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# The Australasian Bat Society Newsletter

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**– Instructions for contributors –**

The *Australasian Bat Society Newsletter* will accept contributions under one of the following two sections: Research Papers, and all other articles or notes. There are two deadlines each year: **31<sup>st</sup> March** for the April issue, and **31<sup>st</sup> October** for the November issue. The Editor reserves the right to hold over contributions for subsequent issues of the *Newsletter*, and meeting the deadline is not a guarantee of immediate publication.

***Opinions expressed in contributions to the Newsletter are the responsibility of the author, and do not necessarily reflect the views of the Australasian Bat Society, its Executive or members.***

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. Manuscripts can also be sent on 3½" floppy disk, preferably in IBM format. **Please use the Microsoft Word template if you can (available from the editor).** 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 addresses of authors; 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 addresses of authors. 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.
- Some black and white photographs can be reproduced in the *Newsletter* after scanning and digital editing (consult the Editor for advice). Diagrams and figures should be submitted as 'Camera ready' copy, sized to fit on an A4 page, or electronically as TIFF, JPEG or BMP image files. Tables should be in a format suitable for reproduction on a single page.
- Research Papers and Notes will be refereed, and specialist opinion will be sought in some cases for other types of articles. Editorial amendments may be suggested, and articles will generally undergo some minor editing to conform to the *Newsletter*.
- Please contact the *Newsletter* Editor if you need help or advice.

<b>President</b>	<b>Secretary</b>	<b>Newsletter Editor</b>
Lindy Lumsden Arthur Rylah Institute Dept. Sustainability and Environment 123 Brown St Heidelberg, Victoria 3084 Ph: 03 9450 8694 Fax: 03 9450 8799 Lindy.Lumsden@dse.vic.gov.au president@ausbats.org.au	Maree Kerr 72 Lee Steere Crescent Kambah, ACT 2902 Ph: 02 6296 4823 Fax: 02 6230 0544 Mobile: 0412 311 403 cantcatchme@netspeed.com.au secretary@ausbats.org.au	Kyle Armstrong Kyoto University Museum Yoshida Honmachi, Sakyo-ku Kyoto, Japan 606-8501 Fax: +81 75 753 3276 Mob: +81 90 7118 6844 kyle@inet.museum.kyoto-u.ac.jp editor@ausbats.org.au

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**– Editorial –**

Another bumper issue! – thanks to everyone who contributed, especially Maria Adams for the Recent Literature section, the printing and mailouts, and to Lindy for editorial comments.

There is not much news from the editor this issue, however I am still seeking expressions of interest for the compiled *Newsletters* Vols 1-20 on CD or printed (\$25 and \$100 respectively).

The ABS has been busy the last few months disseminating information about itself in Taiwan (with a poster put together by Lindy for the Symposium on East Asian Mammals, Taichung, Taiwan), and at the recent 4th Annual Australian Wind Energy Conference, held 24-25 February. I have included the information pamphlet put together by Terry Reardon (and with input from others) after the President's Report. There was no further ABS business to report in this issue. The next will include summaries from the FAGM – should be a cracker!

As always, waiting with bated breath for your next contribution ...

**Kyle Armstrong**  
**Newsletter Editor**



A condensation-bejewelled *Rhinolophus cornutus* from Tsushima Island, Japan

*Front cover:* Terry Reardon captured this image of two Southern Bent-wing Bats *Miniopterus schreibersii bassanii* together at Naracoorte.

**– President's Report –**

Hi everyone. I hope you all had an enjoyable and productive summer of batting.

