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Newsletter of the Australasian Wildlife Management Society

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Inside this issue:

27th AWMS Conference 2014 ... *you need to be there*

Your AWMS Committee have gone all out this year to provide a great scientific Program of interest to all spectres of wildlife management.

The program theme of **Wildlife Management in Australasia** is scoped to ensure there is something of interest for everyone involved in wildlife management; a variety of stakeholders including all those in the resources sector and those servicing the industry, consultants, policy makers, academic institutes, natural resource management groups and local interest groups.

With four high profile keynote speakers and sixty presenters over the three days of sessions, (Tuesday 2 - Thursday 4 December), the program offers focused symposia - *Managing wildlife on inhabited Islands* and *Managing wildlife in the resource sector*, plus a number of Student sessions and Open sessions.

Download the Conference Program

You really should make an effort to attend this event being held at the Pullman King George Square, Cnr Ann & Roma Streets, Brisbane. The registration fees are affordable and the option of a one-day registration is available for those who are unable to commit to the full three-days. Email awms@onqconferences.com.au if you require more information.

If you are a student, check out the website to see the subsidised assistance offers for conference attendance. We'd love to see you in Brisbane!

Interested in a tour?

Organisers have arranged a number of short tours around the Conference. You need to be quick to book into these through the online conference registration process -

- Stradbroke Island (Monday 1 December
- Batty Boat Cruise (Thursday 4 December)
- Australia Zoo (Friday 5 December)

Read **more** .....

Register now .... **click here!!**

Meet our keynote speakers

Dr Geoff Lundie-Jenkins
Manager, Biodiversity Services, Queensland Dept of Environment & Heritage Protection

Dr Brad Keitt
Director of Conservation at Island Conservation, US

Prof Richard Engeman
Biologist, National Wildlife Research Center, Department of Agriculture, US

Dr Andrew Smith
Senior Ecologist, Chevron Australasian Business Unit (Barrow Island)

Read the keynote biographies

A very special deal....

Prof Richard Engeman will hold a half-day workshop (9am-12.30pm) on Friday, 5 December 2014 following the AWMS Conference (Cost $50.00).

The workshop is targeted towards students and practitioners and can be considered an introductory guide to sampling and design.

The workshop will cover off on the use of indices and concepts on how to sample at a population level including different survey designs and their limitations.

To attend you will need to register online through the conference registration pages. If you are having problems, email awms@onqconferences.com.au

From the President

Greg Baxter

Welcome to the final AWMS newsletter for 2014. If the end of the year is approaching it must mean the AWMS annual conference is also approaching. Preparations are well in hand and the preliminary program for 2014 is now available at the web site. Early bird registrations are now closed, but there is still time to register.

The 2013 accounts have now been finalised and I am very pleased to be able to report that the Society is in healthy financial position. Revenues were $12,294 in excess of expenditure during the 2013 financial year. AWMS now holds total assets of $102,065 and while we are ever mindful of the need to maintain a stable financial base, the committee is investigating more ways to spend that money to the benefit of members. Tangible examples include sponsorship of three books so that they are more affordable. The first is Predators in the Australian context (published), Proceedings of the camera trapping symposium (at the printer), and Latest advances in reintroduction science (final editing). We have also sponsored Bradd Keit and Rick Engeman to travel from the US to be keynote speakers at AWMS 2014. Rick will also conduct a statistical workshop while he is here.

October will be a significant month for the wildlife management community in Australasia. Late in that month Glen Saunders will retire from his position with NSW Department of Primary Industries. Glen has had a long and distinguished career in wildlife management and was instrumental in establishing AWMS, the Vertebrate Pest Unit in Orange, NSW, and served as a past President of AWMS. His retirement is an apt time to pause and reflect on his valuable contribution. AWMS will be well represented at a retirement function for Glen to be held in Orange late October. I am sure all members join with me wishing him a long and happy retirement.

Earlier this year I informed members that AWMS had been contacted to be party to consultations about the current revision of the Queensland Macropod Management Plan. That revision is now complete and a new plan is now being finalised. I was especially pleased that AWMS had a seat at the table to champion the value of science and empirical evidence since there were so many, disparate views also being expressed.

There was further recognition of the place of AWMS in the wildlife management community in mid-October when I was contacted, as AWMS President, by the Fran Malloy from the BBC, who wanted comment on 'humane options for pest control'.

At the end of the interview she explained that during the interview she had come to a completely different view of what on-the-ground wildlife managers did, and was much more convinced of the good motives of managers than before she began.

