native flora and its seed bank still intact. However, such areas would normally be included in 'derived grasslands'. The identification guidelines conclude; *'Inevitably difficulties will arise when faced with decisions on whether particular sites are able to respond to assisted natural regeneration. Expert advice may need to be sought in these circumstances.'* The expert advice would come from ECA members and other ecologists.

The following key for identifying Box – Gum Woodland is given in the identification guidelines:

1 The site is in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands or NSW South Western Slopes Bioregions:

2

1* The site is outside the above bioregions:
the site is not Box-Gum Woodland

2 There are no native species in the understorey, and the site is unlikely to respond to assisted natural regeneration:
the site is not Box-Gum Woodland

2* The understorey is otherwise:

3

3 The site has trees:

4

3* The site is treeless, but is likely to have supported White Box, Yellow Box or Blakely's Red Gum prior to clearing:

5

4 White Box, Yellow Box or Blakely's Red Gum, or a combination of these species, are or were present:

5

4* White Box, Yellow Box or Blakely's Red Gum have never been present:
the site is not Box-Gum Woodland

5 The site is predominantly grassy:
the site is Box-Gum Woodland

5* The understorey of the site is dominated by shrubs (excluding pioneer species):
the site is not Box-Gum Woodland

This key greatly oversimplifies the Final Determination and the discussion in the identification guidelines summarised above. In particular, step two in the key essentially means that any degraded Box – Gum Woodland remnant is part of the EEC as long as there is at least one native species in the understorey. Since some native plants characteristic of this community are colonising species with weedy behaviour, sites that do not have at least one native species present are rare, except for cropping paddocks.

At step 5, the key should specify native grasses and native shrubs, rather than just grasses and shrubs, even though it might seem obvious that this is what is meant. These considerations mean that the use of this key alone could result in an incorrect classification of remnants. While most ecologists would be aware of these issues and would use the key in the context of the rest of the guidelines, there is potential for error.

Aside from the above, the main difficulty in applying the identification guidelines is their generality and lack of precision. Many vague terms are used that require interpretation by the ecological practitioner. For example:

1. *'Unlikely to respond to assisted natural regeneration'*. This terminology and the associated explanation raise a number of questions including;

- a. What is an acceptable level of potential regeneration? For example, is the reappearance of more than 20, 50 or 80 percent, say, of the original biodiversity required?
- b. If (as is often the case) the remnant supports only native species that are widespread, common colonising species,

or common species tolerant of livestock grazing: is it worthy of assisted natural regeneration?

2. '*Predominantly grassy*': While most ecologists, including myself, would interpret this as meaning that more than half of the ground cover comprises native grasses; should it be more? Or should it be interpreted as having a combined cover of native grasses and forbs exceeding that of native shrubs?
3. '*Whether any of the listed characteristic species occur*'. This statement and step 2 in the key imply that the presence of a single characteristic species is enough to regard a remnant as part of the CEEC. This is ecological nonsense, since one species does not make a community. The real question is: how many listed characteristic species should be present to regard the remnant as representative, or sufficiently representative, of the original community to merit protection?

In short, it is my view that these guidelines potentially allow far too many highly degraded and irrecoverable areas to be afforded protection under the TSC Act from a plant biodiversity viewpoint. However, it is recognised that the trees themselves may provide valuable habitat opportunities for fauna, even in highly degraded remnants. Nevertheless, the fauna value can be expected to increase dramatically the closer the remnant is to its original condition.

The Commonwealth Approach

Box-Gum Woodlands are listed under the Commonwealth EPBC Act as the *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands Critically Endangered Ecological Community* (CEEC) (DEH 2006a). The former Department of the Environment and Heritage (DEH, now DSEWPC) has avoided many of the problems outlined above by focusing protection under the EPBC Act on the rarer, better quality, more viable Box-Gum Woodland remnants that retain much of their original community diversity. DSEWPC has committed

considerable resources to the protection and enhancement of high quality remnants through funding of the Grassy Box Woodland Conservation Network.

Identification guidelines for the CEEC were published in 2006 (DEH 2006b). The guidelines adopt much the same approach to defining the broad ecological community as in NSW (NPWS 2002a), but differ in applying a more rigorous quantitative approach to identifying remnants that qualify as CEEC. The Commonwealth guidelines also exclude shrubby woodlands from the CEEC, and define them as having '*a continuous shrub layer of more than 30 percent cover*'.

