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For consistency, the following guidelines should be followed:

- Emailed electronic copy of manuscripts or articles, sent as an attachment, is the preferred method of submission. Faxed and hard copy manuscripts will be accepted but reluctantly! Please send all submissions to the *Newsletter* Editor at the email or postal address below.
- Electronic copy should be in 11 point Arial font, left and right justified with 16 mm left and right margins. Please use Microsoft Word; any version is acceptable.
- Manuscripts should be submitted in clear, concise English and free from typographical and spelling errors. **Please leave two spaces after each sentence**.
- Research Papers should include: Title; Names and affiliation of authors and an email address for corresponding author; Abstract (approx. 200 words); Introduction; Materials and methods; Results; Discussion; and References. References should conform to the Harvard System (author-date; see recent *Newsletter* issues for examples).
- Technical notes, News, Notes, Notices, Art etc should include a Title; Names and affiliation of author(s) and an email address for the corresponding author. References should conform to the Harvard System (author-date).
- All pages, figures and tables should be consecutively numbered and correct orientation must be used throughout. Metric units and SI units should be used wherever possible.
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- Editorial amendments may be suggested and all articles will generally undergo some minor editing to conform to the *Newsletter*.
- Please contact the *Newsletter* Editor if you need help or advice.
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– Editorial –

Hello everyone,

I hope that you enjoy this, the 39th edition of the ABS *Newsletter*. Diving straight into the thick of things; I feel that the society as a whole is becoming increasingly exposed to issues surrounding bats, particularly flying-foxes. For example, there were two articles on bats in the recent edition of the Australian Wildlife E-News (published by the Wildlife Preservation Society of Australia Limited).

Unfortunately this exposure; often via political decision making and the ensuing popular media coverage, does not always shed the most positive light on bats. The broader ABS membership and our executive are therefore actively campaigning, providing advice and collating facts for distribution more than ever before. Our achievements on these fronts underpin the multi-disciplinary nature of the ABS, with a united effort presented across carers, researchers, students, consultants and genuinely really concerned individuals – despite our existing every-day commitments.

Most notably, I am referring to the current Queensland Government's decision to resume shooting of flying-foxes in orchards (see pages 6 and 30 to 31), but our efforts apply equally to other topical issues such as the role of bats in virus transmission, mammal action plan reviews and just recently, the development of a unique forum to discuss advances in acoustic recording technology (contact Terry Reardon terryreardon04@gmail.com if you would like more information on this).

Continuing to underpin all of the positive messages that we are sending out about bats, is solid, exciting research conducted by an incredibly bright bunch of researchers, many of whom are students. Thanks to all those who have provided an update on their research activities (see pages 14 to 28). Whilst the e-mail discussion list (discussion@list.ausbats.org.au) is a great forum for keeping members abreast of current issues, events, requests and queries, this *Newsletter* remains an important repository of research summaries and findings. Thanks again for your contributions.

Within the following pages you will be whisked away to India for some ANABAT-ing (page 19), to PNG to discover a potential new species (page 16) and you'll be time warped back to 1983 to enjoy a couple of very entertaining batty tales originally published in Australian Bat Research News (page 42).

Susan Campbell
***Newsletter* Editor**

Cover: A Neapolitan triplet of Australian *Rhinolophus* from Iron Range. The '*roberts*' beast in the middle is remarkable for its outsized boofy head in addition to other outsized accoutrements, and the first harmonic of its echolocation is quite audible. Photo thanks to Luke Hogan (via Kyle Armstrong).

Photo above – a Striped Lemur checks out the pram at a wildlife safari park in Scotland.

– From the President –

Seems like a lot has happened since the last *Newsletter*. The executive and extended executive has had a couple of meetings, and we have moved ahead on a few points. In my own bat world, I have just returned from six weeks on Cape York capturing bats. Part of it was with Terry Reardon, Tony Mitchell and Luke Hogan and it was a terribly successful and enjoyable trip. Luke and Tony were very generous in giving up their time to help, so I am glad we saw a lot of species, including highlights such as *Hipposideros semoni* and the three *Rhinolophus* forms that I am doing taxonomic work on.

In a lot of ways the recent fieldwork was a warm-up for the Bat Blitz. It was unfortunate that we had to postpone the Blitz until next year (Terry Reardon will provide updates), but a lot of groundwork has been now laid. Rio Tinto Alcan are still providing some much appreciated and generous funding and we are close to sealing our agreement with them. We also have our wildlife ethics and scientific permits, which came after the long application process that required consideration from the Government land manager and all relevant Traditional Owners on Cape York. Terry put in a lot of effort and facetime with the Traditional Owner communities to obtain access permission – thanks Terry for all your time and trouble for this project so far. We are hoping to have some good interactions with the Aboriginal people.

The ever-present flying-fox related issues have now become entwined with changes to legislation, some of which have already come through (e.g. reintroduction of permits to allow shooting in Queensland) and others that might be in the pipeline. Carol Booth recently spearheaded a response to the *Land Protection Legislation (Flying-fox Control) Amendment Bill 2012* in Queensland State parliament, which was a combined response from many different environmental organisations that included the ABS – thanks Carol for your energy on this one. The society also wrote to the Commonwealth Environment Minister Tony Burke on the issue of devolving some environmental matters to the States. We received a reply, which outlined the Minister's pursuit in this regard. I have put both letters into this *Newsletter*.

The issues surrounding flying-foxes and some other areas are certainly very topical at the moment. I certainly hope the newly developed Hendra vaccine will help to significantly reduce the danger of Hendra for people and horses, and so lessen the backlash against flying-foxes. I was interested to read the remarkable story written by Deborah Middleton of all the work that lead to the release of the vaccine – a great example of the value of technical science and the dedication of people working to develop the vaccine.

In my new role as president of the ABS, it very quickly became overwhelming to respond to all that was going on, especially in the flying-fox arena. It also became clear that the ABS needs a clear set of standardised responses to the often similar issues that pop up, and these need to be readily available for the media or for use as directed responses. To this end, we have pursued a previous idea of having position statements that we can forward in their entirety, place on our website for easy reading or download, and draw from when writing letters or other types of responses. Greg Ford and Greg Richards have taken the lead on two issues and have produced Position Statements on Hendra and the shooting of flying-foxes. Thanks also to everyone who made comments. We plan to put together more of these Position Statements on various topics, with the current priorities being 'Bats and Wind Farms', 'Relocation of Flying-fox camps', and 'Bats and Land Clearing/ fragmentation'; as well as ABS Recommended Guidelines on 'Bat detectors and acoustic surveys'. These will be dynamic documents, so there will be an opportunity to have them updated periodically as feedback comes in and situations change.

There are many other activities undertaken every day by our members that champion the cause of bats – thanks to everyone, and I look forward to reporting more in the next *Newsletter*.

Kyle Armstrong
ABS President

– Australasian Bat Society Inc: Business and Reports –

AUSTRALASIAN BAT SOCIETY, INC.

ABN: 75 120 155 626

POSITION STATEMENT
SHOOTING AND FLYING-FOXES

Background

The shooting of flying-foxes has been carried out for many decades, particularly as a means of protecting fruit crops and for dispersing flying-fox camps that are regarded as problematic by some sectors of the community. Recently the Queensland State Government has reintroduced legislation that allows farmers to apply for damage mitigation permits to shoot flying-foxes in commercial orchards. The New South Wales State Government also allows shooting of flying-foxes under a permit system for similar purposes; however, that State has legislated to phase out shooting by 1 July 2014, except under special circumstances.

Shooting of flying-foxes in orchards has been shown to be an ineffective method for reducing flying-fox impacts on commercial fruit crops. The only proven and effective method for protection of orchards from flying-foxes is exclusion netting.[1]

The shooting of flying-foxes is inhumane because it is almost always done at night, when visibility is poor and with shotguns, which frequently do not result in a clean kill. When a flying-fox is shot with shotgun pellets, the injuries are random and do not necessarily cause instant death. Scientific research[2] has shown that a significant majority of flying-foxes shot this way can take up to four days to die (see Figure 1).

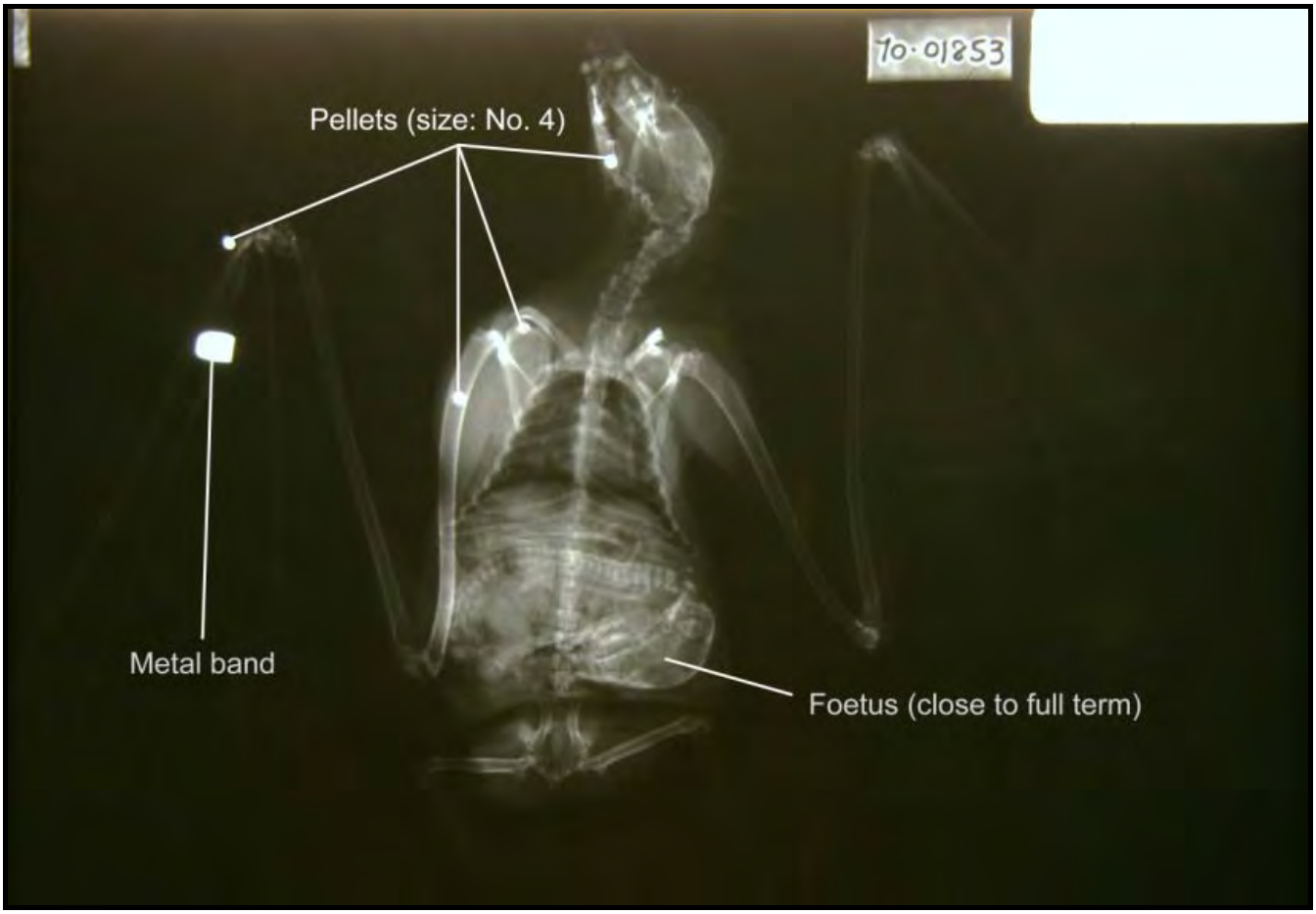
Flying-foxes often do not drop from trees when debilitated from being shot and wounded. This is because the structure of the leg is such that when hanging on a branch a set of tendons in the leg locks the foot, a function developed in the process of evolving the ability to sleep in trees without falling[3.] Hence, when mortally wounded, a flying-fox is likely to be locked onto a branch some distance above the ground, where it will be difficult to access for the final despatch.

[1] NSW Flying-fox Licensing Review Panel: Report to Landscapes and Ecosystems Conservation Branch, NSW Department of Environment and Climate Change, May 10, 2009.