AWMS membership is slightly up on last year, and it seems we may have arrested the downward trend of previous years. However, the committee remains vigilant and has taken steps to expand membership by sponsoring a conference on transport ecology which allowed us to have advertising material on and in the conference satchel. It is hoped that measures such as this will expose AWMS to potential new members who may not otherwise have known about us.

Finally I want to note the retirement of Cheryl Krull who has done an excellent job editing our newsletter over the past few years. Cheryl has been an outstanding editor who heads off into a new career with our thanks. I also welcome our new editor Jessica Baumann to whom you can send newsletter contributions henceforth, jess_baumann@hotmail.com.

I look forward to catching up in Brisbane in December.

Australasian Wildlife Management Society Annual General Meeting - 2014

All AWMS members are advised that the AGM will be held at 16:45 (Brisbane, Queensland time) on Wednesday 3 December 2014 in the Hotel Pullman King George Square, Roma Street, Brisbane, Queensland, Australia. The AGM will be held in one of the meeting rooms used for the 27th AWMS Conference.

Agenda items to be covered:

1. Minutes of 2013 AGM held on 21 November 2013 in Palmerston North, NZ
2. President's report
3. Correspondence (Secretary)
4. Treasurer's Report
5. Membership Secretary's Report
6. Position Statement Co-ordinator's Report
7. General Business
   - student representatives' report/s
8. Other Business
9. Election of Committee position: Secretary

Nomination Form for AWMS Committee can be found at the rear of this Newsletter.

AWMS CONFERENCE DINNER

Wednesday 3 December 2014
Ballroom, Pullman King George Square

7pm-12pm

Themed:

SAFARI

Grab your pith helmet and let's go bush!
Do you have a safari suit lying around?
Maybe you own an animal onesie?
Maybe your outfit depicts something a little more stationary!

Prizes for best and worst dressed so get creating.

Dress up is optional.

Attendance at the dinner is inclusive in FULL registration categories but you MUST have indicated at registration that you wish to attend otherwise no ticket has been issued for you. Day delegates and guests must pay to attend.

If in doubt, please contact the conference organisers by email: awms@onqconferences.com.au

JOIN AWMS NOW AND SAVE $$$ ON YOUR CONFERENCE REGISTRATION!

WWW.AWMS.ORG.AU

What you might need to know ....

The venue for the 27th AWMS Conference is the Pullman King George Square, located at the Corner of Ann and Roma Streets, directly opposite Roma Street Train Station. Brisbane Airport is 20-30 minutes out of the CBD with both National and International Airports in close proximity. Domestic flights arrive from all Australian capitals and some regional centres.

Getting to the venue from the airport

Airtrain - Airtrain is the quickest, most economical way to travel. Only 20 minutes on the train and you'll arrive in the heart of Brisbane City. Roma Street station is the stop directly opposite the Pullman King George Square. Airtrain's Brisbane City transfer is a direct service. The Airtrain stations at the Domestic and International Airports are located directly outside the terminals, with trains departing every 15 minutes during peak periods. A return ticket City/Airport - $31.00 one adult - http://www.airtrain.com.au/index.php

Taxi - At the Domestic Terminal, the taxi rank is located centrally in front of the terminal. At the International Terminal, the taxi rank is located at the northern end of Arrivals on Level 2. A fare to the city can range from $35-$40. The two major taxi companies are Black & White (13 10 08) and Yellow Cab Co (13 19 24). All taxis are meter operated by time and distance, and operate twenty four hours a day. Taxis indicate they are vacant by illuminating their sign on the roof. At both airport terminals available taxis will wait at the taxi rank.

International travellers will require a current Passport to enter Australia. Other than New Zealand residents, persons entering Australia will also require a Visa to stay for the conference. If you have any queries regarding what is required, the Australian Immigration website is www.immi.gov.au/immigration/

Accommodation may be booked through the online registration process at the conference venue only. Brisbane offers a range of alternate accommodation options but these will need to be booked by you directly.

Thank you to our Gold and Silver Sponsors

Queensland Government

Invasive Animals Cooperative Research Centre

Still hanging on vertically: A study on a nocturnal gecko in response to a changing environment *(Gehyra variegata)*

Wei Cheng Tan, Australian National University, Email u5002326@anu.edu.au

Most ectothermic animals, including reptiles, have variable body temperatures. The body temperature (Tb) influences behaviour, physiology and ecological performance, as well as fitness in reptiles (Huey 1982). Because reptiles' physiological rates are temperature sensitive, it is difficult to keep their body temperature constant and they often rely on external sources of heat. Therefore many species, despite considerable heterogeneity in their thermal environments, use a suite of physiological and behavioural mechanisms (e.g., varying activity time, moving between sun and shade, and adjusting posture) in order to maintain their body temperature near an ideal temperature.