DEH (2006b) includes a flow-chart to help in determining whether a remnant constitutes part of the CEEC. The flowchart includes a number of quantitative measures for identifying areas that meet CEEC requirements including:

1. Defining the patch to be examined: Patches must have at least 5 trees no more than 75m apart, or are areas with a predominantly native ground cover. Importantly, patches are to be assessed at a minimum of 0.1ha or 50 × 20m. This differs from standard practice in NSW where most floristic work is done at a 0.04ha scale (20 × 20m).
2. Whether the patch has a predominantly native understorey: This is defined as '*at least 50 percent of the perennial vegetation cover in the ground layer*'.
3. A minimum patch size of 0.1ha is specified.
4. Perhaps the most important criterion in the flowchart is the requirement for 12 or more non-grass native understorey species to be present, and at least one of which must be an important species. A list of native species found in Box-Gum Woodlands is available from the DSEWPC website with the 'important' species annotated. This requirement attempts to ensure that remnants admitted to the CEEC contain a significant

representation of the original community biodiversity.

5. Even if patches do not meet the preceding understorey requirement, they can be accepted as CEEC if the patch is more than 2 ha in size and either averages more than 20 trees per ha, or has natural regeneration of the overstorey eucalypts.

There are a number of issues with the Commonwealth identification flowchart:

1. Oddly, the flowchart contains no criterion for separating shrubby woodlands from grassy woodlands. So someone who uses the flowchart alone, without reference to the rest of the document, may not make this distinction.
2. The minimum patch size of 0.1ha seems hardly viable ecologically, but appears designed to protect some very small high quality remnants of this critically endangered community in such places as cemeteries.
3. Patches of more than 2ha in size with an average of more than 20 trees/ha are likely to be relatively common, and including them in the CEEC appears to defeat the purpose of the exercise from a plant biodiversity viewpoint. However, it is important for fauna, including a suite of endangered species that depend on Box – Gum Woodland trees as habitat.

Is it working?

My reason for writing this article is that despite the efforts of DECCW and DSEWPC in providing identification guidelines, the Box–Gum woodlands are sometimes misdiagnosed. Misdiagnosis of TECs is not good for the ecological consulting community as a whole; may not produce the outcomes desired by regulators; and may create unnecessary difficulties for the broad development community.

I will keep the following two examples general as they are not only from my own work, and I don't

wish to be critical of other studies or colleagues. In any event, I consider the causes of the problem relate to the guidelines and not the performance of individuals or organisations, who assumedly all strive to achieve the correct outcomes for their clients and the community as a whole.

Example 1 – Yellow Box in the Central Hunter Valley.

In 2002, I conducted a flora survey for a coal mine near Warkworth in the Hunter Valley shortly after Box–Gum Woodlands were listed as Endangered in NSW. At that time, only the Final Determination was available. Patches of Yellow Box on the upper levels of floodplains were identified as part of the EEC since they conformed with the community description in the Final Determination. A subsequent broad study of Central Hunter Valley vegetation (Peake 2006) involving hundreds of quadrat sites and cluster analyses determined that the Yellow Box was part of a distinct community dominated by River Red Gum and Forest Red Gum on alluvial soils called the Hunter Floodplain Red Gum Woodland Complex. This community is not regarded as part of the Box–Gum Woodland EEC by DECCW in the Biometric Vegetation Type Database (DECCW 2008). The main reason for this apparent misdiagnosis was the then absence of broad region-wide vegetation studies, so that it was impossible to place the study area in the broader regional context.

Alternatively, it may not have been a misdiagnosis, since the patches I examined in isolation met the criteria for the EEC. In this scenario, parts of the Hunter Floodplain Red Gum Woodland Complex may in fact belong to the Box–Gum Woodland EEC, in contradiction to the DECCW classification of the community in the Biometric Vegetation Type Database (DECCW 2008).