[2] Deaths and injuries to Grey-headed Flying-foxes, *Pteropus poliocephalus* shot at an orchard near Sydney, New South Wales. Authors: A. Divljan, K. Parry-Jones & P. Eby. *Australian Zoologist* Vol. 35, No. 3.

[3] *Flying Foxes: fruit and blossom bats of Australia* Pp. 28-29. Authors: L. Hall and G. Richards. Published by UNSW Press, Sydney, 2000.

Figure 1. Veterinary x-ray of a flying-fox that eventually died four days after being shot in an orchard near Sydney. Three points on the wing had been broken, rendering flight impossible; and the left jaw had been severed by a pellet. The metal band indicates that it was once a research animal.



Another significant issue arises in relation to the timing of shooting to control flying-foxes at orchards. In many areas where shooting permits will be applied for, the ripening of orchard fruit coincides with the spring-summer flying-fox breeding season. This means that many of the females that are shot will be pregnant or have milk-dependent young at the roost (camp), which will subsequently starve to death. Research has found that the deaths of these young results in a 44% increase in the number of animals actually killed from orchard shooting during the breeding season[4].

While there are Codes of Practice for the shooting of flying-foxes[5,6], which must be acknowledged and followed by permit applicants, the issuing authorities have only limited means to ensure adherence to those Codes. Furthermore, other than reading and acknowledging the Code of Practice, applicants require no further endorsement or approval for the ethical treatment of the animals. This is in stark contrast to the strict Animal Ethics guidelines and approval systems that must be followed by other people, such as scientists and animal carers, who undertake research and rehabilitation on native wildlife species.

[4] Deaths and injuries to Grey-headed Flying-foxes, *Pteropus poliocephalus* shot at an orchard near Sydney, New South Wales. Authors: A. Divljan, K. Parry-Jones & P. Eby. *Australian Zoologist* Vol. 35, No. 3.

[5] *Code of Practice — Ecologically sustainable lethal take of flying-foxes for crop protection*. Department of Environment and Heritage Protection, Brisbane, August 2012.

[6] *Standard operating procedure for the shooting of flying-foxes*. Office of Environment and Heritage, Sydney, November 2011.

ABS Position on shooting of flying-foxes

The Australasian Bat Society understands the frustrations of primary producers, but opposes any damage mitigation measures that may be inhumane or which could be deleterious to flying-fox populations.

We acknowledge that managing flying-foxes in orchards is a difficult dilemma for people who depend on primary production for their income, however, the ABS strongly objects to the shooting of flying-foxes in any situation. We reiterate the following key points:

- two of the four species subject to shooting are listed as threatened species under both State and Federal conservation laws;
- the shooting of flying-foxes is generally ineffective in reducing their impact on commercial orchards;
- the shooting of flying-foxes on crops is inhumane because the likelihood of a clean, instantaneous kill is low and the majority of animals that are shot experience a slow death;
- the shooting of flying-foxes during the breeding season, when crop damage mitigation peaks, is inhumane because if a female is killed or injured so that she cannot return to the flying-fox camp, her single young, which depends on her milk, will die slowly over a number of days; and
- all flying-fox species have been shown to play a keystone role in maintaining our natural environment.

For these reasons, the ABS strongly objects to the shooting of flying-foxes in any situation.

The ABS does, however, recognise the complexity of this human-wildlife conflict and recommends the following research and management actions to improve the protection of both fruit crops and flying-foxes:

- The culling of any native species by shooting should be conducted under strict protocols, which require an instant and painless kill of each target animal. Where the relevant authorities deem it necessary to provide permits for the shooting of flying-foxes, the ABS strongly recommends that the animals be despatched instantaneously by a single shot to the head.
- If used incorrectly or on mobile animals (e.g. flying-foxes in flight), shotguns frequently do not cause instant death, rather producing painful injuries and sometimes prolonged death if the animals cannot be found and humanely killed. The ABS strongly recommends strict adherence to and administration of the existing Codes of Practice and Standard Operating Procedures for shooting of flying-foxes.
- The ABS recommends that if shooting licences are issued for culling during the breeding season, the numbers permitted to be shot include the loss of young *in utero* or those that are lactation-dependent in a maternity camp. On the basis of available data, if a permit is approved for a kill of 50 animals, then only 28 should be allowed to be shot, to account for the loss of *in utero* or dependent young.
- The ABS supports the use of humane crop protection methods, such as exclusion netting, to address the issue of crop damage from both flying-foxes and birds. In the long term, full enclosure of orchards with appropriate netting provides a more effective, economical and humane alternative to shooting.

- The ABS understands that the process of change to non-lethal methods for reducing crop damage from flying-foxes may be slow, but supports legislative change to improve the adoption of non-lethal measures and the complete phase out of shooting.

- The ABS recommends and supports government and/or industry funded research into developing and refining non-lethal control measures that foster protection of both flying-foxes and rural industries.

Flying-foxes and the Australian environment

The ABS recognises that flying-foxes, in some circumstances, cause economic losses to the Australian horticulture industry through consumption and spoiling of fruit in commercial orchards. We also believe the ecosystem values that flying-foxes provide to the Australian environment have not been adequately represented in the public debate on flying-fox management.

As such the ABS would like to make the following points:

- Flying-foxes play a keystone role in maintaining biodiversity and structure in natural vegetation communities across Australia. Many vegetation communities rely on their blossom and fruit feeding behaviours to assist with pollination and seed dispersal.

- The loss of natural habitats due to human population expansion and development activities is a major cause of declining native species populations and a key threatening process for many rare, vulnerable and endangered species, including flying-foxes.

- Habitat loss is also considered by the ABS to be a key driver of increasing contact and conflict between humans and native species such as flying-foxes.

- The ABS recognises the importance of protecting and managing dwindling habitat resources in urban and rural areas for the conservation of all native species, and opposes any measures that deliberately remove or impair the function of those resources as flying-fox habitat.

- The ABS recognises the migratory behaviour and other long distance movements in flying-fox species, and supports legislation and management actions that account for population connectedness and protection across state boundaries.

What is the ABS?

The Australasian Bat Society (ABS) is a not-for-profit organisation, registered under the NSW Associations Incorporation Act 1984 through the NSW Department of Fair Trading. Our aim is to promote the conservation and study of bats in Australasia. ABS membership is wide-ranging and includes research scientists, natural resource managers, students, wildlife carers and members of the general public. Anyone with an interest in bats or conservation is welcome to join the Society. For more information on the ABS and membership, go to our web site at http://ausbats.org.au/.

AUSTRALASIAN BAT SOCIETY, INC.

ABN 75 120 155 626

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The Hon Tony Burke MP
Minister for Sustainability, Environment, Water, Population and Communities
Parliament House, Canberra, ACT 2600.

24 August 2012

Dear Mr Burke,

The Australasian Bat Society (ABS[1]) is concerned about the recent decision to devolve some environmental matters to the State and Territory Governments, in particular the management of Flying-fox camps. As part of the Australian Environmental Network we also share a widespread concern about recent proposed wholesale reforms of environmental protection laws to remove "green tape" that would result in changes to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

We are worried that these reforms will remove important safeguards for the sound conservation of Flying-foxes and potentially other species of conservation significance. Further, we recognise that the EPBC Act exists to ensure that the interests of States and Territories and the business sector do not compromise Matters of National Environmental Significance – we note in the past that there have been times when State Governments have not always acted in the national interest, and that State legislation sometimes does not place the same level of rigorous responsibility on development proponents.

The ABS acknowledges the expectation for streamlining regulation, however we believe that Commonwealth legislation will better protect species such as Threatened-listed Flying-foxes that cross State boundaries and have national significance. Many ABS members work tirelessly to advocate for Flying-fox conservation, and by far our greatest energy is placed in educating and informing in situations where misinformation and poor understanding abound. In the context of devolving responsibility for assessments of Flying-foxes to the States, there are several considerations that we feel would not be adequately represented in a State-based decision making process:

[1] See Section *About the Australasian Bat Society, Inc* at the end of this letter.

1. Some species of Flying-fox have populations that extend across State and Territory boundaries, exhibit long distance migratory behaviour, and may be significantly compromised even if a significant threat operates in only one State. Conversely, other species such as the Spectacled Flying-fox, are distributed in only one State, and may therefore not have representation outside areas subject to poorly considered 'management' options.

2. The Grey-headed Flying-fox and the Spectacled Flying-fox are listed in a Threatened category under the EPBC Act as a result of independent scientific assessment undertaken by experts against relevant criteria in the context of their value on a National scale and threats to their entire population.

3. There is no Recovery Plan or similar in place for the Grey-headed Flying-fox and therefore no framework for actions that the States may decide upon to be validated against.

4. Some of the proposed State activities are not genuinely consistent with the objectives of the EPBC Act. For example, a plan to reintroduce shooting as a crop protection method via Damage Mitigation Permits will be unable to avoid impacting Threatened-listed species, and those with relatively small distributions. Such a strategy seems archaic when there are clearly more efficient, intelligent, humane and equally effective non-lethal management approaches already available.

5. Reintroductions of actions such as shooting might encourage further concessions that would further weaken the effectiveness of EPBC legislation and listing in Threatened categories.

6. Poor decision making may have implications outside the scope of just one species. In the case of Flying-foxes, this may have wider ecological consequences, given their indispensable roles as pollinators and seed dispersers in our native forests.

7. In the context of Flying-foxes in urban areas, the often first-response strategy of dispersing camps is more likely to cause similar problems nearby.

8. The issue of zoonotic diseases such as Hendra virus is unquestionably of concern to people living, working or schooling their children nearby a Flying-fox camp. However, uninformed comments that are propagated regularly in such situations are unhelpful and serve to overcomplicate an already complex issue.

We respectfully encourage you to consider these points when negotiating with the States, and rather than relinquishing Commonwealth responsibility for Matters of National Environmental Significance to the States, we hope that capacity can be found within your own department to provide the necessary expediency in decisions involving Flying-foxes. The ABS membership will always be very pleased to assist in difficult matters that require specialist knowledge and experience of bat species. I would be happy to discuss further with yourself or your Department.

Yours sincerely,

On behalf of the Australasian Bat Society
Dr Kyle Armstrong
President

About the Australasian Bat Society, Inc

The ABS is a professional body comprising around 300 members, representing research scientists in universities and government, students, wildlife rehabilitators, environmental consultants and members of the public with a general interest in bats. We aim to promote the conservation of all populations of all species of bats in Australasia, and our activities extend from grass roots advocacy to scientific research, and the development of standards and the provision of conservation advice at State and Commonwealth level.

Our members have been instrumental in the development of Commonwealth documents and resources such as "The Action Plan for Australian Bats", "Survey guidelines for Australia's threatened bats", entries in the Species Profile and Threats Database, and several Recovery Plans for Threatened-listed species.

Through its members, the ABS has strong links with similar societies in other countries such as Bat Conservation International and the South East Asian Bat Conservation Research Unit, and our members contribute our specialist knowledge to international organisations including the International Union for the Conservation of Nature, Flora and Fauna International, the World Wildlife Fund and Conservation International.

The Hon Tony Burke MP

Minister for Sustainability, Environment, Water, Population and Communities

C12/15698

01 NOV 2012

Dr Kyle Armstrong
President
Australasian Bat Society Inc
PO Box 481
LINDFIELD NSW 2070

Dear Dr Armstrong

I refer to your letter of 24 August 2012 concerning the management of problematic flying fox camps. As you noted, I have written to State and Territory Environment ministers in the range of the Grey-headed Flying-fox, inviting them to enter into conservation agreements under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the management of problematic flying-fox camps. The conservation agreement is not intended to apply to the culling of flying foxes to reduce impacts on crops.

The conservation agreements would remove the need for Commonwealth environmental approval where appropriate State regulatory systems are in place and they meet the Commonwealth's environmental standards. Under the EPBC Act, a conservation agreement can only be made in place of a federal environmental assessment if the Minister is satisfied that the action is not likely to have a significant impact on the listed threatened species. This ensures that the safeguards you refer to remain in place, but through a simpler mechanism.

The conservation agreement is one of a number of flying-fox measures that the Commonwealth is pursuing with State and Territory governments. Through the Flying-fox Senior Officer's Working Group, information programs about living with flying foxes, improved in-situ management of flying-fox camps, and other measures are being pursued.

Regarding research and monitoring, the government has announced six projects for Hendra virus research supported by $2 million in funding. This includes funding to establish a national flying fox monitoring program to better understand trends in both the abundance and distribution of flying foxes across State borders. This will allow for better prediction and management of their associated disease risk and for their conservation management.