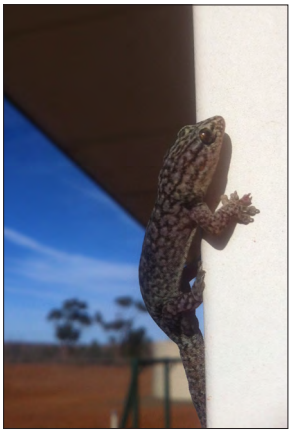
Barking gecko (Underwoodisaurus milii)

However, since the 19th century, human beings have been altering the natural environment in numerous ways that impact on ectotherms. Intensive agriculture, for instance, is an example of anthropogenic land use change that negatively affects many aspects of the natural environment. As the world population rises and human territories expand, humans continue to modify the natural habitat of flora and fauna, introducing man-made structures and altering vegetation communities. This new habitat will likely alter the thermal opportunities for reptiles that behaviourally thermoregulate as 1) man-made structures are built of materials that absorb and reflect heat differently and may provide greater or fewer sheltering sites compared to bushes or trees; and 2) introduced vegetation may replace preferred native vegetation for thermoregulation.

Climate change, one of the most significant anthropogenic disturbances, will likely have a considerable impact on reptile populations. For the past decade, Earth's surface temperature has increased by approximately 0.8°C due to increasing greenhouse gases. Projections for Australia relative to 1990 temperatures include temperature increases of between 0.6°C and 1.5°C by 2030 and between 1.0°C and 5.0°C by 2070.

To date global warming has already caused extinction in many terrestrial ectotherms. Ectotherms are vulnerable to climate warming because their physiological functions are strongly influenced by environmental temperature. Although increasing environmental temperature can increase performance level based on the thermal performance curve of ectotherms, when it rises over the optimum temperature, T_{opt}, the performance level drops significantly. If a large proportion of the active period of an animal is too hot to allow activity, lizards will not be able to forage enough food to survive and reproduce. According to Sinervo et al. 2010, Australia may be one of the sites in the world that will most likely experience local lizard extinction risk by 2080 due to climate warming.

Temperature determines the quality of thermal environments which differ markedly between diurnal and nocturnal reptiles. Diurnal reptiles use behavioural adjustments with respect to solar radiation to maintain high and relatively constant body temperatures (Tb), often taking advantage of considerable heterogeneity in their thermal environments. However, for nocturnal lizards, such as geckos, the absence of the sun, lower air temperatures, and reduced thermal variation among microhabitats may limit opportunities to effectively thermoregulate. Night-time air temperatures may influence thermoregulatory strategies if, for example, warm temperatures provide many microhabitats near the preferred temperature (thus reducing the benefits of thermoregulation), or if cool temperatures restrict the availability of microhabitats near the preferred temperature (increasing the costs).



Tree Dtella (Gehyra variegata)

Similar to common house geckos in appearance, the Tree Dtella, *Gehyra variegata* (Geckonidae), is a small, arboreal nocturnal gecko that can be found almost everywhere inland Australia. Active throughout the year, these insectivorous geckos are ambush foragers and have been found foraging at air temperatures as low as 18°C (Bustard 1967). Accompanied by my supervisor Dr. Lisa Schwanz, a senior research professor from University of New South Wales, this study was undertaken in Fowlers Gap Research station in western New South Wales, Australia. Fowlers Gap is situated 112 km North of Broken Hill. Widely spaced cottages and buildings (50 - 1000m apart) provide shelters and habitat for the geckos in addition to natural riparian *Eucalyptus* sp. trees.

Still hanging on vertically continued....

Over 19 nights between mid-November 2013 and mid-December 2013, 135 individuals were sampled in the field. Most geckos in this study (n=70) were marked with a nontoxic paint to reduce the likelihood of resampling. Our primary objectives were to:

1) Determine the preferred temperatures of the gecko *Gehyra variegata*
2) Examine whether geckos choose substrates randomly or non-randomly with respect to preferred substrate temperatures; and
3) Determine whether Tree Dtella is a thermoregulator, a thermoconformer or both

Preferred Substrate Temperature

Preferred substrate temperatures (T_p) were measured using a thermal gradient (Figure 1). Temperatures were monitored using iButtons distributed every 20cm along the length of both runways (model DS1921G iButtons, Maxim Integrated, San Jose, CA, USA).