Example 2 – White Box in the Brigalow Belt South Bioregion

I am currently assessing vegetation for a development project in the Brigalow Belt South

Bioregion. The study area includes occurrences of White Box on undulating landscapes that are posing diagnostic challenges in relation to the Box–Gum Woodland EEC and CEEC. White Box in hilly forested areas of the site is co-dominant with White Cypress Pine over an understorey having large patches of shrubs alternating with open areas and a generally sparse cover of grasses and forbs. In this scenario, where quadrats are placed becomes critical in determining whether or not the community is classified as a shrubby woodland. Visual estimates of shrub cover on 20 × 20m quadrats averaged 25%: just below the Commonwealth 30% shrubby woodland threshold. Since the vegetation met all other criteria in the Commonwealth flow chart for the CEEC, my initial conclusion was that the patch was part of the CEEC.

However, some characteristics of the community did not ring true for a grassy box woodland from my experience in Central Western NSW. The ground cover vegetation was sparse; in contrast with the relatively high densities of grass and forb cover characteristic of grassy box woodlands in the south. Also, the community is on relatively poor gravelly soils in hilly terrain, rather than the higher fertility soils characteristic of Box–Gum Woodlands. In addition, the floristics of the community agree closely with the *White Box - White Cypress Pine shrubby open forest of the Nandewar and Brigalow Belt South Bioregions* vegetation community listed in the Biometric Vegetation Type Database (DECCW 2008). This community is not recorded in the database as part of the Box–Gum Woodland EEC (DECCW 2008) at the State level. This raises questions about whether it should qualify as CEEC at the Commonwealth level.

Given these uncertainties, it is not surprising that other consultants working in the same area have taken a different view of the same community, and indeed, the same patch that I was working in. They have argued quite reasonably that:

1. Since the average shrub cover is <30%, it is not a shrubby woodland.

2. The shrubs present are pioneering species that are expected to decline in numbers over time. Their current patchy abundance was probably induced by previous logging.
3. They concluded that since the shrub cover was well below the threshold; is discontinuous; and dominated by pioneer species: the community was more likely to have originally been a grassy rather than a shrubby woodland.

From the point of view of the EPBC Act guidelines, the 30% threshold is critical for determining whether a patch of vegetation is part of the EEC or not. It also provides an instant solution to the diagnostic problem. However, it is a somewhat simplistic and arbitrary approach that could result in some areas of effectively the same community being proclaimed part of the EEC, while others are not. The percentage of shrub cover on an area is likely to be strongly influenced by fire regimes, drought, grazing pressure, etc. Mass germinations of many shrub species may occur after fire, with shrub density then declining slowly over time. Conversely, drought and grazing may cause the decline of shrubs, possibly reducing their density below 30% in normally shrubby communities. Consequently, use of the threshold alone may lead to incorrect conclusions. A better approach may be to use the threshold in conjunction with the floristics and site characteristics of the community to arrive at a more broadly based determination.

It is therefore important to consider the community in the broader regional context i.e. where it fits into the vegetation spectrum across the landscape. Previous regional studies have identified White Box – White Cypress Pine associations in hilly areas of the Nandewar and Brigalow Belt South Bioregions as shrubby woodlands, and hence they have not been identified in the Biometric Vegetation Type Database as part of the Box–Gum Woodland EEC (DECCW 2008). By contrast, communities considered to be part of the EEC occur in lower lying areas along watercourses and on lower slopes (DECCW 2008). It is my view that the vegetation in the area being discussed here is

more shrubby woodland than grassy woodland, even though the shrub levels are below the Commonwealth threshold. It is likely that in other parts of the region occurrences of the community may well exceed the threshold regularly. In addition, not all the shrubs present are pioneering *Acacia* and *Cassinia* species: large patches of longer-lived *Dodonaea* and *Beyeria* species are also present.

What does it all mean?

Firstly, as we all know, *it sn't easy being an ecological consultant!* Our job is to take the unending and fascinating variation of nature and squeeze it into ill-fitting regulatory boxes. The regulators themselves obviously have difficulty in defining the boxes in the first place. In the Box-Gum Woodlands, the approaches of the DECCW and DSEWPC to defining the same vegetation communities could not be more different. DECCW has avoided specific numbers and thresholds, and the problems of artificial divisions associated with them, such as outlined above. This has resulted in a situation where almost every occurrence of a Yellow Box, White Box or Blakely's Red Gum, or any of their associated species, represents an example of the EEC, unless the site is not '*predominantly grassy*'. I do not consider this approach is sustainable as it includes far too many highly degraded areas in the EEC.

The Commonwealth approach is more selective, but prescriptive, with its focus on the higher quality remnants. However, the imposition of numbers and thresholds immediately creates artificial dichotomies on the often continuous variation that characterises nature.