Thank you for writing on this matter.

Yours sincerely

Tony Burke

Tony Burke

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–Research Notes –

The impact of artificial light at a *Tadarida australis* roost entrance

Margaret Turton

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The effect of light, both artificial and natural on bats has been a topic of discussion for as long as people have been studying bats. The extent and intensity of artificial night lighting throughout the landscape has increased to such an extent that it has substantial effects on the biology and ecology of bats and other species (Rydell and Racey 1993, Longcore and Rich 2004, Stone *et al*. 2009).

Studies have shown that bright moonlight affects activity in some bat species (Morrison 1978, Reith 1982, Bork 2006, Ciechanowski *et al*. 2007), although other researchers have found no impact on bat activity (Karlsson *et al*. 2002). Street lights and sports ground lights appear to attract bats to feed on the abundance of insects attracted to these bright lights, however it appears that this feeding strategy may only favour some species of bat, in particular favouring faster-flying species such as White-striped Freetailed Bats (*Tadarida australis*) while slower-flying species such as long-eared bats (e.g. *Nyctophilus* sp.) avoid foraging around lights (Rydell and Baagøe 1996).

It has been suggested that bats use light intensity as a cue for nightly departure from their roost (Laidlaw and Fenton 1971, Downs *et al*. 2003). This theory is reinforced by the fact that light located near a roost access point will delay bats from emerging and thereby shorten the amount of time available to them for foraging. The disturbance created by the illumination of a bat roost may cause the bats to desert the roost completely. Bright light may also reduce social flight activity and cause bats to move away from the light area to an alternative dark area.

Laidlaw and Fenton (1971) showed that brightly lit areas were not favoured for roosting by bats, and that the bats would choose dark areas in preference. This preference for dark roosts locations is logical, as artificial lighting can also increase the chances of predation at a roost entrance.

My own experience on the impacts of light on a bat roost was in late 2011. I have been monitoring a maternity roost of White-striped Freetailed Bats (*Tadarida australis*) in a building for approximately five years. On a routine visit to the roost one night, it was realised with horror that a light outside the building was on – for the first time in many years. An exit count was being carried out at the time, and only one bat had been observed leaving the roost. The light was immediately turned off. After investigation, it appeared that an efficient maintenance man had realised that this light had not been working, and therefore fixed it to turn on automatically at dusk, and off at dawn.

Table 1. Bat numbers and date of return.

Date of return	No of tagged bats returned	Days after light turned off
20 November	2	2
23 November	6	5
24 November	7	6
25 November	3	7
27 November	1	9
30 November	3	12
16 December	1	28
Total tagged bats	**23**	

As a large number of the bats that had utilised the roost over the 5 year period had been PIT tagged, the data was available to observe roost activity during the period that the light had been on. A look at the data from the PIT tagged bats during that time showed that from the 17 October 2011 when the light was turned on, there was a decrease of tagged bats in the roost from 25 to 7. Over the next few days, this number was reduced to one then to no tagged bats in the roost. After the light was turned off on 18 November 2011, the numbers of bats returning to the roost gradually increased to 22 bats twelve days after the light had been turned off, with another bat returning 28 days after the light had been turned off (Table 1). Two of the bats that had been present in the roost when the light had been turned on did not return at all during the subsequent maternity season. The highest number of bats returned five (6 bats) and six days (7 bats) after the light had been turned off, showing that it had taken a few days for the bats

to realise that the light was now off and that it was safe to return to the roost (Tables 1 & 2).

Of the 23 bats that returned when the light had been turned off, four visited the roost only intermittently or left the roost early (January instead of April), showing a disruption to the usual behaviour during the maternity season. Whether this activity is directly related to the light disturbance or not cannot be confirmed.

Our understanding of the full range of ecological consequences of artificial night lighting is still limited, however, this random unplanned event shows that light at a roost entrance unequivocally has an impact on the occupation of the roost.

This observation of the impact of light at the entrance of a bat roost will be written up more fully during the next maternity season, when we shall be able to observe if the bats that did not return, or those bats whose behaviour was altered, return to the roost and remain for the full maternity season.

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Table 2: Individual bat numbers and date individuals returned to the roost.

Bat No.	Date of return to roost	Bat No.	Date of return to roost	Bat No.	Date of return to roost
3	X	27	23/11/2011	44	X
6	24/11/2011	30	30/11/2011	45	24/11/2011
13	30/10/2011	32	23/11/2011	46	24/11/2011
15	23/11/2011	34	30/10/2011	48	24/11/2011
17	24/11/2011	37	25/11/2011	50	24/11/2011
19	23/11/2011	39	16/12/2011	53	20/11/2011
20	23/11/2011	40	25/11/2011	54	20/11/2011
23	24/11/2011	41	25/11/2011		
25	27/11/2011	42	23/11/2011		

A batty adventure in Papua New Guinea

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Two students venture out into the wilderness of Papua New Guinea in search of microbats, not knowing what to expect – it was quite an adventure. Six hours drive east of Port Moresby lies Cloudy Bay, a low lying rainforest area that is sustainably logged. Our mission was to collect reference calls from as many bat species as possible and determine the effect of sustainable logging on the microbat communities.

Above: One of the creek line harp traps which caught *Hipposideros diadema*, *Macroglossus minimus* and *Miniopterus magnate*.

Opposite: Julie explains how to identify a microbat to our local helpers.

Both photos taken by Catherine Hughes.

Our first surprise was the drive to Cloudy Bay; 3 hours of intense motion sickness were followed by a further 3 hours of what could only be described as death defying rally car driving (in a Land Cruiser). Winding dirt roads (of less than ideal conditions) were navigated at an average speed of 130 km/hr! Needless to say; we discovered that the best cure for motion sickness is sheer terror.

Once we arrived, the hunt for the bats was on. We began harp trapping on the first night, generally placing our harp traps in creek lines or along 'skid' tracks (tracks made by the logging vehicles which were almost exactly harp trap width). Every two nights we moved the harp trap to a new location and were rewarded with new species at almost every site. We also attempted to mist net – however this was met with fairly low success rates. We suspected it was because the nets were not high enough.

Overall we caught *Myotis moluccarum, Pipistrellus papuanus, Pipistrellus wattsi, Pipistrellus angulatus, Miniopterus australis, Miniopterus magnater, Hipposideros diadema, Nyctophilus microtis, Macroglossus minimus, Syconycteris australis* and… a mystery long-eared bat!

The long-eared bat appeared to be a *Pharotis* sp., however species level identification needs to be carried out in Australia. If it is *Pharotis*

imogene, this is the first verified specimen found since 1890.

The acoustic detection survey was conducted with our best attempts of camouflaging the detectors. However the keen eyes of the locals weren't fooled, and before long one of our detectors went 'missing'. We put out messages with our local helpers to explain that the detectors belonged to us and we needed them for the rest of the survey. By the end of the day our missing detector had been returned. Apparently the village women "thought it was a bomb", so they had taken it home. We inspected the detector and found all the settings changed – apparently they were trying to defuse it!

Papua New Guinea has been such an adventure and, despite the extremely long hours, we would do it all again. We have no doubts that the unexplored territories of PNG contain many more surprises for bat ecologists.

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Adorable little *Pipistrellus wattsi* caught in forest logged 6 years ago (Photo by Julie Broken-Brow).

The mystery long-eared bat, perhaps *Pharotis imogene*? - Body measurements all seem to fit – although head-body is 0.5 mm longer. Canine is 1.7 mm (which is "slightly longer" than *Nyctophilus microdon*, 1.5 mm). But the nose leaf really seems to give it away, especially when you look at the illustrations in Flannery comparing *Nyctophilus microdon* and *Pharotis imogene*. Also this bat has very large eyes, and proportionally very large ears (both of which are used to characterize the species. (Photo by Catherine Hughes).

What's the bat tattoo?

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Marking bats can be difficult, particularly small ones. My colleagues and I have been marking small mammals and reptiles using fluorescent tattoos, which do not seem to affect the animals, at least over the short to medium term. The method is cheap and relatively quick, but undoubtedly needs more research. We are keen to know if you use this method on bats; please e-mail me if you do and wish to comment, and I will try to synthesise the information that I receive and make it available (with your permission). The tail, legs, wings, tail membrane, or ears of bats could be tattooed, but we have not yet marked bats. If membranes can be tattooed, then it should be relatively easy to mark bats. Tattoos are injected and can be very small, but may only be seen upon recapture, unlike arm bands, which can sometimes be seen in roosts (but have other problems). For more information on this tattoo method, go to:

http://www.publish.csiro.au/nid/90/paper/ZO11088.htm.

If you do not have access to the Australian Journal of Zoology, I can send you an electronic copy of the article (Petit *et al*. 2012).

Reference

Petit, S., Waudby, H.P., Walker, A.T., Zanker, R., Rau, G. (2012). A non-mutilating method for marking small wild mammals and reptiles. *Australian Journal of Zoology* **60**: in press.

Fig. 1. KMTR Tiger Reserve, Tamil Nadu (left) and opening of the workshop (from left to right: myself, Hayden Torr, Richard Crompton, Dr. Debbie Bartlett, Dr. Nikky Thomas and Dr. Juliet Vanitharani with three of her colleagues.

Bat calls from India

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India is a hotspot for biodiversity, particularly in relation to bats, with 114 currently known bat species (13 megabats, 101 microbats) which represents 20% of the subcontinent's mammal species. This large proportion shows the need to foster acoustic monitoring techniques and establish regional databases to enable the inventory of bat species in regions of high biodiversity, which are found all over the Indian subcontinent.

To address this demand, a microbat acoustic workshop was held to enhance the understanding and practical application of acoustics in the study of bat diversity in India, and to build a network of academic researchers from South and South-East Asia as well as from Europe and Australia. In the long term, this project aims to gather bat calls from several regions in India and their neighbors such as Nepal and Sri Lanka into a central call library which will enable local scientists to use and share them for their monitoring projects.

The workshop took place 22-25 April 2012 at the Kalakadu-Mundantharai Tiger Reserve (KMTR) in Tamil Nadu, South India. The reserve is considered to be one of the world's biodiversity hotspots. The long rainy periods (about eight months) give this rich forest reserve with 14 rivers and streams not only abundant habitat for tigers, leopards, crocodiles and macaques, but also large numbers of endemic plant and animal species. It is also a perfect place to find a high diversity of bat species! How excited I was to be able to take part in this workshop in such a stunning reserve!

Twenty-two researchers and students from several states in India (Kerala, Andhra Pradesh, Rajasthan, Maharashtra, Karnataka and Assam) were invited to attend this ultrasonic training workshop. In addition, 14 international delegates from Lao PDR, Nepal, Sri Lanka, Thailand, Germany/Australia and United Kingdom took part.

The workshop was organized by Dr. Juliet Vanitharani (Department of Zoology and Research Centre of Sarah Tucker College) and Dr. Nikky Thomas (The Harrison Institute, United Kingdom), and sponsored by the Harrison Institute, the University of Greenwich and Tamil Nadu Forest Department. Following the workshop, Pettersson Elektronik and Titley Scientific donated ultrasonic equipment and software to delegates from several states of India to use and gather reference calls.

Fig. 2. KMTR Tiger Reserve.

What did we learn and experience from the workshop?

First of all, it was of course a great meeting of bat students and researchers, who shared ideas and knowledge and were very keen to learn more about acoustic monitoring. Richard Crompton, the UK Titley representative, gave a demonstration of the Anabat detector, the software and smart functions to use for the analyses. Dr. Nikky Thomas from the Harrison Institute gave an overview of Pettersson detectors; the differences between full spectrum and zero crossing recordings and of course tips on how to use the software.

Fig. 3 [opposite] & 4 [above]. Introduction to ultrasonic detection. Richard Crompton introducing Anabat (left) and Dr. Nikky Thomas the Pettersson (right with white blouse).

During the sessions and while participants worked on their first analyses, the PhD students Boun from Lao PDR, Pipat from Thailand and myself were engaged as demonstrators.

The evening sessions

The evenings of the workshop were dedicated to the actual recordings, including active and passive monitoring of bat activity as well as gathering initial reference calls from captured bats. In small groups we went to rivers and paths of the forest to set up harp traps and mist nets and to undertake recordings. Kumar, Juliet´s field assistant, was very innovative in building a small "Anabat hut" for the stationary monitoring. With just a few sticks, strings and some covering material he created this protection for the Anabat over night.

What bats did we catch?