Figure 1. *Thermal gradient (120 × 12 × 18 cm) with an opaque pexiglass divider in the middle operated in the field laboratory.*

Over 13 nights, each night two geckos ($N_{lizards}$ = 26) were placed into a runway and allowed to acclimate for at least 30 minutes. Observations were made every 30 minutes for three hours during the night and once in the morning. At each observation period, we recorded the gecko positions and room temperature. We also measured the weight and SVL of the geckos after the last observation in the morning. By using simple interpolation of the iButton temperatures, I calculated the temperature at each observation from the gecko's location position. The preferred substrate temperature, T_p, of *G. variegata* at Fowlers Gap was 34.44°C, which was quite high for a nocturnal gecko.

Substrate Selection

Upon sighting a gecko, we used an Infrared (IR) gun to measure the surface body temperature of the gecko. We did this to see if the IR gun could provide an accurate measure of gecko's body temperature. Geckos were subsequently caught by hand within 30 seconds of first sighting to record internal body temperature.

Geckos were grabbed at the front half of the body or head to prevent rapid warming of the lizards and tail autonomy. After each successful capture, cloacal body temperature was recorded within the first 15 seconds of capture by gently inserting the thermocouple into the gecko's cloaca. Captured geckos were marked with a unique number on their dorsal body surface using a nontoxic marker.

For all geckos, whether captured or not, selected substrate temperature (T_{sub}) was also recorded with a thermocouple wire secured with fabric tape onto the substrate. Environmental operative temperatures (T_e) of non-selected substrates were measured at the time of capture using the same method as measuring substrate temperature but at a random point 1m away from the selected substrate (2-pt design; N=56 geckos). For an additional 30 geckos, we expanded our measurement of the operative temperatures by recording substrate temperatures at 8 non-selected points arrayed around the gecko's position. For this, we established a 1m x 1m 9-pt grid, with substrate recorded at 0.5 m intervals in a 3x3 grid, with the gecko's position as the centre (selected) point. Geckos that were too high (>2m) on the buildings were excluded, as they were difficult to reach.

Our findings suggest that *G. variegata* are largely thermoconformers at night but can modestly alter nocturnal thermoregulatory behaviour. This study also shows warmer nights allow better thermal conditions for the geckos to operate. But then, what would the geckos do on nights where air temperatures (T_{air}) is above the preferred substrate temperature? Will they find cooler spots, or are they equally constrained in their thermoregulation and risk death by overheating? Many ectotherms have critical thermal maximum (CT_{max}), the highest temperature point they can tolerate. Activity in hot weather especially during summer may result in T_b exceeding CT_{max}, eventually leading to death (Hutchison & Maness, 1979; Li, Wang, Mei, & Ji, 2009). Thermoregulators are in danger of performance depression and extinction if extreme daytime or night-time temperatures occur under global warming (Huey et al., 2009; Sinervo et al., 2010). In fact, thermoconforming lizards with low body temperatures in thermally constrained habitats can be less tolerant of warm temperatures and more susceptible to extinction under climate change compared to thermoregulating animals (Huey et al., 2009). Fortunately, our paper indicates that the *G.variegata* may have high tolerance for warm temperatures, and be less vulnerable to climate change compared to mesophilic thermoconformers. It is likely that thermophillic lizards will benefit from global warming and mesophillic might not. We believe more study needs to be done on the thermoregulation strategies in ectotherms in thermally-constrained habitats in order to predict the response of species to climate change.

Still hanging on vertically continued....

A full report of our findings is currently in preparation and will be submitted to Journal of Zoology. This article will focus on the question of thermoregulation trade-off and strategies in the gecko.

Acknowledgements

This expedition was funded by the Australasian Wildlife Management Society. Huge thank you to Dr. Lisa Schwanz for her superb guidance and providing transport on land to site. Thanks also to Dr. Keith Leggett, the site manager of Fowler's Gap Research Station for his kind hospitality throughout the trip.

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V th International Wildlife Management Congress
July 26-30, 2015 in Sapporo, Japan
第５回国際野生動物管理学術会議

AWMS was recently contacted by The Wildlife Society (TWS) from the USA with a request for us to nominate a plenary speaker on 'Education for the Future' at the 5th International Wildlife Conference. The conference is being held in Sapporo, Japan 26-30th July 2015, hosted in partnership by TWS and the Mammal Society of Japan (MSJ). AWMS nominated Professor Stephen Sarre from the University of Canberra, and we were recently notified by TWS that Stephen's nomination has been accepted. Congratulations Stephen!