In the case of the second example above, I consider that the imposition of the 30% shrub cover threshold resulted in hundreds of hectares of non-grassy White Box Woodland being shoe-horned into the CEEC. The consultants involved really had little option, since the guideline is so specific. They were aware that the vegetation was equivalent to the White Box – White Cypress Pine Shrubby Woodland defined in the Biometric Vegetation Types Database, and no doubt also

knew that it was not regarded as part of the NSW Box-Gum Woodland EEC. Nevertheless, they were constrained by the threshold to nominate the occurrence as part of both the Commonwealth CEEC and the NSW EEC, and even renamed it accordingly as a grassy woodland in some places in the documentation. As well as creating difficulties in interpretation for consultants, the outcomes of rigid thresholds may have huge repercussions for clients.

I believe we need a better approach. We need guidelines that are robust but flexible, and don't impose unrealistic strictures on the community identification process. I don't have all the answers, but I hope this article stimulates constructive discussion. I would be interested in the views of ECA members on this and any similar issues.

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Personal Locator Beacons

Stephen Ambrose
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ECA Council Member

While on a leisurely three-day bird-watching trip in December 2010, I lost my balance and fell about 1.5 m from a rock shelf and landed flat on my back. Fortunately, I avoided serious injury, sustaining just mild bruising and a few scratches. However, I considered myself lucky because I could have easily broken my back if I had landed slightly differently.

This incident was in a woodland reserve and although I was only about 300m in from a dirt track and about 10 km from the nearest town (Parkes), I was alone and out of view of anyone who would be travelling along the track or nearby roads.

Later that day, I sat down and thought more about what had happened. It wasn't a fall from a major height, but what would I have done if I had broken my back or was physically incapacitated in some other way? Yes, I was alone, which is a common situation when bird-watching. I did not have a satellite phone and the locality had patchy mobile phone coverage. In the case of a very serious injury, I would have had to wait until someone came by and discovered me. The likelihood of that happening soon after the accident would have been very slim.

Therefore, upon arriving back in Sydney, I decided to purchase a personal locator beacon (plb) in case of a future serious accident in the field. A plb is a radio beacon that sends out a distress signal when it is activated by a person in distress and in need of rescue by emergency services. As the name implies, a plb is for personal use, usually on land, whereas emergency position-indicating radio beacons (epirbs) signal maritime distress and emergency locator transmitters (elts) signal aircraft distress.

The activated distress signal from a plb is detected by the Cospas-Sarsat satellite system, the international satellite system for search and rescue. The digital signal has a frequency of 406 MHz and usually has a GPS position encoded into it, which provides instantaneous identification of the registered user and the location of the plb.

My desktop investigation revealed that there were several types of plbs. Those that:

1. emit a distress signal encoded with a GPS position only, when manually or automatically activated;
2. have the ability to send a limited number of text messages to a mobile phone and/or short email messages to an email box, in addition to emitting a distress signal; and/or
3. equipped with CB radio, so that one can communicate with rescuers as they are approaching the rescue scene.

There is also another plb system that routinely sends out a signal of its position at programmed time-intervals (e.g. once every 30 minutes), rather than sending out distress signals. The GPS data from these signals can be downloaded onto a subscriber's computer anywhere in the world to monitor the movements of a person carrying the plb. Therefore, these types of plb are similar to satellite radio-transmitters that you would attach to an animal to monitor global movements (long-distance migration, nomadism or dispersal).

What plb system you choose depends on your needs and budget. I chose the basic plb design: a McMurdo Fast Find 211 PLB (with GPS). This unit was the one that several of my bird-watching and bush-walking colleagues recommended to me, but there are also other brands available in the Australian market-place (eg Ebay). It is a compact device that is only slightly larger than most mobile phones: it weighs 150 g and its dimensions are 106 mm (length), 47 mm (width) and 34 mm (depth). The plb is waterproof and also comes with a tight-fitting rubber pouch that allows the plb to float on the surface of the water, if used in a marine or aquatic environment. If purchasing this brand of plb for use in Australia, it is essential that it is the Fast Find 211 because other models (Fast Find 200 & 210) are not registered for use in this country. I understand that this is because these other models don't meet the buoyancy requirements of the Australian Maritime Safety Authority (AMSA) Regulations AS/NZS4280.2. Each plb unit and user must be registered with the AMSA soon after purchase so that these details are available to search and rescue teams in the event of a rescue attempt.