The Financial Annual General Meeting and associated workshops in Melbourne are nearly upon us, and I look forward to several days of discussions and catching up with people. We have arranged a number of workshops on interesting and topical issues. There will be summaries of these workshops in the next *Newsletter* for those of you that couldn't make it to Melbourne. The first workshop is on the impact wind farms on bats. Wind turbines, and proposals for new wind farms, are popping up all over the place, and while I am sure we all support green energy in principal, there are concerns that the proliferation of wind farms will increasingly impact on bat populations. When I first saw wind turbines from a distance, the blades appeared to be moving so slowly that I thought our zippy little bats would have no problems avoiding them. However, I reconsidered this when I stood underneath one and felt the tips of the blades whizzing past me at more than 200 kph. Dead bats are being found underneath wind turbines in south-eastern Australia. I have heard of numbers of White-striped Freetail Bats *Tadarida australis*, Gould's Wattled Bats *Chalinolobus gouldii* and Chocolate Wattled Bats *C. morio* being killed. At some sites in the USA, large numbers of migrating bats have been found dead. We need more information on the impact of wind farms on bats in Australia and how to mitigate these impacts, including determining guidelines for pre-development assessments and post-construction monitoring. As a first step in highlighting this issue, the ABS (produced by Terry Reardon) has compiled a brochure on bats and wind farms. Terry distributed this brochure to delegates at a wind farm conference in Adelaide in February, and to departmental officers dealing with wind farm developments. Our workshop discussions will aim to refine our position on wind farms and discuss what assessments, monitoring and research are required.



Teetering on the brink – the Christmas Island Pipistrelle (*read on ...*). Photo Lindy Lumsden.

On another conservation issue, I would like to alert members to the plight of the Christmas Island Pipistrelle *Pipistrellus murrayi*. Christmas Island is an amazing place, with many endemic species within its small area (only 135 km<sup>2</sup>). The Christmas Island Pipistrelle is endemic and is the only species of microbat on the island. The distribution and abundance of the pipistrelle has declined dramatically in recent years and there is now real concern that it is on the brink of extinction. In the mid-1980s, Chris Tidemann surveyed the bats of Christmas Island and found the pipistrelle to be common and widespread. When I was first there in the mid-1990s it had started to decline and was becoming rare in the north-east section of the island (which is where the settlement is located). By 1998 it had shrunk further west and we could no longer find it in the north-east. This retreat is still continuing with both Greg Richards and David James recording further declines in abundance and distribution. It is now so rare that it can only be found reliably at one site in the far west of the island. Unfortunately we do not know what is causing this decline. The decline commenced before the explosion in numbers of the Yellow Crazy Ant, which had a severe impact on a range of species, but is now largely under control. It appears that something other than the ants triggered the decline, however it is likely that the ants exacerbated the problem. Martin Schulz and I have just written the Recovery Plan for this species, which is available on the Department of Environment & Heritage website if people want to read more about it. Funding and further studies are urgently required to determine the cause of the decline and to start managing it. If anyone is interested in this species or has ideas on ways to help, please contact me. Believe me – this species needs all the help we can give it before it is too late. The ABS will write a letter to the Minister for the Environment and outline the plight of the species and encourage him to fully fund the Recovery Plan.

And finally, on a brighter note, I would like to relate an amusing story that happened on a recent field trip. We were investigating bat activity in remnant vegetation in farmland in northern Victoria and had set up two harp traps in a narrow strip of roadside vegetation, along a gravel road not too far from farmhouses. When we were checking the traps a farmer pulled up in his ute and offered that if we wanted somewhere more private to sleep in our hammocks, we were welcome to use his hayshed. It took a moment for me to realise that he thought the traps were hammocks and that we must have been doing it tough to be needing to sleep on the side of the road! Trying not to laugh we explained that we were catching bats and declined his very kind offer!

**Lindy Lumsden**  
**ABS President**



**Editor's Note:** Our Prez Lindy Lumsden has been in the news lately. The David Ashton Biodiversity Award was presented to Lindy Lumsden and the Conservation of Insectivorous Bats Team, which included Andrew Bennett and John Silins, for their project: 'Bats – the missing link in insect control'. See the websites:

<http://www.dpi.vic.gov.au/dpi/nrensr.nsf/LinkView/F4538077A82DA446CA256F250016664DBB81D4C3ED763371CA256C8D0081E852>

<http://www.abc.net.au/science/news/stories/s1329246.htm>

Thanks to Terry Reardon for the information. If you don't have a robot to type in the super-long address above, you can simply Google it with 'Lumsden', 'Ashton' and 'bat'. Hit the '*I'm feeling lucky*' button.