Stephen will provide a report for the newsletter on his return.

HAVE YOU ANY ITEMS OR STORIES FOR THE NEWSLETTER?

We'd love to hear from you. Please send items to the Newsletter editor, jess_baumann@hotmail.com

AWMS 2014

Australasian Wildlife Management Society Annual Conference

HAVE YOU REGISTERED YET?

Click here to do it now!

2-4 December 2014

Pullman King George Square, Brisbane, Queensland

Managing Wildlife in Australasia

Response of exotic and native bees to floral resources within urban green spaces

Jessica Baumann, University of Melbourne, Melbourne School of Land and Environment baumannj@student.unimelb.edu.au

Increasing habitat loss from urbanisation threatens bee populations in many regions of the world (Potts et al. 2010). In urban landscapes, however, it has been found that local-scale habitat characteristics drive pollinator visitation and may have the potential to mitigate the effects of larger landscape scale habitat loss (Williams and Winfree 2013). Local-scale habitat can be found within land uses such as residential gardens, recreational reserves, urban parks, golf courses and other green areas, collectively referred to as urban green space. Given medium body size bees forage up to 2km away from their nesting site (Greenleaf et al. 2007), green spaces present potentially large, inter-connected areas of habitat in cities which may have the capacity to support metapopulations of pollinators (Goddard et al. 2010). Quantifying variation in attractiveness of floral resources within these green spaces to bee pollinators may be helpful in encouraging diverse pollinator communities in urban areas via the identification of key floral traits that support the most diverse assemblage of bees.

To date few studies have been undertaken on urban bee populations in Australia and their response to urban landscape changes. Of the 20,000 bee species worldwide, Australia has approximately 1600 species of native bees (Batley and Hogendoorn 2009). Australia's bee fauna is highly endemic, with the short-tongued species of the Colletidae family comprising one of the most speciose bee groups in the continent. Bees from Halictidae family, which possess a short tongue on an extendable appendage which functions similarly to a long tongue ('functionally long-tongue'), are also abundant. Comparatively, the more advanced long-tongued bees from the Apidae and Megachilidae families are depauperate in species. Across all families, most species are solitary and nest in soil, hollow stems and woody debris. However, the ecology of Australian native bees is still poorly understood (Batley and Hogendoorn 2009). The social European Honeybee (*Apis mellifera* of the Apidae family) is an exotic species in Australia, introduced to provide honey and agricultural crop pollination. Managed hives and feral colonies are now widespread across the continent (Paton 1993).

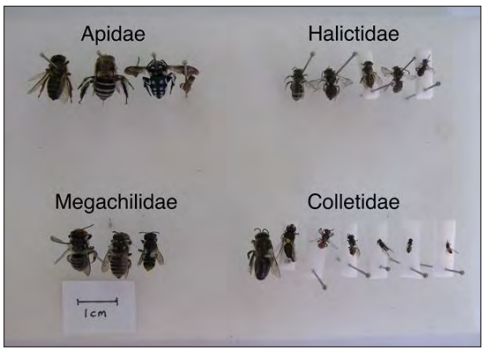
Jess Baumann surveying for bees (Photo-Jess Baumann)

For my Honours research project, I was part of a research team at the University of Melbourne lead by Dr Stephen Livesley, investigating the ecosystem services and biodiversity benefits provided by urban green spaces. We assessed bee abundance, diversity and community composition in urban green spaces in South-East Melbourne to determine if bee communities differ between green spaces, and if floral resources influence community composition.

The relationships between flower traits and traits of their bee visitors were also investigated.

To sample bees in the urban landscape, 32 one-hectare plots were established in dominant urban green spaces in South-East Melbourne: golf courses, residential gardens, botanic gardens and remnant heathlands, with eight plots in each green space type. Sampling was undertaken throughout February 2014 on warm sunny days where bees were collected via passive pan trapping and direct sweep netting during timed periods, and the plant species on which each individual bee was caught recorded. Floral species richness and abundance within sampling plots was also measured. Bee and floral specimens were later identified to species and categorized according to functional trait groups by taking measurements and with the aid of published literature and taxonomic experts. For instance, bees were grouped according to size and tongue length, and flowers were categorized based on size, colour, inflorescence type, native or exotic status and accessibility of nectar ('open' or 'closed' according to pollination syndromes as in Olesen et al., 2007).