We caught around 10 different bat species during the workshop and gathered their reference calls. Some of the captured bats were *Myotis horsfieldii, Pipistrellus tenuis, Hipposideros cf einnaythu, Hipposideros fulvus, Hipposideros speoris* and *Rhinolophus acuminatus.*

Any other animals other than bats?

But of course, in such a stunning forest like this we also had the chance to experience more wildlife other than our immediate focus. Such as the macaques! During lunch we had to be very cautious of these smart animals as they just waited for a moment when we were inattentive so that they could pinch some snacks. And of course also the graceful peacocks, the national bird of India, were curious about us while we were sitting outside eating delicious Indian food.

Fig. 5, 6 and 7. Students [above] and Dr. Juliet Vanitharani [right] recording with Pettersson and Anabat detectors. Kumar [below] making the "Anabat hut".

Fig. 8 [left]. Harp trapping.

Figs. 9 and 10. Two of the captured species: *Myotis horsefieldii* [below] and *Megaderma spasma* [right].

Fig. 11. Other fauna encountered including a macaque visiting during lunch [above].

Fig. 12. Other fauna encountered including a peacock.

After four days of working and learning together, sharing ideas and knowledge, and building new friendships, most of the participants had to return to their states and countries. Everybody seemed to be excited now about being able to set up their own local monitoring projects and to gather their own reference calls of their regions.

Some lucky ones, myself included, stayed for a few more days with Dr. Juliet Vanitharani to explore some of the bat caves in the mountains of the tiger reserve. After climbing up the mountains, we were rewarded with caves inhabited by bats such as *Hipposideros* spp. and *Rhinolophus* spp.

I am really grateful that I was able to take part in this workshop. And after this experience I can just repeat myself that bat people are just great individuals wherever you meet them across the globe.

What has happened since the workshop and where next?

The collection of reference calls in India continues and since April 2012, there have been collected in Tamil Nadu alone enough reference calls from 17 different bat species (both with Anabat and Pettersson detectors) for the bat call library. If you would like to support this project with spare equipment such as mist nets or harp traps, feel free to get in touch with me and I will make sure that it will go into the right hands in India. Thank you, Tanja.

Fig. 13 and 14. One of the rivers in the reserve [left] and tea break in the mountains [above]: from left Boun, Abi, Pipat and Tanja.

Long-distance and frequent movements of flying foxes – implications for management

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Ed: Billie Roberts and colleagues have published on the long-distance and frequent movements of flying foxes. Their article is available online for free and if you would like to comment on the paper or are looking for more information go to:

http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0042532

Abstract

Flying-foxes (Pteropodidae) are large bats capable of long-distance flight. Many species are threatened; some are considered pests. Effective conservation and management of flying-foxes are constrained by lack of knowledge of their ecology, especially of movement patterns over large spatial scales. Using satellite telemetry, we quantified long-distance movements of the Grey-headed Flying-fox *Pteropus poliocephalus* among roost sites in eastern Australia. Fourteen adult males were tracked for 2–40 weeks (mean 25 weeks). Collectively, these individuals utilised 77 roost sites in an area spanning 1,075 km by 128 km. Movement patterns varied greatly between individuals, with some travelling long distances.

Five individuals travelled cumulative distances >1,000 km over the study period. Five individuals showed net displacements >300 km during one month, including one movement of 500 km within 48 hours. Seasonal movements were consistent with facultative latitudinal migration in part of the population. Flying-foxes shifted roost sites frequently: 64% of roost visits lasted <5 consecutive days, although some individuals remained at one roost for several months. Modal 2-day distances between consecutive roosts were 21–50 km (mean 45 km, range 3–166 km). Of 13 individuals tracked for >12 weeks, 10 moved >100 km in one or more weeks. Median cumulative displacement distances over 1, 10 and 30 weeks were 0 km, 260 km and 821 km, respectively. On average, over increasing time-periods, one additional roost site was visited for each additional 100 km travelled. These findings explain why culling and relocation attempts have had limited success in resolving human-bat conflicts in Australia. Flying-foxes are highly mobile between camps and regularly travel long distances. Consequently, local control actions are likely to have only temporary effects on local flying-fox populations. Developing alternative methods to manage these conflicts remains an important challenge that should be informed by a better understanding of the species' movement patterns.

Reference

Roberts, B.J., Catterall, C.P., Eby, P. and Kanowski, J. (2012). Long-distance and frequent movements of the flying-fox *Pteropus poliocephalus*: Implications for management. *PLoS ONE* **7**(8): e42532. doi:10.1371/journal.pone.0042532.

Bat research update

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The Forest Science Centre saw some dramatic changes in 2011. Its 22 full-time staff suffered a 50% cut, with the Forest Biodiversity section being particularly hard hit with just two staff surviving (Brad and Traecey Brassil) from six. This has obviously led to some major changes, although some bat work continues to be undertaken. In the past year Brad and Traecey (and previously Mark Chidel) continued field work on three main projects.

The first project involved radio-tracking Golden-tipped Bats in southern NSW in a site now 10 years post-logging (2012). Previously bats were tracked at this site prior to logging in 2000/01 and one year post-logging (2003). Despite a decline immediately after logging, longer-term data demonstrated recovery, suggesting that management practices used by Forest NSW have been ultimately effective for protecting this threatened species. The results from this project were presented in more detail at the ABS conference (2012) and are to be written up for publication.

Other recent research by Brad, Traecey and Mark Chidel has been investigating the habitat requirements of the threatened Greater Long-eared Bat *Nyctophilus corbeni* in Pilliga forests.

This bat is strongly associated with cypress forests and the Pilliga forests represent core habitat. Although the bat's distribution is reasonably well known, little is known of its ecology and what the impact of timber harvesting is. The aim of the study has been to investigate roost selection, because roosts in tree hollows are typically the most critical resource for insectivorous bats. Three radio-tracking trips have been completed and at this stage a preliminary inspection of the data indicate that bats commonly roosted in dead trees, mostly commonly in ironbarks, but also in cypress and buloke. It is notable that tree roosts often had a relatively small diameter (< 50 cm dbh). Such small trees are not the "typical roosts" selected by other bat species that have been studied. We also used transects to measure the availability of dead trees in stands of differing logging history, which will, in combination with the radio-tracking data, provide important information on the distribution of potential roosting trees.

Just a few weeks ago Brad and Traecey completed a field trip to the forests of Eden to document changes to the bat community after second-round alternate coupe logging that took place in 2000. This is a long term study that began in 1999, with the study site having been re-sampled in 2001, 2002, 2007 and this year 12 years after logging. Needless to say, there are quite a few Anabat files awaiting analysis for this project.

Fig. 1 (above). Harp trapping in Eden in 12 year old regrowth compared to Fig. 2. (over leaf) with a harp trap set up in 35 yr old regrowth (photos Brad Law).

Brad is also busy supervising a range of students. Caragh Threlfall completed her PhD at the end of last year on 'Conserving Biodiversity in Urban Landscapes – Mechanisms influencing the distribution, community assembly and resource use of insectivorous bats in Sydney, Australia'. Caragh has moved to Melbourne to take-up a post-doc and continue her interest in urban biodiversity studies. Leroy Gonsalves submitted his thesis earlier this year and is polishing off minor revisions on 'Saltmarsh, Mosquitoes and Insectivorous Bats: Seeking a Balance' (ACU). Lisa Cawthen is busy writing up – 'The ecology of Tasmania's insectivorous bats in a timber production matrix' (UTas).

Anna McConville, from The University of Newcastle, is in the final throes of writing her PhD thesis on the ecology of *Mormopterus norfolkensis* (East-coast Free-tail Bat). She writes "I've been very busy, having radio-tracked bats to their muddy mangrove roosts, followed them as they foraged at night, created habitat models from bat detector recordings and even collected bat poo to investigate diet." She has completed three manuscripts that are currently under review:

- "Morphology is not always a good predictor of habitat use: a case of bats with differing conservation status in south-eastern Australia";
- "Maternity colonies of the rare East Coast Free-tail Bat (*Mormopterus norfolkensis*) select mangroves as roosts in south-east Australia"; and
- "Preliminary observations on roost characteristics of East Coast Free-tail Bats *Mormopterus norfolkensis* in two different regions of NSW".

Additionally, Anna is finalising papers on home range, local habitat selection and diet. She aims to submit in early 2013, which will give her plenty of time to prepare for the ABS trip to Cape York!

Rachel Blakey is just starting her second field season, beginning with a trip to Koondrook Pericoota forest. Rachel is working with Forests NSW to determine the impact of forest thinning on bat and insect communities within flooded and dry River Red Gum forests along the Murray River. She will use Terrestrial Laser Scanning to determine fine-scale structural features of sites in varying stages of regrowth after thinning and relate this to biotic data, leading to improved understanding of management techniques in River Red Gum forests. Just to the east of Koondrook Pericoota, in Barmah-Millewa Forest, Rachel will assist Michael Pennay (Office of

Environment and Heritage) to collect baseline data for a long-term ecological thinning adaptive management project. In the New Year, supported by the *Australasian Bat Conservation Fund* and the *Wildlife Preservation Society of Australia*, Rachel has plans to investigate the impact of excluding both diurnal and nocturnal gleaning predators from River Red Gum saplings with varying access to water. She hopes this will elucidate ecosystem services provided by bats and birds to River Red Gums, in the form of controlling herbivorous insects and leaf loss. Rachel is also collaborating with Kim Jenkins and Leroy Gonsalves to integrate bats and nocturnal insects into istotopic studies of floodplain foodwebs. Finally, she will assist me in co-supervising an Honours student at UNSW, investigating the effects of pollution and urbanisation on Large-footed Myotis within Greater Sydney.

Gavin Bonsen has just submitted his honours thesis at UTS on 'Resource Selection Patterns in Microbats as a Response to Noise Pollution and Urban Development'. Below is the abstract from his thesis.

*As the global human population continues to grow, urban areas are expanding at extreme rates. This urban expansion can have devastating consequences on native floral and faunal associations, and is found to be a major cause of species extinctions. However, the ability of certain species to persist in urban areas remains an important topic for conservation efforts. Aside from the initial loss of habitat, urban areas are subject to a range of interacting processes that influence species persistence within. It is common for urban areas to experience high levels of chemical, noise and light pollution, which have been found to detrimentally impact on species interactions. Like birds, insectivorous bats (Microchiroptera) have shown persistence in areas of at least moderate levels of urbanisation, perhaps as a result of their high mobility and ability to fly through the urban matrix. Birds have shown behavioural changes in areas affected by high levels of urban noise. In this thesis, I examine the persistence of certain bat species within the peri-urban landscape of Sydney. I investigate whether noise levels produced by a major road in a reasonably unmodified patch of habitat (Garigal National Park) has any detectable impact on the foraging activity of bats. I also investigate whether urban noise levels within two different levels of urban development have the potential to influence bat activity. Finally, I examine the use of drainage culverts as roosts throughout a largely suburban landscape to determine whether urban noise influences roost site selection in bats. I show that open- and edge-adapted species do not appear to be influenced by these levels of noise within the peri-urban landscape. However, concern arises for certain clutter-adapted species (*Nyctophilus *spp.) that are likely to be more influenced by the presence of urban noise because of their distinct foraging characteristics.*

Saltmarsh, mosquitoes and insectivorous bats: seeking a balance

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The saltmarsh mosquito (*Aedes vigilax* Skuse) can be locally abundant throughout summer, representing a potentially important prey resource for insectivorous bat species. However, *Ae. vigilax* has been identified as an important vector of mosquito-borne viruses such as Ross River virus and Barmah Forest virus and is a known nuisance biting pest. Coastal residential areas adjacent to Empire Bay on the Central Coast of New South Wales are prone to nuisance biting from *Ae. vigilax* and other estuarine mosquito species, particularly in late summer each year. Residents have requested use of a broadscale mosquito spraying regime (using *Bacillus thuringiensis israelensis, Bti*) to control numbers of *Ae. vigilax.* Although it has been suggested that *Ae. vigilax* may be an important dietary item for insectivorous bats foraging within saltmarsh, no study to date has specifically investigated the importance of the mosquito in the diet of these bats. In my PhD I investigated the importance of *Ae*. *vigilax* to insectivorous bats on the NSW Central Coast by examining relationships between bat activity, habitat use by bats, bat diet and the availability of *Ae*. *vigilax* and non-mosquito prey in three major habitats (saltmarsh, urban and forest) within the area. In all, 15 bat species and two species groups were recorded, of which eight are listed as threatened under the NSW *Threatened Species Conservation Act* (1995). Bats were most active in forest habitat,

however, proportional feeding activity was greatest in saltmarsh. Positive relationships between prey abundance and total bat activity were only detected in the less cluttered saltmarsh habitat. Activity of bats in saltmarsh habitat was greatest along vegetation interfaces between saltmarsh and neighbouring landward habitat (coastal swamp forest) and the seaward habitat (mangrove forest). The diets of five bat species trapped in forest adjacent to saltmarsh consisted of a diverse range of prey, dominated by moths. Only two bat species (Eastern Forest Bat *Vespadelus pumilus* Gray and Little Forest Bat *Vespadelus vulturnus* Thomas) consumed *Ae. vigilax*. I radio-tracked *V. vulturnus* to investigate habitat use during two extremes of *Ae. vigilax* abundance. *Vespadelus vulturnus* shifted from preferential use of saltmarsh to neighbouring coastal swamp forest, corresponding to a shift in the distribution and abundance of *Ae. vigilax*. The findings of this study are used to make an assessment of the importance of *Ae. vigilax* to insectivorous bat diet. I conclude that *Ae. vigilax*, along with moths, is an important prey resource for bats of the *Vespadelus* genus. It is beyond the scope of this project to infer potential impacts of broadscale mosquito control on all insectivorous bat species. However, in the absence of a before-after-control-impact (BACI) designed study, a precautionary approach is recommended whereby any application of *Bti* is restricted to later in summer in order to avoid bat lactation periods, when energetic demands are greatest. I also propose an adaptive management approach, whereby careful monitoring of insectivorous bat populations before and after the application of broadscale control measures is required.