The distress signal is activated by manually removing a plastic tab at one end of the plb and pressing a button. An antenna automatically uncoils and the distress signal transmits for at least 24 hours at a 5-watt output. This plb is also equipped with a flashing light which can be activated manually to aid in your detection by rescuers after dark. The battery life is 5 years, non-rechargeable, but the batteries are easily replaced. There is a battery strength meter on the plb and

the instructions recommend that this be checked monthly.

The average retail price of the McMurdo Fastfind 211 PLB is about \$640, but I managed to pick up a new unit on eBay for \$520, so they are relatively expensive devices. However, this unit is at the lower price range of all plbs that I investigated, and had the added advantage of being small and lightweight. I also reasoned that \$520 was a small price to pay if the plb could one day save my life.

I recommend that all ecological consultants consider purchasing a plb. You don't have to be in a remote location to need rescuing and a plb is particularly useful if you are injured, victim of a snake bite or just lost in a location that is generally out of sight of passers-by. Moreover, those plb units which are similar to animal satellite transmitters can bring some comfort of mind to those monitoring your field movements from a distant computer location.

By the way, the day of my fall was still a successful day of birding. I did find the pair of nesting Painted Honeyeaters that was the subject of my search I also recorded a total of 112 woodland bird species in woodland remnants around Parkes over the weekend, so it was well worth the visit!

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 as Orogen's senior botanist:

Notes on a cryptic Critically Endangered flora species on the NSW mid North Coast (part of a series of lesser known Threatened flora of the NSW North Coast)

Diuris flavescens (Orchidaceae)

Description: Leaves linear, 100-200mm long, 3-4mm wide. Flower stem terete, 100-250mm long, 1-6 flowers. Flowers 12-16mm across, pale yellow with dark brown or dark maroon markings on dorsal sepal and base of labellum including along the 2 callus ridges (see photo). Dorsal sepal points forwards (often slightly ascending), 5-9mm long, 3-5mm wide. Lateral sepals point forwards and downwards (deflexed), tend to be broader at the tips and are crossed (usually weakly, occasionally strongly crossed), 10-15mm long, 1-1.5mm wide. Petals flexed backwards, elliptic to almost circular, 6-10mm long, 4-5mm wide. Petiole generally brown, 4-6mm long. Labellum 6-8mm long, midlobe ovate 4-6 x 4-6mm, lateral lobes elliptic to round, 2-3mm x 1mm. Callus ridges 2, divergent, 4-5mm long.

Habitat: As with many species in the *Diuris* genera, *Diuris flavescens* is typically found in periodically slashed native pasture (derived grassland) near or on the edges of Dry Sclerophyll Forest (DSF dominated by *Corymbia maculata* - *Eucalyptus siderophloia* - *Eucalyptus acmenoides* - *Eucalyptus propinqua* - *Eucalyptus microcorys*) on siltstone-derived clay soils adjoining (upslope from) the Manning River floodplain. Also recorded within partially cleared (disturbed) Dry Sclerophyll Open Forest with a sparse upper (tree) stratum.



Associated species: *Diuris sulphurea*, *Themeda australis*, *Eragrostis brownii*, *Dianella caerulea* var *caerulea*, *Acacia ulicifolia*, *Daviesia ulicifolia*, *Goodenia bellidifolia* subsp *bellidifolia*, *Cheilanthes sieberi*, *Aristida vagans*, *Pratia purpurascens*, *Panicum simile*, *Hypericum gramineum*, *Pteridium esculentum*, *Glycine clandestina*, *Sporobolus indicus**, *Pennisetum clandestinum**, *Cynodon dactylon**, *Oxalis perennans*, *Imperata cylindrica* var *major*, *Microtis parviflora*, *Thelymitra pauciflora*, *Dichelachne micrantha*, *Leucopogon juniperinus*, *Ozothamnus diosmifolius*, *Echinopogon caespitosus*, *Andropogon virginicus**, *Dichondra repens*

Distribution: Appears to be restricted to the Tinonee – Bight – Wingham - Burrell Creek locality on the mid north coast of NSW with three confirmed populations, but could be more widespread south to Krambach, Kundibak and Dyers Crossing. Short flowering periods (2 weeks or so at beginning of October) and absence of surveys in suitable habitat on private lands may be responsible for lack of records in these areas.