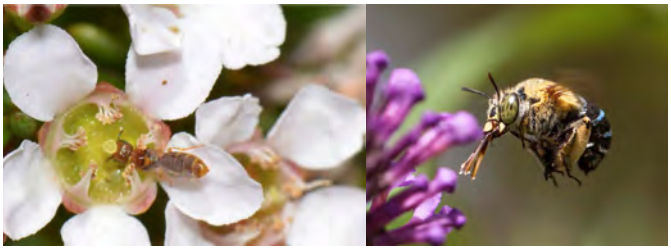
Overall a total of 710 bees from 34 species were collected in this study. The greatest abundance and diversity of bees were found in botanic gardens and golf courses, which both had distinct bee communities. Botanic gardens, characterised by a diverse mix of exotic and native flowers, were composed predominantly of medium-to-large bodied, functionally long-tongue generalist bees from the Apidae, Halictidae and Megachilidae family. Golf courses, characterised largely by native Myrtaceae trees, mostly consisted of a different subset of Halictidae species and small, short-tongued, specialist bees from the Colletidae family. Residential gardens and remnant heathlands had the lowest species abundance and diversity, dominated by *Apis mellifera*. However, at the time of sampling both of these areas had very low floral abundance following Melbourne's January heat wave. This highlights the importance of habitat connectivity within fragmented urban landscapes. Bees tend to return to where they hatched (Michener 1969), so smaller bees that have limited flight ranges will be more at risk to population decline when there are limited local floral resources available during drought years.



A sample of bee species caught in this study (Photo – Jess Baumann)

Response of exotic and native bees to floral resources within urban green spaces continued

To further explore how floral resources may drive bee communities, bee-flower trait relationships were then investigated irrespective of green space type. We found that bees with functionally long-tongues used both open and closed flower types equally. Conversely, bees with short tongues were more restricted in resource utility and were only ever found on open or bowl-shaped flowers with easily accessible nectar rewards. Both small and larger bees also showed a preference for small to medium flowers in clustered inflorescences that enabled more efficient foraging, and most were particularly attracted to flowers that were pink and purple in colour. While both native and exotic plants were used by native bees from the Apidae, Halictidae and Megachilidae families, bees from the Colletidae family were only ever found on native plant species, indicating that while a traits approach may be useful to determining factors driving bee visitation to different floral resources, consideration of the requirements of the species endemic to a region should not be overlooked.



A short-tongued native bee (Pachyprosopis kellyi) drinking nectar from an open bowl-shaped flower (Photo – Ken Walker) *versus a long-tongued bee (Amegilla sp.) drinking nectar from closed tubular flowers* (Photo – Erica Siegel)

The results obtained from this study indicate that specific floral composition of green spaces influence bee community composition in urban areas, and that there is potential for green spaces within urban areas to accommodate a wide range of native species by selectively planting floral resources. To encourage diverse bee pollinator assemblages into green spaces in an Australian urban context, planting of open flowers with nectar resources accessible to bees of all functional groups, particularly short-tonuged bees which dominate the Australian bee fauna, is recommended. The open, bowl-shaped flowers of *Corymbia ficifolia* trees (in particular those with pink flowers) were noted to be attractive to wide range of bee species with different functional traits, and may serve as a useful 'magnet' species to encourage bees into urban areas and increase bee visitation frequency to the benefit of less attractive plant species. These trees, which were prominent in golf courses and are commonly found in urban parks, lining streets and occasionally in residential gardens, might be particularly suited for increasing connectivity in the urban matrix. Each tree produces a large number of flowers in a single season that enable efficient foraging, and remained flowering throughout the hot summer providing important forage later into the bees' reproductive season.

The provision and appropriate management of suitable resources for native wild pollinators will be of particular importance if the destructive honeybee parasite *Varroa* mite enters Australia and causes the same dramatic reductions in pollination services that have occurred elsewhere (Le Conte, Ellis & Ritter 2010). The dominance of *A. mellifera* found in residential landscapes presents a risk to pollination services should this happen, and more consideration therefore needs to be given to enhancing native bee communities in urban areas as critical insurance pollinator populations. However, the utilisation of floral resources for nectar is only half the story, and to maximize utility of green spaces for native bee conservation purposes, knowledge of pollen preferences for egg provisioning and nesting requirements is needed for advancing native bee habitat and resource integration into urban landscape design for resilient cities.