More evidence of the effect of climate change on Western Australian bats

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The progression south of some of Western Australia's arid zone bats appears to be continuing. Recently, two of the species common in the arid Murchison bioregion have been detected considerable distances south of their historic southern range boundary. These are Finlayson's Cave Bat (*Vespadelus finlaysoni*) and Hill's Sheath-tailed Bat (*Taphozous hilli*).

In the pastoral country inland of the WA Wheatbelt, the southern boundary of the traditional range of these species was on the southern boundary of the Murchison bioregion. Up until 2005 the southernmost colonies of both species were known from Tallering Peak near Mullawa, near Mount Elvira HS further east and colonies of the cave-bat were known from Kalbarri on the coast and Jokers Tunnel near Yalgoo. In 2008, BB detected a cave-bat call at a mine site 30 km south of "Jokers". By 2010, both species were being detected at Charles Darwin Reserve (CDR) near Wubin and just inland from Geraldton, both locations on the northern boundary of the wheatbelt, a southern range expansion of about 100 km. In that year BB picked up a small number of calls of both species for the first time at CDR. The call of the sheath-tailed bat is quite distinctive with a constant frequency (cf) shape at about 25 kHz. The regional call of the cave-bat is frequency modulated (fm) at 55-58 kHz, well above its nearest species, the Chocolate Wattled Bat (*Chalinolobus morio*), at around 50 kHz.

During 2012, further evidence of the movement south has come to hand. Early in the year, much larger numbers of calls of both the cave-bat and the sheath-tailed bat were detected near CDR and BB caught a cave-bat in a harp trap set at the adit of an abandoned mine there. It was measured and confirmed to be *V. finlaysoni* using the dimensions in Kitchener *et al*. (1987) prior to being released. Later in the year SF detected a small number of cave-bat calls a further 150 km south, near New Norcia, on the southwestern boundary of the Avon Wheatbelt bioregion and near the Jarrah Forest. These latest call detections were both in woodlands close to an ephemeral drainage line.

The most surprising aspect of these records is the movement of the cave-bat. Being tiny at 5 g and an obligate cave roost species it is not known to migrate. It is though ubiquitous across the western arid zone being found at any location with suitable roost and forage conditions. This southern expansion appears to indicate that these species are taking advantage of favorable conditions as the southwest of Western Australia dries out with climate change.

Kitchener, D., Jones, B. and Caputi N. (1987). Revision of Australian *Eptesicus*. Records of Western Australian Museum **13:** 427–500.

– Reports, Viewpoints –

Ed: The Queensland Government's decision to reintroduce shooting of flying-foxes as a legitimate form of control in crops is a contentious issue that required ABS members and executive to respond at all levels, including the publication of the ABS' first position statement on shooting of flying-foxes (page 6) plus the following articles. Thanks to Nick Edards for permission to publish this image that highlights exactly what is at stake, note the hefty weight that this mum is hauling around [I know how she feels]!

Queensland reintroduces the shooting of flying-foxes

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On Threatened Species Day, 7 September, the Queensland Government re-introduced shooting of flying-foxes for crop protection, four years after it was banned for humaneness reasons.

In what the Queensland Environment Minister claims is a "balanced" policy, fruit growers in Queensland are now permitted to shoot more than 10,000 flying-foxes a year, including of threatened species: 1280 Grey-headed and 1800 Spectacled Flying-foxes. The numbers are said to represent 1.5% of the lowest estimated populations. They don't include the death of orphaned young, which could increase the toll by about 40% for the two threatened species and Black Flying-foxes (assuming that females constitute about half those shot in orchards).

Continuing a Queensland tradition of exempting flying-foxes from protections that apply to other native species (see box), the government has made a regulation exempting flying-foxes from humaneness requirements for damage mitigation permits issued under the Nature Conservation Act 1992.

This is in recognition that shooting flying-foxes in orchards is inevitably inhumane, as Queensland's Animal Welfare Advisory Committee advised in 2008. The cruelty is two-fold: a high rate of wounding and the death by dehydration or starvation of orphaned young. The AWAC's advice led to the former government banning shooting of flying-foxes because of the legal requirement for humaneness.

To substitute for humaneness, the new regulation requires fruit growers issued with a damage mitigation permit to adhere to a code of practice.[1] It includes requirements that only stationary flying-foxes are shot, that searches are made for any wounded animals and that young found in an orchard are either killed or passed to a carer. Each grower will be permitted to shoot the following numbers of species occurring in their area:

- 15 Spectacled Flying-foxes
- 20 Grey-headed Flying-foxes
- 30 Little Red Flying-foxes
- 30 Black Flying-foxes

The Commonwealth Government has washed their hands of it, deeming an additional mortality of 1.5% of a threatened species population as unlikely to have significant impact – despite the recovery plans for both species (still draft for the Grey-headed Flying-fox) recognising that flying-foxes require high survivorship due to a low reproductive rate and identifying lethal crop protection as a threat.

Since European settlement, flying-foxes have suddenly faced a greatly increased mortality due to habitat loss, persecution and culling (Martin and McIlwee 2002). Due to their low reproductive rate, Grey-headed Flying-foxes also have a low population growth rate, even under optimal conditions. This, combined with increased mortality puts the species at risk of severe population decline.[2]

Apart from commercially exploited threatened fish species, flying-foxes are the only nationally threatened species subject to government-sanctioned killing. Shooting of flying-foxes also occurs in NSW although it is intended to be phased out by 2014, except under ill-defined 'special circumstances'.

The head in the sand approach of the Federal Government is exemplified by its expectation: "that Queensland will put in place appropriate compliance and enforcement measures to ensure their quotas are not exceeded. Rigorous processes to fulfil the State's responsibility for animal welfare would also be expected."[3]

Recent history has demonstrated a conspicuous failure to enforce, with three civil court cases providing evidence of large-scale non-compliance in Queensland orchards that the government had ignored. This is unsurprising in part because Queensland has very weak right of entry powers for compliance officers, rendering monitoring difficult. Compliance officers can only enter property with the consent of the occupier or a

[1] In an article in Punch on the changes: "This is a familiar trick. Any time you want to do something cruel to an animal, have it put in a code of practice along with a general provision defining all actions done under a code of practice to be outside the welfare jurisdiction."

[2] Draft recovery plan for Grey-headed Flying-foxes.

[3] Letter to Denise Wade from the Assistant Secretary of the Wildlife Branch, 17 September 2012.

warrant, and the cost-slashing LNP government has said there are no new resources for enforcement. The LNP government has also undermined the potential for community enforcement by de-funding the Environmental Defenders Office Qld, which has provided legal services for previous flying-fox court cases, and proposes to change costs rules for the Planning and Environment Court, exposing litigants to potentially very large cost orders.

The quota for Grey-headed and Spectacled Flying-foxes allows, on average, one to be shot every second or third night over a 6 week fruit season. Unless enforcement is extremely rigorous it is naïve to expect growers to comply with the quota numbers or the code. It is far too easy for growers on private property at night to shoot what they please.

The Commonwealth Government is also trying to wash its hands of regulating dispersals of camps of the two threatened species by negotiating a conservation agreement with the NSW and Queensland Governments for them to approve all dispersals.

To balance means "to bring into harmony or proportion". It is difficult to discern which aspect of the new shooting policy for flying-foxes the Queensland Environment Minister considers "balanced". Harmonious suffering? Proportionate death of threatened species?

History repeats itself – governments exempting Queensland flying-foxes from standard protections

Queensland governments have consistently demonstrated a willingness to exempt flying-foxes from protections extended to other native species, so as to allow them to be killed.

Flying-foxes didn't receive any protection at all until they were listed with other native fauna under the Fauna Conservation Act 1974. Fruit growers were then allowed to shoot them under licence but in 1984 flying-foxes were removed from the list. According to an account in *Natural History Australia* (Lane 1984), "It appears that the Qld Minister was lobbied by a small number of fruit growers in his electorate and on the basis of this one-sided and short-sighted argument, proceeded with amendments to the legislation." Lane reported that flying-fox shooting was a growing "sport" for children after school.

It took a decade for flying-foxes to regain the status of protected wildlife – in 1994 under a newly elected ALP government and under new legislation, the Nature Conservation Act 1992. Fruit growers were still permitted to shoot or electrocute large numbers under damage mitigation permits.

In 2002, the Queensland environment minister received advice from the Scientific Advisory Committee that Spectacled and Grey-headed Flying-foxes warranted listing as threatened species. But because this would have meant the end to lawful killing, the Minister left the scientific advice languishing in his inbox.

Now, the latest exemption – of flying-foxes from humaneness requirements – allows farmers to once again shoot them after a four-year reprieve. The laws are eminently flexible for unpopular or inconvenient species.

Queensland's flying-foxes need help

Denis Wade

Vice President
Bat Conservation & Rescue Qld Inc.

vicepresident@bats.org.au

The change of season brings with it not only the promise of new life but it also heralds a new reign of suffering and death for the flying-foxes of Queensland.

Following the cessation of lethal Damage Mitigation Permits in 2008, our persecuted bats enjoyed a brief respite but following pressure from orchardists and a change of government, they are once more in the shooters gun sights. Despite two of the four species of flying-fox found in Queensland already federally listed as

vulnerable to extinction, the State Government gazetted amendments to the Nature Conservation Act, ironically on National Threatened Species Day, 2012.

Our job as rescuers, rehabbers and educators was tough enough before these draconian amendments and this turn of events has ripped at the hearts of many of our carers. As a result, we are finding it increasingly difficult to attract and retain members. Nobody wants to raise an orphaned flying-fox only to have it released into a perilous, shrinking environment, let alone face the perennial hazards of barbed wire, drape netting, car hits, dog attacks, ongoing habitat destruction, seasonal starvation events and human persecution.

Our organisation responds to between 1500 and 2300 calls for bats in distress each year and as a fully self funded volunteer organisation, we struggle to meet our growing rescue demands and fulfil our education commitments. However, we are determined and committed to improve welfare outcomes and enhance community knowledge about our gentle flying-foxes at every rescue and event that we attend.

Much of the venom directed towards flying-foxes stems from ignorance and fear. The print media have been particularly vicious, consistently dishonest and highly successful in their negative portrayal of our forest pollinators. Watching this sad evolution unfold has been demoralising, with regional councils and media latching onto and prostituting perceived health risks. All levels of Government have failed in their duty to counter this mendacity and to disseminate truthful and accurate information to the community regarding the low risk of disease transmission.

As the anger and resentment towards flying-foxes has grown, so has the cruelty inflicted upon them escalated. Where once people tolerated bats in their trees and backyards, they now want them gone as they mistakenly fear for their family's safety. Our role is sometimes reduced to that of a body retrieval service as some people are capable of ignoring a bat trapped in netting or on barbed wire and they are indifferent to its suffering and inevitable death. We also encounter members of society who are so callous that they will refuse us permission to cut their netting or barbed wire to rescue a trapped flying-fox and only the threat of police involvement will sway their decision.