Miscellaneous Notes: Ex situ population successfully cultivated from harvested seed and fungal isolates identified for encapsulation-dehydration (orchid seed and mycorrhizal fungal storage technology). Pollinators unknown (probably small native bees) and suspected to be achieved by floral mimicry. Suspected to mimic nectar-rich *Daviesia ulicifolia* and *Goodenia bellidifolia* subsp *bellidifolia* which co-flower with *Diuris flavescens* at two of the known populations. Successfully hand pollinated. Population sizes vary from the low hundreds to <50 plants. Suspected to be fire tolerant (underground

tuber) and likely to flower well following a summer burn as do many terrestrial orchids. Slashing during inappropriate times (eg. vegetative growth phase) or prolonged absence of slashing have been shown to impact upon flowering abundance. Generally absent from undisturbed Dry Sclerophyll Forest with which it adjoins. Can tolerate light grazing outside flowering and seeding periods.

Quite distinct from *Diuris sulphurea* with which it generally co-occurs (*D. sulphurea* is a larger orchid with a darker yellow colour and more pronounced maroon blotches).

Conservation Status: Critically Endangered (TSC Act).

Isaac Mamott

Notes on a cryptic Endangered flora on the NSW mid North Coast (first part of a series of lesser well known Threatened flora of the NSW North Coast)

Lindernia alsinoides (Scrophulariaceae)

Description: An erect, often multi-stemmed perennial forb to 30cm in height. Stems are often quadrilateral in cross section; light-green in colour, 1mm in diameter. Internodes up to 40mm long. Leaves are opposite, generally ovate, thin, 3 veined at base (venation is faint), light green; 7-8mm long, 3mm wide, leaf apex generally acute or acuminate; petiole 1 mm long (almost sessile). Single flower, light bluish violet, borne on the end of a single stalk (terminal raceme) emanating from the axil of a leaf pair. Five free sepals (attached at base), 2mm long. Corolla comprised of an upper and lower 'lip'. Upper lip is single and entire, 6-7mm long, 2-3mm wide, 2 indistinct lateral lobes and often slightly notched at the apex. Lower lip is 3 lobed, 8mm wide often with white markings on central lobe. Pedicels up to 35mm long, 0.5mm diameter, semi-erect. Four stamens of unequal length (didynamous). Filaments with conspicuous spurs, sometimes coloured. Capsule 2mm long, ovoid with numerous dust sized seed. Generally less than 10 flowers per plant. Tends to flower year round in most populations.

Habitat:- Thought to be a post-disturbance coloniser, this forb is typically found around the edges of dunal Swamp Sclerophyll Forest communities (*Eucalyptus robusta* – *Melaleuca quinquenervia*) that fringe freshwater wetlands and within regenerating Swamp Sclerophyll Forests that have been subject to disturbance events (eg. storms that have created canopy gaps or slashing/clearing). Also found in shallow dunal depressions (swales), generally waterlogged (or in moist soils) with surface water depths up to 50mm (occasionally completely inundated for short periods).

Associated species: Found in- a dense groundcover typically dominated by sedges and swamp grasses including *Baumea juncea*, *Baumea rubiginosa*, *Chorizandra cymbaria*, *Schoenus brevifolius*, *Tetraria capillaris*, *Gonocarpus micranthus*, *Goodenia paniculata*, *Selaginella uliginosa*, *Lobelia anceps*, *Isachne globosa* with sparse mid and overstorey strata including *Eucalyptus robusta*, *Melaleuca quinquenervia*, *Glochidion ferdinandi*, and *Callistemon salignus*.

Distribution:- Williamtown is its known southern extent with confirmed populations known from Pacific Palms, Forster and Coopernook in Port Stephens, Great Lakes and Greater Taree LGAs.



Unconfirmed records on far north coast which author has not yet had a chance to verify.

Miscellaneous Notes: Tends to gradually senesce once canopy re-establishes and is thought to remain dormant in soil seedbank until favourable germination conditions return. Successful ex situ cultivation and re-introduction into suitable habitat (successful salvage and re-introduction project to be subject of future article by author). Most populations appear to be hermaphroditic (androgynous).