# Bats and wind farms



## Some bat facts:

- bats are mammals
- all 90 species of Australian bats are native
- bats occur in most landscapes
- bats are nocturnal
- bats are long-lived, have low reproductive rates, and are sensitive to environmental disturbances
- bats provide essential ecosystem services (pollination, seed dispersal, insect regulation).

There are two major groups of bats, generally referred to as microbats and megabats.

Microbats are typically small mouse-sized bats, that eat mainly insects. They use sonar for navigation in the dark.

Eight species of microbats are nationally listed as threatened and are protected under the EPBC Act 1999. Many more species are listed as threatened under State laws.

All reported fatalities of bats from wind turbines, in Australia and overseas, have been microbats.



Goulds wattled bat  
Grey-headed flying-fox



Megabats, or flying-foxes, are large bats. They live on a diet of fruit and nectar. They use vision for navigation. While there are no reports of megabat fatalities caused by collision with wind turbines, they too may be vulnerable. Megabats do not occur in countries where most existing wind farms have yet been built. In Australia, no wind farms have been built near megabat colonies.

The Australasian Bat Society Inc. (ABS) has amongst its aims, to promote bat conservation, and raise awareness of bats by providing information about Australasian bats.

The ABS strongly supports environmentally-friendly energy generation and therefore has no philosophical objection to wind farms.

However, studies in Australia and overseas have demonstrated that bat fatalities have been caused by impact with wind turbines. With the projected growth in the number of wind farm proposals, there is a need to find ways to minimise the ecological impact of wind farms on native bats.

The purpose of this brochure is to:

- provide relevant information about Australian bats and wind farms;
- make recommendations about pre- and post- wind farm construction environmental impact studies.

For further information contact:



## AUSTRALASIAN BAT SOCIETY INC.

PO Box 3229  
Taramama NSW 2026  
<http://abs.ausbats.org.au>  
email: [secretary@ausbats.org.au](mailto:secretary@ausbats.org.au)

### Impacts of wind farms on bats

There is an increasing number of reports from around the world, of fatal impacts by wind turbines on bats.

Where reliable data are available, the bat deaths reported range from 1.6 per turbine per year<sup>1</sup> to over 90 bats per turbine per year<sup>2</sup>.

Even a relatively low number of deaths per turbine per year, could result in many hundreds of mortalities for a single wind farm development.

High annual mortality rates may prove catastrophic for populations of some bat species.

### Steps to minimise the impact upon bats

The selection of turbine sites is the most important stage for minimising harmful impacts to bats.

Bat-friendly site selection involves the following steps:

- consultation with bat specialists during the prospecting stage, and
- thoroughly conducted EIS/EES surveys.

Two other steps are important to the overall process:

- post-construction monitoring, and
- research.

### Early consultation

The ABS recommends that bat specialists be engaged early in the wind farm prospecting process. The early recognition of highly sensitive bat areas can only save time and money.

### Importance of thorough assessment prior to development of wind farm

Comprehensive surveys are required as part of Environmental Impact Statements (EIS) and Environmental Effects Statements (EES) during the planning phase of all new developments to determine what bats may be in the area and how they might be impacted.

Questions that should be asked with respect to a proposed development site include:

- what species of bats occur in the area?
- are any of these listed as threatened under national or state legislation?
- what are the relative activity levels of bats throughout the site? This should be assessed at each proposed tower location.
- how do activity levels vary in response to habitat types (e.g. wetlands, remnant vegetation, open farmland)?
- are there important roost sites in the area (e.g. caves, large old trees with hollows)?
- are there potential migration routes or commuting corridors?
- what are the activity levels of each species at blade height compared to ground level?
- what are the seasonal activity patterns (bats are most active spring to autumn with generally low levels over winter)?
- what is the likely impact upon local populations.