Future Aspirations

I am working towards publishing the results of this study in a scientific journal before the end of the year. Currently I am employed as a Research Assistant at the University of Melbourne, where I'm working with Dr Nick Williams and Dr Caragh Threlfall to continue research in native bee ecology in Melbourne's urban parks. We are collaborating with Parks Victoria to survey insect pollinator communities in remnant and revegetation sites and determine if Parks Victoria revegetation programs are benefiting pollinators. We will also be testing the utility of artificial native bee nests in these areas for potential use in increasing native bee populations in urban landscapes, and quantifying pollination services provided by bees in these areas by measuring the pollination success of a locally native plant. I am quite interested in research which takes a social-ecological system perspective to benefiting biodiversity, and I am considering future PhD options!

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ANET 2014: Reducing the ecological impacts of our linear infrastructure

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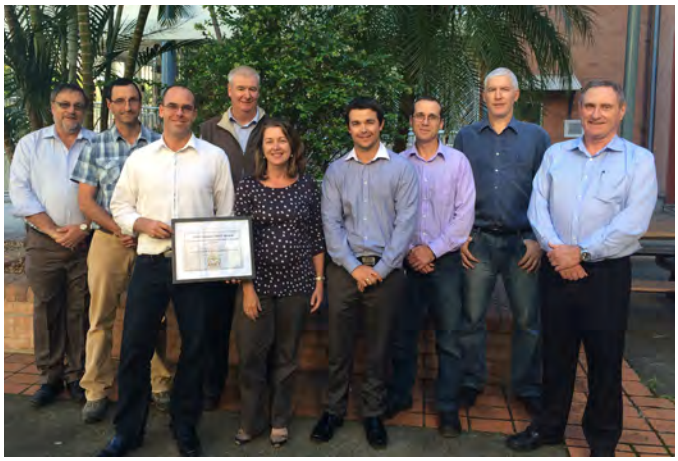
What do roads, railways, trails, pipelines, utility easements and seismic exploration lines have in common? The most obvious answer is that they are all examples of linear infrastructure that traverse most landscapes globally, and the networks they form are expanding rapidly. There are in excess of 64 million km of roads on earth – enough for 83 return trips to the moon – and 25 million extra lane-km are expected to be built by 2050, 90% of which will be in non-OECD countries. And another statistic for your next trivia night: the 870 million vehicles around the world in 2009 are expected to more than double to 1.7 to 2.8 billion by 2050. The less-obvious common feature of these linear infrastructures is that they all have numerous deleterious impacts on the environment, the most obvious being the direct loss of habitat due to clearing for construction and wildlife mortality due to collision with vehicles and trains. The indirect effects are also significant, and include habitat degradation due to weed invasion, changes to micro-climatic conditions, and other edge-effects; increased access by humans, resulting in unsustainable levels of hunting for bushmeat or poaching and further clearing and development; they form barriers or filters to the movement of wildlife; and for some species, the linear clearing provides a corridor for enhanced movement across the landscape, potentially exacerbating the spread of invasive species.

The other feature these linear landscape elements have in common is that they all fall under the remit of the Australasian Network for Ecology and Transportation, otherwise known as ANET. ANET is a professional network dedicated to the research, design and implementation of environmentally-sensitive linear infrastructure across Australasia. ANET acts as a hub, providing links between government, industry, scientists and community groups to ensure all have access to current evidence and best practice. ANET is focussed on the Australasian region (Australia, New Zealand and all of Asia), but is open to anyone from around the globe. Go to www.ecoltrans.net for more info and to join. Membership is free of charge. You can also find us on Facebook https://www.facebook.com/ecoltransANET or follow us on Twitter '@ecoltransnet'.

ANET was formed in 2013 and we held our inaugural conference in Coffs Harbour in July 2014. Coffs Harbour was chosen because it is centrally located to Australia's largest single linear infrastructure project – the upgrade of the Pacific Highway, which stretches over 700 km between Newcastle and the New South Wales/Queensland border. The Pacific Highway passes through endangered ecological communities and habitat that supports many rare and threatened species and populations of wildlife, including emus, spotted-tailed quolls, gliders, koalas and threatened fish.

The design of the Pacific Highway upgrade includes numerous measures to protect wildlife, conserve native vegetation and improve driver safety, including wildlife underpasses, rope-bridge crossings, glider poles, koala drop-down ramps and various designs of exclusion fencing. While not without its frustrations or challenges, the project has been largely responsible for innovation and setting best-practise standards in ecologically-friendly road planning, design and construction in Australia. In recognition of the efforts of the NSW Roads and Maritime Services (RMS), we awarded the project team with the 'ANET Best Practice Award in Ecology and Transportation". We congratulate RMS on this outstanding achievement and look forward to identifying other projects that are worthy of this award at future ANET conferences.



Proud recipients of the ANET Best Practise Award in Ecology and Transportation – The NSW RMS Pacific Highway Project Team.