The fear generated by Hendra virus has been unrelenting and the rolling ball really gathered momentum when the media latched onto and erroneously accused flying-foxes of being the harbingers of all manner of disease. As a result, bats will be forever synonymous with the scourge of Hendra virus and the premature death of 'Dusty the dog.'

As an organisation, we lobby and fight for change and we need urgent assistance to educate not only the public but ill-informed politicians at all levels of government. Amongst other initiatives, we are planning to produce a 24 page education booklet for distribution across Queensland, detailing the issues and hazards that are threatening the survival of our flying-foxes.

Hope for a brighter future is all that we have and we will press on with our education, rescue and care commitments. We strive to change opinions at every event we attend and when people visit our education trailer and meet our human sized Grey-headed Flying-fox Stella with baby Luna attached even the most cynical gain a new perspective.

In this era of ongoing mammalian extinctions and climate change, we need to explore new ways for humans and bats to co-exist in harmony and we need to promote and embrace the role of positive education as the key to the future survival of Australia's flying-foxes.

ABS Bat Conservation Fund recipients

CONGRATULATIONS *to* **Jo Burgar** *(Murdoch University) and* **Rachel Blakey** (*University of New South Wales)***,*** *recipients of the 2012 ABS Bat Conservation Funds.*

Following are updates from our three 2011 ABS Bat Conservation Fund recipients highlighting the excellent work supported by this Society.

For further information on the ABS Bat Conservation Fund, including submission deadlines, please see our website: http://abs.ausbats.org.au

Cory Toth

PhD Candidate

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Despite the fact that bats show the greatest range of reproductive behaviours in mammals, one mating system remains conspicuously absent. Lek breeding, in which males aggregate within specific areas of their habitat and advertise to females via sexual displays, has only been described in one species to date. Therefore, it's of considerable interest that lek breeding has been suspected in New Zealand's Lesser Short-tailed Bat (*Mystacina tuberculata*), an endangered species endemic to the country.

Short-tailed Bats are medium-sized, tree-roosting bats found predominantly in old-growth forests across New Zealand. During the summer months male *M. tuberculata* individually defend small cracks and holes and trees and sing, presumably to attract passing females. These 'singing roosts' have been reported to be clustered spatially, suggesting lek breeding. However the breeding behaviour of *M. tuberculata* has never been formally investigated and so lek breeding remains to be confirmed and details on *M. tuberculata* reproductive behaviour are limited. My PhD project under the supervision of Dr. Stuart Parsons at the University of Auckland aims to confirm or refute lek breeding in *M. tuberculata* while also elucidating further details of their reproductive ecology.

I have recently completed my first field season studying a population of *M. tuberculata* in the Pikiariki Ecological Area in the central North Island, and was able to obtain valuable data regarding male singing behaviour and female movement patterns throughout the breeding season. Male singing roosts were clustered spatially, with a large aggregation of males situated in an area surrounding the colony's known communal roost trees. There was a marked increase in male singing activity following the female birthing period (mid-December – mid-January), with most singing males found between February and March. Analysis of recordings of male singing show that male repertoires are complex and contain a number of elements, further indicating that singing could be used as a courtship display and may be a trait used for selection by females. Radiotelemetry of adult females across the breeding season showed that individual females had markedly different foraging grounds, including forest edges, pine plantations, and open scrubland, and many travelled great distances from the communal roost each night. This widespread foraging behaviour may be what drives males to cluster near communal roosts, as the communal roosts may be the only areas where males are guaranteed to encounter females during the night.

In addition to these findings an important task we completed in this past season was to trial the use of passive integrated transponder (PIT) tags on *M. tuberculata* at Pikiariki. PIT-tags will play a central role in the coming years of this project, as they will allow us to individually identify bats and track the use of singing roosts via automatic PIT-tag readers mounted on roost entrances. With the money provided by the ABS Bat Conservation Fund we were able to purchase the PIT-tagging equipment necessary for this next step in the project.

During the next two years we plan to PIT-tag a large portion of the population and take morphometric measurements from each individual, including sex, weight, forearm length, and age (if possible). With this information we can answer questions pertaining to the use of singing roosts by males and females. For example, is it the same male that uses a singing roost each night (i.e. does he actively defend it), and is it only males of a certain size that can successfully defend these roosts from competitors? We can also quantify female visitation rates with respect to particular males as a proxy of selection for male traits (e.g. size), and further correlate this with the song traits of the males present in the roost. The use of PIT-tags will also have lasting impacts beyond the scope of this project, as they will allow for the continuation of similar studies in years to come, and for the long-term monitoring of this population by the New Zealand Department of Conservation.

Jenny Maclean

Director Tolga Bat Hospital

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Tolga Bat Hospital received a donation in early 2012 from the Australasian Bat Conservation Fund. It was spent on food for over 400-orphaned Spectacled Flying-foxes that came into care during the paralysis tick season September 2011 to January 2012. We continued support feeding of the orphans at the release site until late June 2012.

During these months we had over 30 volunteers living in at the Bat Hospital, as well as numerous local volunteers. The most we had at any one time was 12 volunteers. RSPCA sent us three of their staff for a week each, and enabled an airlift of about 100 orphans to the Gold Coast. These orphans were cared for by Trish at the Australian Bat Clinic, and then returned by road in February. A huge thank you to RSPCA, Trish and her volunteers for taking a load off our hands.

Our research has shown that some orphans and tick paralysis adults that are released back into Nature do survive. We will never know the exact percentage. There are animals from previous years that return to the release cage when we are releasing the current year's orphans, as well as microchipped animals returning with another bout of tick paralysis. All animals released over a seven year period were microchipped. The high incidence of tick paralysis on the Tablelands ensures that if camp fidelity is high, there will always be repeat customers. Six of our tick paralysis adults had collars fitted by CSIRO when they were released and all survived to give data over a period of a few months. So we know that what we do to rehabilitate these animals can work.

Let's hope that we are not now, with the change of government in Queensland and changes under the EPBC Act, rehabilitating these animals to a life of being harassed or shot.

While there are Spectacled Flying-foxes on the Atherton Tablelands there will unfortunately always be a paralysis tick season at the end of every year. I have been managing this animal welfare crisis for the last 15 years with the help of many volunteers, and am now looking to step back from this role. It is an all-consuming role, working 7 days a week 15 hours a day for about 4 months of the year, and at a slightly lesser pace for another 3 months. It is 9 months from when the first tick bats come in and when the support feeding of orphans ceases. It requires living with large numbers of people. I am hoping to find a larger organisation to manage the project, or sufficient funding to employ the right person to manage tick season each year. I intend to continue managing the educational role of the Bat Hospital though for a while longer.

Tolga Bat Rescue & Research Inc.
ABN: 1563 484 5633

Julie Broken-Brow

PhD Candidate

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Julie Broken-Brow releasing a *Scoteanax ruppellii* (photo credit: Andrew Dawson).

Microbats in the Mangroves

Mangroves… a muddy, smelly, often inaccessible habitat that only crabs and crazy researchers will inhabit? Or tall, open forests with an abundance of roosting and feeding resources for microbats? Mangroves are clearly more than meets the eye.

In south-east Queensland *Avicennia marina* (Grey Mangroves) occupy an area of 533 km^2 and can grow up to 25 m tall, forming large, open forests. Previous studies have found mangroves to be an important habitat for many microbat species in Australia, Borneo and Brazil. With generous donations from the Australasian Bat

Society, Long Grass Nature Refuge and Pink Heath Project, I set out to determine if (and how) microbats use three structurally distinct mangrove forests in south-east Queensland.

Above: Lactating *Chalinolobus morio* caught in mature mangrove forest at Tinchi Tamba Wetlands. (Photo credit: Nick Leseberg).

Below: One of the mangrove creeks crossed by Julie during her research – note the bat bags attached to her shirt buttons. (Photo credit: Julie Broken-Brow).

Ed: Slightly curious how Julie took this photo of herself! ☺

Grant funds were put to good use purchasing a harp trap and an Anabat detector. With the plentiful support of other bat enthusiasts, I managed to borrow four harp traps and three passive Anabat detectors to assess microbat abundance and activity in the mangrove forests. I wanted to compare three forest types: old growth, mature (both structurally open) and regrowth (structurally closed). Despite many difficulties I finally managed to find twelve study sites (four of each forest type) and begun my Honours research adventure!

After four months and 40 volunteers, I had collected all my data and it was time to figure out what was going on in that stinky mangrove world. Fourteen species of microbats were found in the mangroves (with *Chalinolobus morio*, *C. gouldii* and *Scotorepens* sp. being the most common). I discovered that the relative abundance and activity of microbats was significantly higher in open *A. marina* forest compared to closed forest but there was no significant difference between old growth and mature forest. This indicated that microbats prefer open mangrove forest.

The preference for open forest was also exhibited by all foraging guilds and was particularly stronger amongst females, particularly pregnant or lactating females. In fact, only one lactating female was found in regrowth mangrove forest – a *Nyctophilus gouldi*, which is specifically adapted to high-clutter environments. Several roosts were found in old growth and mature mangrove forests. All evidence pointed to the presence of maternity roosts in open forests. The best explanation for these results is that open forests provide roosting opportunities and low clutter foraging habitat.

My research has important management implications for microbat conservation. *Avicennia marina* mangrove forests in south-east Queensland are not currently being managed for microbat protection. *A. marina* mangrove forests should be protected and mosquito control methods need to be re-evaluated. Of course, further research is required to gain a better understanding of microbats in mangroves.

Wind and Wildlife 2012 Conference

October 9th, Melbourne, Australia

Lisa Cawthen and Mark Venosta

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Context:

As of October 2010, there were 52 wind farms in Australia, most of which had turbines from 1.5 to 3 megawatts (MW). The total operating wind generating capacity at this time was 1,880 MW, with annual production of almost 5,000 GWh providing close to two percent of Australia's national electricity demand.

South Australia had close to half of the nation's wind power capacity, accounting for almost twenty percent of that state's electricity needs of as October 2010. Victoria also had a substantial system, with about a quarter of the nation's capacity, and projects under construction forecast to more than double that capacity by the end of 2013.

The conference website describes the aims of the meeting: http://windandwildlife.com.au/

One hundred and twent-two people attended from non-government organisations, state regulators, consultants, researchers and academics. There were numerous attendees from New Zealand (3 spoken papers) and two attendees from Denmark (1 spoken paper). There were 14 spoken papers that will ultimately be published in proceedings by Springer. A few spoken papers will not be submitted to Springer as they are being published elsewhere. The dominant topic was bird interactions with turbines focusing on collision risk and impact assessment, as well as some general discussion of other impacts to wildlife and mitigation. Much of the presentations focused on novel techniques for assessment such as radar tracking for migratory/pelagic/raptor species (birds) in NZ and Denmark, aerial survey for Brolga and satellite tracking of Brolga movements in Victoria. Their was also some reflective discussion of collision risk modelling techniques, 10 years of eagle monitoring in Tasmania and mortality monitoring methods.

A panel session was held at the end of the day to try and bring together constructive discussion of the days topics and the audiences own experiences with wind and wildlife. An expert panel was assembled to facilitate the discussion.

There will be ongoing discussion amongst attendees and the organising committee around hosting another conference at some point and facilitating further discussion.

Mark Venosta.

A student's persperctive:

Australasia's first wind and wildlife conference was held at the Melbourne Zoo. The aim of this conference was to promote consistencies in research, management and policy, to promote co-operation, sharing and learning and develop working relationships. Over 120 consultants, researchers, government and community representatives attended the conference, including members of the Australasian Bat Society Inc.

Unlike Europe and North America, Australasia has no major research program or group researching wind and wildlife, so this conference was a fabulous opportunity to share knowledge, promote the publication of and access to data and encourage future work. Unfortunately there was only two presentations that discussed bats in detail – Emma Bennett's presentation on field methodology: a practical look at wind farm scale, field methods and results and a presentation by myself and Cindy Hull – Bat fatalities at two wind farms in Tasmania, Australia: bat characteristics, and spatial and temporal patterns (the later of which has recently been accepted for publication in the New Zealand Journal of Zoology upcoming special edition: Wind energy and wildlife).

Emma discussed how she successfully uses dogs to find animal carcasses beneath wind turbines, with bats, particularly the White-striped Freetail Bat dominating carcass counts. I discussed how in Tasmania, Gould's Wattled Bats were the most common species found beneath wind turbines in the absence of a resident population of White-striped Freetail Bats and that mortality occurred primarily in autumn, perhaps due to mating or some other factor.