Bat surveys require specialist expertise and equipment. The ABS recommends that bat specialists are consulted during the preparation of EIS/EES so that assessments are conducted using appropriate techniques and sampling methodology, and that all important issues are considered. The ABS has developed minimum reporting standards to ensure that the level of reporting is appropriate.

### The importance of monitoring after wind farm construction

A key element in the goal of reducing environmental impacts of wind farm developments is to learn from the experience of completed projects.

If proper pre-project assessment has been conducted, then developers should have no concerns about supporting on-going monitoring of the effects of wind farms on bats.

It is only by studying existing wind farms, particularly with the inclusion of well-designed monitoring, that potential impacts on new developments can be assessed. Results can then be integrated with targeted research to reduce the impacts upon bats. This improved knowledge base also gives a better platform to inform pre-project assessments (i.e. EIS/EES).

### The need for targeted research

The continuing challenge for wind farm developers and engineers, working with bat researchers, is to find methods to reduce the impact upon bat populations.

Targeted research should be undertaken to look for possible methods to deter bats from flying close to turbines.

Other valuable areas for research include:

- determining why bat strikes occur
- developing models for assessing likely mortality rates
- identifying migration paths and commuting corridors.

**– Research Papers and Notes –**

**A version of microbat holding bags**

**Murray Ellis**

*New South Wales NPWS, PO Box 2111, Dubbo, New South Wales 2830.*

*Email: murray.ellis@environment.nsw.gov.au*

The safety of staff and the efficient handling of animals were two key considerations during fauna surveys in western New South Wales. We decided that we needed bags that indicated clearly the type of fauna within. We chose plain bags for safe or easily-handled fauna, red bags for venomous fauna and blue bags for bats. Dedicated bat bags allowed people not vaccinated for Lyssavirus to identify those bags they were to avoid.

The production of additional bags for the surveys provided the opportunity to design bags specifically for bats. Most fauna-holding bags are tied at the end and then suspended by the ties, and most fauna then make their way to the bottom of the bag away from the opening. Bats tend to climb upwards, as can be seen from the way they accumulate in the catching bags of harp traps. We took advantage of this behaviour when designing new holding bags, so that the hanging support and therefore the bats would always be at the opposite end of the opening.