The ANET conference was very well attended, with >140 delegates from Australia, New Zealand, Taiwan, China, Sweden, Singapore and the UK. There were about 50 spoken presentations, 20 posters and 10 trade displays and sponsor booths (conference handbook and many presentations available at http://ecoltrans.net/anet-conference-2014/proceedings/). Presentations were made by university students, researchers, ecological consultants, planners and managers covering a wide range of topics from the cost of caring for animals injured in wildlife vehicle collisions to offsets and bats and birds in bridges, with much more in between. There was a great atmosphere at the conference, with most people staying on-site, which provided multiple and diverse opportunities for networking. Indeed, most attendees remarked that the networking opportunities were particularly useful. I really appreciated this feedback "Normally, I have a small vomit at the thought of 'networking opportunities', but this was certainly different".

ANET 2014: Reducing the ecological impacts of our linear infrastructure continued

The third day of the conference was a field trip, where over 100 delegates boarded buses and visited sites along the Pacific Highway where crossing structures had been installed for wildlife, including the landbridge at Bonville – the first of its kind in Australia. Facilitated and led by staff from RMS, the field trip was an excellent opportunity to inspect many of the things we had heard about earlier in the conference and indeed for many delegates, the first up-close experience of road mitigation measures.

Wildlife underpass on the Glenugie Bypass being used by conference delegates

A busload of people prepare to trek across the Bonville Landbridge.

A highlight of the conference was the guest speaker during the conference dinner – Sean Willmore the founder and director of the Thin Green Line Foundation. Roads through all wilderness areas are a serious issue, and even more so in countries where poaching and bushmeat hunting occurs. The Thin Green Line Foundation is devoted to protecting park rangers across the globe and supporting the families of rangers who are killed in the line of duty. In the past 10 years alone it's estimated that over 1000 park rangers have been killed, 80% of them by commercial poachers and armed militia groups.

Thin Green Line provides park rangers with essential anti-poaching equipment and training to assist them in patrolling on the front-line of conservation as well as financial support to the widows and orphans of park rangers killed in the line of duty. Do check them out and support their work: http://www.thingreenline.org.au/.

The success of the ANET conference was due in large part to the support of many other professional organisations and networks, companies and government agencies. We are especially grateful to AWMS for sponsoring one of the conference sessions, and we look forward to working collaboratively with AWMS and our other sponsors into the future with our many shared aims and objectives. The full list of sponsors is available here http://ecoltrans.net/anet-conference-2014/sponsors/

In some respects, it would be fantastic if ANET became redundant and ceased to exist. However, the rate of expansion of transport infrastructure across Australasia and beyond shows no sign of slowing down, and indeed the opposite trend is more likely. Furthermore, research from around the globe continues to demonstrate that the impacts of linear infrastructure and vehicles are numerous, diverse, and mostly deleterious. For the time being at least, ANET will continue to provide access to information and networking opportunities to ensure roads, railways and utility easements avoid those sensitive areas and those we build are as green as possible. Our next major conference will probably be in 2016, with smaller workshops and meetings tentatively planned for New Zealand, India and China in 2015.

ANET

AUSTRALASIAN NETWORK FOR ECOLOGY & TRANSPORTATION

Call for nominations for AWMS Committee position: Secretary

All AWMS members are invited to nominate (or second) candidates for the position of Secretary. This position on the AWMS Committee will become vacant from cob of the AGM on 3 December 2014.

All seconded nominations, together with the written consent of the candidate, are to be received by AWMS Secretary, Lyn Nelson, at the following address by cob (5:15 pm Australian Eastern Summer Time) on **26 November 2014:**

AWMS Secretary
Dr Lyn Nelson
PO Box 187
VINCENTIA NSW 2540 or via e-mail: lyn.nelson12@gmail.com

Article 13. (1) (b) of the AWMS Constitution states that nominations "shall be made in writing, signed by 2 members of the association and accompanied by the written consent of the candidate (which may be endorsed on the nomination form).

The following is a guide for making a nomination

[NOTE 1: It is not necessary for all three signatures to be on the one document.

NOTE 2: Nominator, seconder and nominee must be AWMS members.]

I, ... nominate ..... for the position of AWMS Secretary for the election to be held at the AWMS AGM on Wednesday 3 December 2014.

Seconded by :.....

Signed: ..... (nominator) Signed: ..... (seconder)

I, ... agree to be nominated for the position of AWMS Secretary for election on 3 December 2014.

Signed: ..... (nominee)