One of the key points from the conference in relation to bats was that they are an important component that should be investigated at

Australian wind farms. It was acknowledged that assessments of collision risk and monitoring for mortality have limitations in relation to microchiroptera. Sharing data is key to understanding the impacts of wind farms on bats and the factors that influence bat mortality at wind farms. There is clearly a greater need for collaboration between industry, government and academics/researchers to answer these questions, in particular what are the ecological impacts of wind farm mortality on bats at various scales?

Lisa Cawthen

Das Fledermaus

David Wilks

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I came across this superb fossil of das fledermaus (a microbat) collected in shale Messel Pit deposits, Germany on exhibition at the Natural History Museum in Vienna.

The shale deposits are 50 million years old. The name on the plaque was Palaeochiropteryx (literally ancient bat) – probably it is *Palaeochiropteryx tupaiodon*. It looks so similar to modern bats.

Class Mammalia, Order Chiroptera, Suborder Microchiroptera, Family Archaeonycterididae.

Wikipedia info on the species:
http://en.wikipedia.org/wiki/Palaeochiropteryx

Wonderful fossil on display in the Natural History Museum in Vienna, possibly *Palaeochiropteryx tupaiodon*.
[Photo thanks to David Wilks]

Farewell to 'George' – a 23 year old Eastern Freetail Bat

Lindy Lumsden

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In 1989, I collected a number of freetail bats from Victoria to assist Terry Reardon resolve the taxonomy of the *Mormopterus* genus. Prior to this time it was thought that there was only one species of *Mormopterus* in southeastern Australia – the Little Freetail Bat *Mormopterus planiceps*. In those days genetic testing required the extraction of the bat's liver. One of the bats I caught to send to Terry escaped this fate as, based on others that Terry had examined, I decided that it was an Eastern Freetail Bat (*Mormopterus* sp. 2). As it was an important distributional record (from Eildon in central Victoria, which was further west than we thought the species extended at that time) I decided it needed to go to the Museum as a specimen. However, I started using it in talks as it was a very placid, calm individual (as most *Mormopterus* are). I expected it might live for 6 months and then I would take it to the museum. However, it obviously didn't want to go to the museum as it lived for 23 more years!

But all good things come to an end. 'George' as he came to be known, died on 30 June 2012, 23 years after I caught him. As he was an adult when caught, I don't actually know how old he was. At the end he was showing his age – in the last few years he had become rather geriatric. He had difficulty eating in the last year and I needed to find the softest mealworms possible for him. I never managed to teach him to feed himself, so for 23 years I hand fed him and his mate 'Grumpy'. I often wondered if he was too 'dumb' to learn to feed himself, or if he was actually really smart and it was me that was dumb for hand feeding him for 23 years!! In his latter years it could sometimes take up to a hour to feed him a night. However, there was method in my madness – as I used him for talks I wanted him to associate being handled with good things, like food, and not be handled just during talks. For those interested in what he ate all that time – just mealworms and as long as they were mixed with Wombaroo Insectivore or Small Carnivore Mix this appeared to be a balanced diet (although maybe somewhat boring!!). In the early days I tried to feed him a greater range of insects, but mealworms was all he would accept.

George more than earned his keep. He accompanied me to every talk I gave to community groups, workshops or university lectures since 1989. I have never added up how many talks I have given over that time, but for quite a few years it was about 25 talks a year. So George probably went to 350-400 talks with me, and with an average of about 40-50 people per talk that is something like 17,000 people!. I never tired of seeing peoples faces light up when they saw George for the first time, or the tenth time. He had a unique way of winning over even the toughest non-bat person. As he was so relaxed at being handled I used to let people hold him (under close supervision) as having this tiny furry creature in their hand made a huge impact.

A year after I caught George, I caught another Eastern Freetail Bat that was also destined for the Museum. Neither of these bats had names for the first 10 years that I had them, as they weren't 'pets'! People had tried to give them names but they never stuck. However, when my now partner Paul Gray first saw these bats, he immediately said 'George' and 'Grumpy'! What sort of names are these for bats I said, but somehow George and Grumpy they became. Grumpy is still going even though he started looking geriatric several years before George. I had pensioned him off from giving talks and I kept expecting he was going to die, but as yet he hasn't. So now at 22 years, he has outlived George. As they had been housed together for 22 years, I am sure he misses George, as do I.

I used to love it when I would arrive at a talk and someone who had been to one of my previous talks would rush up to me and instead of saying 'Hi Lindy, how are you?' they would just say 'Did you bring George?' And of course I always said yes, with a big smile!

Rest in peace George – and thank you for the huge role you played in changing attitudes to bats in Victoria.

– News and Announcements / Classifieds –

Australasian Bat Night March 2013

Maree Kerr
cantcatchme@netspeed.com.au

Get inspired!

The second Australasian Bat Night is next March – happening all over the country throughout March 2013.

After the successful first ever Bat night this year, we are looking for an even better Bat Night in 2013. ABS is inviting community and local government organisations and individuals to register events and activities for 2013 so we can promote a Bat Calendar.

Please send details of your event to Maree Kerr at cantcatchme@netspeed.com.au giving:

- Name of activity
- Where
- When (date and time)
- Short description
- Target audience (e.g. family event, over 18, under 12)
- Cost if any
- RSVP contact

Or register directly on the website: http://ausbats.org.au

If you have local media contacts please let me know. Television, radio or newspaper coverage can raise interest in your Bat Night event, while increasing public awareness in your community for bat conservation.

Looking for ideas to celebrate Bat Night?
Into sports?! Why not organize a sporting event, like a "Bike for Bats" or a "Midnight Bat Run" right around the time bats fly?

If you live near a landscape where bat colonies are frequently spied in the twilight skies, a local Evening Bat Walk could be just the ticket. Expert bat conservationist advice and the right location may mean you have the makings for an exotic Eco-Bat Tour. You can give a presentation on any bat research or survey you have carried out. Or arrange a visit to a bat clinic or bat exhibit at a zoo or museum. You can also organize a bat shaped cookie baking session or bake sale at your kindergarten or school! Or try a fun hour of finger painting or other craft activity with a bat-tastic theme. What about bat masks or bat mobiles? Family or group activities such as planting trees to benefit both bats and forests, is a good opportunity to spend the day in a stimulating environment of informal learning. Or ask your local hardware store and or bat group, to sponsor a family bat box-building day at a nearby zoo or public park.

Have a look at last year's events for more ideas.

A personal viewpoint: Batty Ecotourism as a contributor to bat conservation:

Call for action

Maree Kerr
cantcatchme@netspeed.com.au

A few weeks ago I watched the flyout of Spectacled Flying-foxes from their colony at Cairns Civic Library. Although Cairns was light on tourists at the time (school holidays had just finished) a number of international and interstate visitors were photographing the bats obviously fascinated by and appreciating the spectacle, even if they knew nothing about the animals.

There is one official sign about the flying-foxes in the Library grounds but nowhere in the city, despite it abounding in visitor information centres, was there any other information about the bats, their ecology or the flyout.

Yet overseas visitors, and many Australians, are amazed by the sight of a river of bats flying out each evening and wonder where is everyone else when watching flyouts. Bats do have a fascination to people and in many places overseas, most famously at Austin, Texas, hundreds of people watch the flyout of Mexican Free-tailed Bats emerging from under Congress Avenue Bridge each evening. However when the bats moved in when the bridge was remodelled in 1980, concerned citizens wanted them moved on. Thanks to the actions of Bat Conservation International, particularly its founder, Merlin Tuttle, in education and raising awareness and

appreciation of bats, this attitude was turned around and now this evening spectacle is one of the most successful bat tourism examples in the world, contributing directly to the economy of Austin and to bat conservation.

The missed opportunity and potential of bat eco-tourism in Australia was the subject of a presentation I gave to the Wildlife Tourism Australia at its 2012 workshop in May. The Austin experience was one of the examples I used to illustrate both the positive tourism and conservation benefits through engendering appreciation and understanding of bats.

The pdf of the presentation can be found on the Wildlife Tourism Australia website: http://wildlifetourism.org.au/blog/events/using-wildlife-for-tourism-national-workshop-2012/presentations-at-national-workshop-2012/

With the new Queensland Government bringing back shooting as a control to protect fruit crops and the bad press over Hendra virus, education of the public is essential and needed now. It is my belief that only by changing attitudes of the general public, by building awareness and appreciation of flying-foxes and their crucial ecological role that we will be able to change policies on flying-fox management. No amount of education on its own will change attitudes – a wildlife encounter can.

This is where bat eco-tourism comes in, including such programs as European Bat Night and the new Australasian Bat Night. I encourage all ABS members to participate in Bat night 2013.

Further reading

Lunney, D. and Moon, C. (2011). Blind to bats: Traditional prejudices and today's bad press render bats invisible to public consciousness. In Law, Eby, Lunney and Lumsden (eds) *The Biology and Conservation of Australasian Bats* (pp44-63) Royal Zoological Society of NSW, Mosman, NSW. Australia.

Pennisi, L.A. et al. (2004). Achieving bat conservation through tourism. *Journal of Ecotourism* **3** (3), 195 - 207.

Call for volunteers!

Tanja Straka

PhD Student, Australian Research Centre for Urban Ecology (ARCUE)
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Dear Bat Friends and Colleagues,

For the next summer field season of my PhD research I am planning microbat trapping (harp traps) in two reserves in Melbourne and two reserves in the eastern suburbs of Melbourne.

The time frame will be from beginning of December 2012 until the end of January 2013.

If you would like to join me for one or (even) a few nights to trap microbats, your company will be very much appreciated!

We will stay over night at the trapping locations in basic accommodation, but we will also check the harp traps frequently during the night. These reserves are supposed to be species-rich therefore; I am hoping that we will get the chance to catch and see a lot of different bats!

I am looking forward to hearing from you. My contact email is: t.straka@pgrad.unimelb.edu.au

Many thanks, Tanja

The proposed ACTION PLAN FOR AUSTRALIAN MAMMALS

John Woinarski, Andrew Burbidge and Peter Harrison
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The conservation status of Australian mammals is poor, and – in many cases – worsening. For many mammal species and subspecies, the current national (and State-based) listings of threatened species haven't kept up with biodiversity decline. Conversely, in a minority of other cases, conservation management has been so successful that the species or subspecies may now no longer meet the criteria for listing as threatened.

Inspired by the recent *Action Plan for Australian Birds 2012* (the third in that series at decadal intervals) compiled by Stephen Garnett, Judit Szabo and Guy Dutson, we (John Woinarski, Andrew Burbidge and Peter Harrison) are attempting to document, in a consistent and comprehensive manner, the current conservation status of all Australian native mammal species and subspecies, and to compile dossiers on all taxa that are extinct, threatened, near threatened or data deficient (and also taxa considered least concern but which have been listed recently as threatened). One aim of this overview is to attempt to help ensure that current threatened species listing is as up-to-date as possible, such that conservation investment can be prioritised most appropriately. Another aim is to establish a benchmark from which progress (hopefully) or deterioration of the entire Australian mammal fauna can be monitored at approximately decadal intervals. Another aim is to provide a systematic and consistent series of accounts from which we can readily analyse the major threats to this fauna. Another aim is to provide a contemporary account of the management requirements for all included mammal taxa, in a manner that is accessible for land managers and the general public; and of the most critical knowledge gaps that researchers may fill to improve conservation outlook.