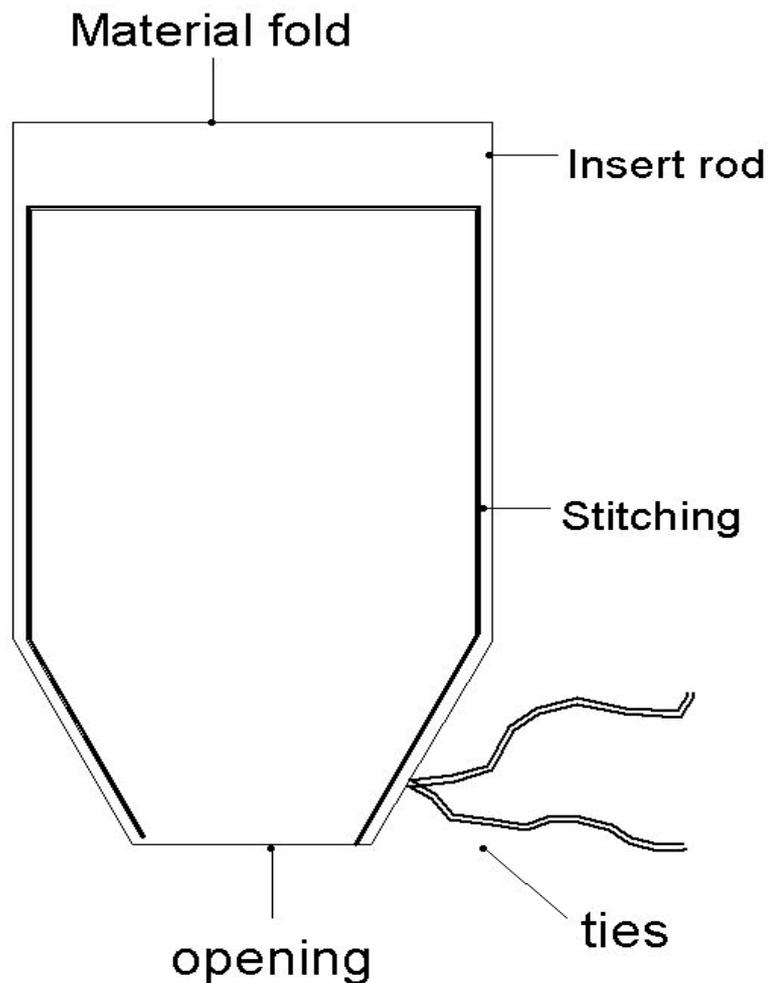


Figure 1. Plan of the bat holding bag.

A length of material used to make the bags was c. 70 cm wide. This was cut into strips that measured 25 x 70 cm. Each piece was then folded in half to give 35 x 25 cm and was stitched as shown in Figure 1, with tie straps attached at the same time. The opening was tapered to c. 15 cm (just wide enough to get my hand in easily) to reduce the chance of bats escaping when being removed from or returned to the bag. Because of the fold, the end opposite to the opening was tubular and formed a pocket through which thin dowel or thick wire could be inserted. This extended several centimetres from either side, allowing the bags to hang inside a cardboard box or an Eskey. When wire was used, the ends had slight hooks bent into them so that they did not slide sideways easily.

When a bag containing bats was suspended the bats usually climbed to the top seam and settled down for the day before being released in the evening. The bats distributed themselves either across the width of the bag or huddled together depending on their preference and thermoregulation needs. Only bats of a similar size were placed in the same bag, and no more than would fit easily across the top of the bag, giving them the opportunity to spread out. During the hot and dry weather common in inland NSW during late summer, the bags could be arranged in a box with a dampened cloth over the top, or in a collapsible Coolgardie safe, to reduce the temperature stress and moisture loss from the wing membranes.

During identification and measurement, the bag to receive the processed bats was hung from whatever was convenient, usually a cardboard box with a hole cut in the wall that the opening end of the bag protruded through. As each bat was processed, it was placed in the opening of the receiving bag and generally the bat climbed to the top. Occasionally, a rowdy bat that wanted to wander downwards required a weight to be put across the mouth of the bag while the next bat was being processed, but usually any wandering bats would soon join the group at the top of the bag. When the bag was full, the opening could be tied off and the bag slid further along the box away from the person doing the processing and a new bag hung ready to receive bats.

While the animals were being transported back to their release sites, the bags were hung by their ties from rods installed in Eskies. The Eskies were used because of their rigidity and ability to insulate animals from extremes of temperature and noise during transport. This meant that the bats had usually climbed to the opening ends of the bags, ready for their release by the time the trapping sites were reached.



## **A comment on microbat hunting strategies**

**Chris Corben**

Web: <http://www.hoarybat.com>, Email: [corben@hoarybat.com](mailto:corben@hoarybat.com)

I was interested to read Leonard Kerry's paper in the previous *Newsletter*, entitled "A winged-insect target-strength model for estimating the prey detection and ranging performance of echolocating bats" (Kerry 2004). I would like to offer a different interpretation of microbat hunting behaviour, which has consequences for the applicability of the model.

Kerry argues (in the 5<sup>th</sup> paragraph of his discussion) that because many bats fly in stratified height bands, they will therefore most likely encounter prey flying at the same height as themselves, meaning in the context of that paper, that they will therefore not be able to detect prey with the maximum possible glint amplitude. This is taken to imply that the model proposed, and other models, will tend to overestimate maximum possible detection distances.