Pollinator(s) unconfirmed but suspected to be small native bees. Localised distribution, stamen-stigma morphology and suspected low to moderate pollen/ovule ratios suggests a degree of self crossing pollination. Successfully hand pollinated. Suspected to be fire sensitive. Population sizes vary from low thousands to low hundreds to <10 plants at a Port Stephens site. Reliable indicator of sandplain (dunal) environment.

Conservation Status: Endangered (TSC Act).

Isaac Mamott

Next issue from The Botany Desk, Isaac Mamott will contribute a detailed discussion on minimum viable population (MVP) sizes for Threatened plants: How much is enough? A scientific approach using Population Viability Analysis (PVA).

Advertising Opportunities with the ECA

Website:

1. \$200 for a banner
2. \$300 for company name with some detail and a link
3. \$500 for company name within box, logo, details and web link

All website packages run for one financial year and include a small ad in any newsletter produced during the financial year.

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1. \$100 for a third of a page
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Advertising is available to service providers of the Ecological Consulting industry. The ECA will not advertise a consultant or their consulting business.

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

Contributions to the Newsletter, Volume 27

Contributions to the next newsletter should be forwarded to the administration assistant Amy Rowles admin@ecansw.org.au by the **1st of July 2011.**

- 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

"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)



Left: Peron's Tree Frog found living in an old paint can in a residential backyard in Merrylands, Western Sydney 2010 (photo courtesy of Laura Worthington).



Above and Below: Lace Monitor soaking up the sun, overlooking Wollondilly River, Bullio NSW, October 2010 (photos courtesy of Laura Worthington)



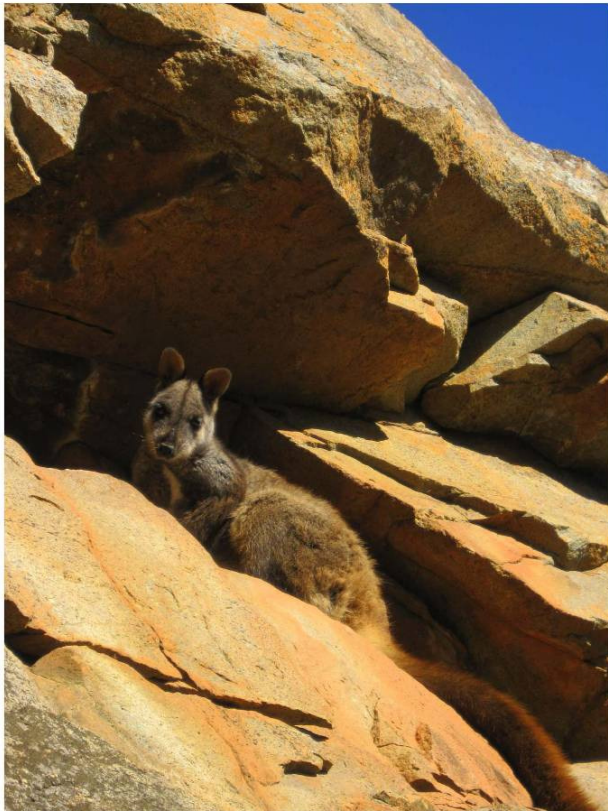
Above: Sharp-nosed Coral Snake, far north QLD (photo courtesy of David Paull).

Below: Golden-crowned Snake *Cacophis squamulosus* at Smiths Lake. **Below Left:** photo courtesy of Michelle Toms. **Below Right:** photo courtesy of Simon Tweed.



ECA Photo Gallery

(Photo Competition Entries)



Above (second place): Brush-tailed Rock Wallaby *Petrogale penicillata* inhabiting steep rocky slopes overlooking the Wollondilly River, Bullio, NSW, September 2010 (photo courtesy of Laura Worthington).

Below Left: *Calochilus robertsonii* (red-white form) from Wyong (photo courtesy of Martin Sullivan).

Below Centre: Yellow-spotted Monitor, far north QLD (photo courtesy of David Paull).



Below Right: Golden-crowned Snake *Cacophis squamulosus* at Smiths Lake (photo courtesy of Michelle Toms)



Above (third place): Black Noddy with chick, Heron Island, QLD. (photo courtesy of Deborah Gleeson). **Below:** Striped Burrowing Frog, far north QLD (photo courtesy of David Paull).