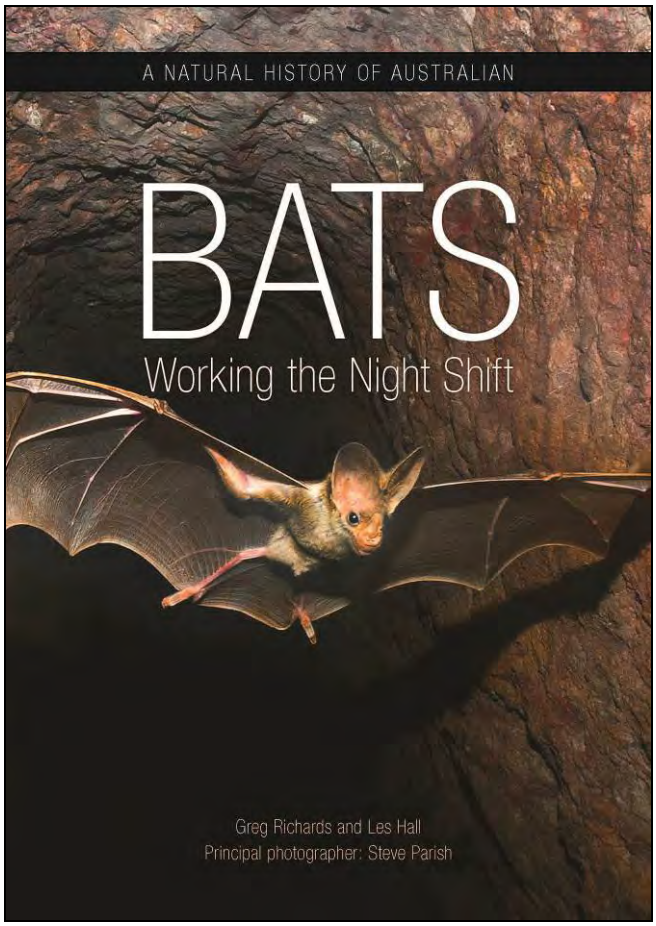
In large part, this project builds on the extremely valuable but now somewhat dated action plans for particular mammal groups – Australian rodents (1995), marsupials and monotremes (1996), cetaceans (1996), bats (1999), and macropods (2011), and of the recent (2008) global mammal assessment (which considered all Australian mammal species (but not subspecies) by the International Union for the Conservation of Nature (and accessible in the Red List).

As of October 2012, we have compiled first draft accounts for all terrestrial Australian mammal species and subspecies for which our initial assessment is that they meet the relevant IUCN criteria to be regarded as extinct, threatened, near threatened or data deficient (as well as those taxa that we think meet none of these categories, but which have been listed recently as threatened). We will send these draft accounts to different sets of experts, known by us to have relevant experience with the taxa. However, we would welcome comment from any researchers with interests in the conservation status of native mammal taxa. If you would like to consider these draft accounts and provide input and comment, please contact John Woinarski (john.woinarski@cdu.edu.au).

The collection of species' and subspecies' accounts, and an interpretation and analysis, will be published by CSIRO Publishing in 2013. For help with this compilation, we acknowledge support from the Norman Wettenhall Foundation.

Semon's Doily-faced Bat – in this species males and females are certainly on different wavelengths, which must not be good for their marital relations and fecundity. An alternative name might be the Ram's Horn-eared Bat, from its habit of curling its long pointy ears when resting. Photo Luke Hogan (via Kyle Armstrong).

– Book Reviews –



A Natural History of Australian Bats: Working the Night Shift

Greg Richards, Les Hall and Steve Parish

CSIRO Publishing

Reviewed by Leroy Gonsalves

I was lucky enough to be given the opportunity to review the new bat book "*A Natural History of Australian Bats: Working the Night Shift*" by Greg Richard, Les Hall and Steve Parish. A big thank you to CSIRO Publishing for sending out a copy of the book for me to review. The authors have done an amazing job! So many different aspects of bat biology, ecology, conservation and care have been covered in an easy to understand manner in this wonderful resource. The amazing photographs by Steve and other contributors document some of the most breathtaking scenery (and bats of course!) Australia has to offer.

Without giving too much away, the book begins with a general introduction to bats. Following on from this, the authors take us all on a tour through the wonderful landscapes and cities of Australia, introducing us to the diverse bat fauna that we're likely to come across. The important aspects of bat biology and reproduction are then covered followed by a section focusing on bat ecology, including what bats eat and where they live. The book also has a great section about some of the challenges bats face as well as a great piece about the history of bats in Australia, from biogeography to interactions with humans. The book ends with an excellent array of species' profiles. The authors also give us an insight into what it is like being a bat researcher with some interesting stories about bat anatomy (penises) at social gatherings – you'll just have to get the book!

Overall, the book is an excellent resource that I'm sure will inspire potential post-grads to become interested in studying bats. I highly recommend the book! A must have for all battos!

Blasts from the past: Extracts from 1983 Australian Bat Research News

Prepared by Greg Richards

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I edited the now historic "Australian Bat Research News" from 1979 to 1984, after which the more sophisticated "Macroderma" became our communication medium. Prompted by a recent query, I had to dig out some of these now ancient periodicals. I had long forgotten about some of the snippets of information within their pages, and thought that some of them may be of interest to readers who were in those days just babies or even just a twinkle in their Mum & Dad's eyes, and when there was only a small network of batologists.

The first article is an amazing tale about the strength of bat maternal instincts, and reinforces why we think these animals are so terrific. Following this sweet story is another that is quite the opposite, and is a gruesome tale about the

enigmatic Greater Broad-nosed Bat, for which there has been a trickle of evidence of killing and eating other bats. Although this evidence has come from this species being confined in captivity, one wonders if it also happens in tree hollow roosts.

The articles have been reproduced verbatim, and in the second article old nomenclature is used: *Nycticeius* is now *Scoteanax* and *Eptesicus sagittula* is now *Vespadelus darlingtoni.*

"ON BATS & THEIR YOUNG … AND THE PUBLIC"

by an anonymous author,
ABRN 19: 14 – 15.

Dick Allison passed on this delightful article – unfortunately the author's name is unknown. The article is unedited.

In 1969 or 1970 my younger brother picked up fourteen baby bats (species unknown) from underneath a lead cap of a telephone post pulled down by the Brisbane City Council. The post was about 400 metres from our house in the urban area. The young bats were hairless and continually giving distress calls (the time being approx. 3.30 pm after school) and I attempted to feed them a milk mixture with an eyedropper and a chewed matchstick.

Later that same evening, around 7 pm while eating our evening meal, we noticed several sharp knocks at the door. I rose and went out to investigate and found the air full of bats, obviously trying to get into the house where the young were. Relieved at the possibility of returning them to their respective mothers, I went back inside and brought one of the young back out, clinging to my thumb. As soon as I went outside, a bat landed lightly on my hand and crawled onto my thumb, and in seconds she and the young bat were gone.

We then brought out the remaining 13 bats and put them on top of a tarpaulin spread over the roof of two cars in the backyard. It was raining steadily at the time, so equipped with umbrellas and torches, we stood and witnessed the females land and pick up their young.

The adults seem to be having trouble with their directional system as they repeatedly bounced off the umbrellas, causing us to put them away for fear of hurting them. The air was full of the calls of adults and young, a chirping, high pitched sound, as I recall. As the adults landed they worked their way through the pile of young till they located the one they accepted to their breast (their own young I presume) and we then observed that they actually waited until the young had fed a short time (the young could be observed sucking at the breast) before attempting to take off again.

As the tarpaulin was a flat surface, they could only attempt to jump off the side (there was no defined edge) but were unsuccessful at gaining altitude before hitting the ground. We picked them up as they fell and threw them in the air with successful results. No aggression was shown by the bats, and no one was bitten by the adults. All the young were picked up.

OBSERVATIONS ON CARNIVORY BY *NYCTICEIUS RUEPPELLII*

by Andrew Long, Sydney,
ABRN 19: 9 – 10.

Nycticeius rueppellii, the Greater Broad-nosed Bat, which to date has been considered insectivorous, has by some been under suspicion of carnivory for quite some time. I hope that the following observations on the carnivorous habits of this bat may be of interest, where I describe an attack and kill made by an *N. rueppellii* on an *Eptesicus sagittula*.

Two male *N. rueppellii* were obtained from a hollow tree limb that was placed on a fire at Bilgola Beach, NSW, in July 1982. One animal received superficial burns to the forearm and was unable to fly. They were placed in a cage 83 x 43 x 43 cm, which also contained a Large Forest Eptesicus, *E. sagittula*, captured at Tumut, NSW. For two days both of the *Nycticeius* had fared well, often consuming 40% of their bodyweight in a single feeding session. Fruit such as canned peaches and pears was also eaten. The larger of the two (forearm = 54 mm) would only take this fruit after a quantity of mealworms was consumed.

On the third night of captivity I was fortunate enough to observe the behaviour of the *Eptesicus* when confronted by the larger species. One of the *Nycticeius* was wandering in its confines when it came within a few centimetres of the *Eptesicus*, which raised itself up on its wrists, opened its mouth, and directed high pitched squeaks towards the intruding *Nycticeius*. It appeared to deter the intruder from further investigation and it retreated to a corner of the

cage. The *Eptesicus* maintained its stance for several minutes.

During the fourth day both *Nycticeius* drank about 1.5 mls of water, the injured on ate 4 g of meal worms, and the other barely at 1 g. Neither bat had gained weight at this stage, being approximately the same as their capture weights of 26.3 and 27.4 g respectively.

At 12.32 that morning I was awaked by shrill cries coming from the cage. On investigation I found that the larger *Nycticeius* had bitten the *Eptesicus* on the snout, drawing blood. The victim was raised up on its wrists, but made no sound, the *Nycticeius* having moved back a few centimetres. The *Nycticeius* then moved back towards the *Eptesicus*, with mouth agape, but seemed reluctant to bite. Both bats held their position for several minutes, and when the *Eptesicus* began to move away it was seized around the head by the *Nycticeius* and crushed in its jaws. The *Nycticeius* then released its grip and began to chew the length of the prey's body before commencing to feed. Pinning the *Eptesicus* down with an extended wing, the *Nycticeius* proceeded to tear patches of fur from the abdomen and feed upon the intestines. After 5 minutes most of the intestines, liver, stomach, and part of the ribcage had been consumed.

Having paused for over 10 minutes, the *Nycticeius* began chewing the left side of the cranium, the brain being drawn into the mouth by swift motions of the tongue. Upon finishing the head only two molars of the lower jaw remained. The shoulders and chest were fed upon next, the muscle being gnawed off rather than cleanly bitten. When it had finished, only the wings, feet, and all bones enclosed by the patagium remained.

The *Nycticeius* then groomed itself for 15 minutes, occasionally stopping to salivate on its wrists and wipe its face. All faecal pellets were collected and examined for fur and bone. No fur or bone was found, but one pellet contained a canine tooth from the *Eptesicus*. Whether bone and fur is masticated so finally that it eludes discovery in the faeces, or digestion breaks it down is unknown.

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Compiled by Lisa Cawthen (University of Tasmania, Hobart) from Web of Science
(early May 2012 – early October 2012)

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Echo Meter EM3

Handheld Bat Detector / Recorder

EM3 - The latest addition to the Wildlife Acoustics product family

The Echo Meter 3 is an all-in-one handheld detector and recorder designed for the active monitoring of bats. The EM3 offers all the features and more of competing solutions, but at a fraction of the price.

- Built-in real-time spectrogram displays current and recent bat passes, in expanded or compressed mode.
- Listen to bat calls in the method of your choice: Heterodyne, Frequency Division or Wildlife Acoustic's patent pending Real Time Expansion – all while simultaneously recording bat passes.
- Record direct to Analook compatible Zero Cross file format or in 16-bit full spectrum (in either .WAV or compressed .WAC format).
- Zoom in and out of recently heard bat calls (on both vertical and horizontal axes) while continuing to monitor and record.
- Playback bat calls in Time Expansion mode at desired speed to hear details of the call.
- The most flexible heterodyne detector on the market:
  - -Auto-Het feature automatically selects frequency based on call dynamics.
  - -Program up to four frequency presets to rapidly tune into a bat call.
  - -Fine tune any feature setting with easy to use button navigation.
- Monitor bat calls with headphones or the built-in speaker.
- Tag a bat call in real-time in one of four categories to facilitate post processing.
- Capture voice notes with bat passes.
- Easily programmed for scheduled recording.
- Fully self-contained, the EM3 is easy to hold, lightweight and requires no additional hardware.
- Optional GPS accessory maps bat signal to location.
- Auxiliary power supply available.
- Optional external microphones available

Specifications:

Power:
Four AA rechargeable NiMH batteries and integrated battery charger included.
Storage:
One SDHC/XC card slot supporting up to 128GB.
Battery Lifespan:
Up to 10 hours on a single charge.
Sampling Rate:
Selectable, 256 or 384 kHz
Recording Bandwidth:
1kHz to 192kHz
Recording Technology:
16-Bit full spectrum or frequency division (zero cross).
Weight:
Less than 0.35kg with batteries

Accessories:

EM3 SMX-US
External Microphone & Lead

EM3 SMX-UT
External Microphone & Lead

Ultrasonic directional horn
for SMX-US/UT

For more information on the EM3 or other Wildlife Acoustics products, navigate to a product sheet at www.faunatech.com.au

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