I have no doubt that microbats of different species tend to hunt at different heights above the ground. For example, it is extremely common to find White-striped Freetail Bats *Tadarida australis* hunting high over treetops, while the Eastern Horseshoe Bat *Rhinolophus megaphyllus* is typically found hunting within two metres of the ground. Nevertheless, the strategies employed by the same species under different circumstances can vary a great deal. An example which I encountered recently was that involving Gould's Wattled Bat *Chalinolobus gouldii*. In southern and eastern Queensland, I have usually found them foraging within a few metres of the ground. Yet in two visits to Mumbulla State Forest in southern NSW, two years apart, I found them hunting mainly above the canopy, up with the freetail bat *Mormopterus*, and giving echolocation calls strikingly reminiscent of the molossids. While this variation may be just the result of differences in prey availability, it has obvious consequences for those attempting to quantify geographic variation in acoustic characteristics.

In my view, bat hunting strategies are highly flexible, and many species with which I am familiar in both Australia and North America can be found hunting in a wide variety of situations, even if their most common modes are quite stereotyped. It is also my impression that microbats often hunt in quite different ways during the twilight period compared to that later at night at the same locality.

Irrespective of their typical hunting heights, I have found it very common for bats to either dive down or swoop upwards to capture prey. Although I have never tried to quantify this, it is my impression that deviations from microbat flight paths during prey interception are much more commonly up or down than left or right. I think it is relatively uncommon for prey to be taken from the same height at which the bat was flying prior to prey detection. It is interesting in this context to consider my recent observations of the Red Bat *Lasiurus borealis* in North America. While watching these bats hunting insects attracted to a streetlight, I found that I could detect them with a bat detector from greater distances as they travelled away from me than as they approached. In fact, they are often surprisingly difficult to detect from directly in front, and I usually first picked up calls as the bats were almost overhead. This suggests to me that much of the radiated energy is directed downwards, or at least, not to the front. This is consistent with an echolocation strategy that is most likely to detect prey from above, in which case the maximum possible glint amplitude could be detected. It is very common to see *Lasiurus borealis* dive down onto prey from above.

Accordingly, I suggest that most microbats are probably capable of detecting insects with the maximum glint amplitudes predicted by the models, and that the models' predictions of maximum detection range may not be unduly optimistic. However, these maximum detection distances will lie above or below the bat, not in the direction in which it is flying.

### **Reference**

Kerry, L. (2004). A winged-insect target-strength model for estimating the prey detection and ranging performance of echolocating bats. *The Australasian Bat Society Newsletter* 23: 6-12.



## Bat boxing update from Organ Pipes National Park and Wilson Reserve

**Robert Bender**

*Friends of Organ Pipes, 9 Bailey Grove, Ivanhoe Victoria 3079. Email: rbender@netlink.com.au*

The bat roost box monitoring project at Organ Pipes National Park, on the north-west fringe of Melbourne, has now been in operation for just over ten years. An earlier paper reported on results to early 2001 (Bender and Irvine 2001). Natasha Schedvin began working with us after an inspection of our initial ten boxes on 19 November 1994 yielded 34 bats occupying six of the boxes. Since then more boxes have been added, and three have been removed. There are now 34 boxes scattered around the valley floor of about 5 hectares south of the Pipes and these are inspected monthly. Up to March 2005 we have had 114 box inspection evenings (Table 1).

Table 1. The intensity of box monitoring is reported as number of box inspections per year (July to June).

Year	1994-5	1995-6	1996-7	1997-8	1998-9	1999-0	2000-1	2001-2	2002-3	2003-4	2004-5
Visits	5	6	12	12	12	12	11	12	12	11	9

In that time, box usage by bats has increased markedly, from 74 bats over the 5 inspections in 1994-5 to a total of 993 bats in 2003-4 (Figure 1). In the first 9 months of 2004-5 we captured 1,039 bats, so the year-to-date total already exceeds the previous year's figure, and by extrapolation should exceed 1,200.

No further boxes have been added since 2001, which may be part of the explanation of the halt to growth in numbers. Another part may be the long drought in southern Victoria, as shown in Figure 2, which gives the total spring and summer rainfall over 13 years. An increase in spring and summer rainfall in 2004-5 seems to have led to a further marked increase in bat numbers (Figure 3). The small gap in August 2003 marks a cancelled inspection as wild winds made climbing our ladder too dangerous.

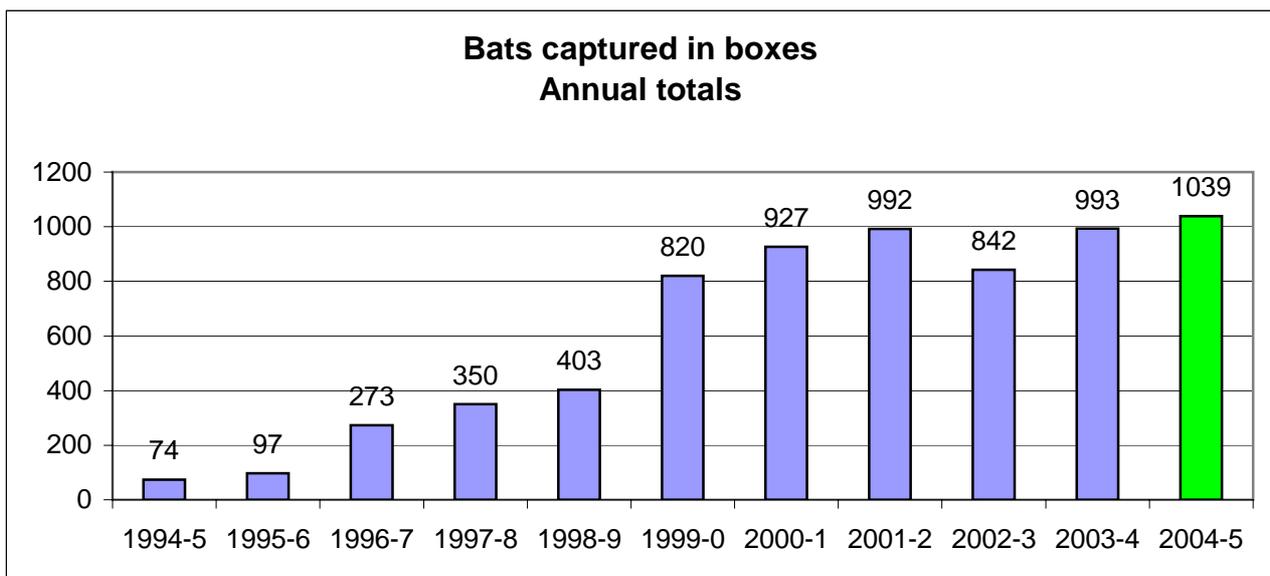


Figure 1. Annual totals of bats captured in the boxes (9 months only for 2004-5).



Table 2. Abundance of each species captured in the boxes, by year (2004-5 is only 9 months of data).

Year	1994-5	1995-6	1996-7	1997-8	1998-9	1999-0	2000-1	2001-2	2002-3	2003-4	2004-5
Gould's Wattled Bat	74	97	273	353	403	740	798	897	816	880	928
Large Forest Bat			6	69	10	73	67	61	13	90	90
Southern Forest Bat				1		4	23			6	15
White-striped Freetail Bat						2	3	32	8	8	4
Chocolate Wattled Bat				2				2	4	8	1
Eastern Freetail Bat							1			1	1

Table 3. Abundance of each species, and the frequency found.

Species		% of bats captured	% of all inspections at which this species found
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	91.14%	91.06%
Large Forest Bat	<i>Vespadelus darlingtoni</i>	7.01%	41.46%
Southern Forest Bat	<i>Vespadelus regulus</i>	0.73%	9.76%
White-striped Freetail Bat	<i>Tadarida australis</i>	0.82%	15.45%
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	0.25%	8.13%
Eastern Freetail Bat	<i>Mormopterus</i> sp.	0.04%	2.44%

In contrast to the regular large number of Gould's Wattled Bats inhabiting the boxes each month, the Large Forest Bats are only occasional visitors, their numbers having peaked just before the drought took hold. Currently the Large Forest bat numbers seem to have settled at about 9% of bats found in the boxes. Again, the figure for 2004-5 comprises only 9 months' records (Figure 4).

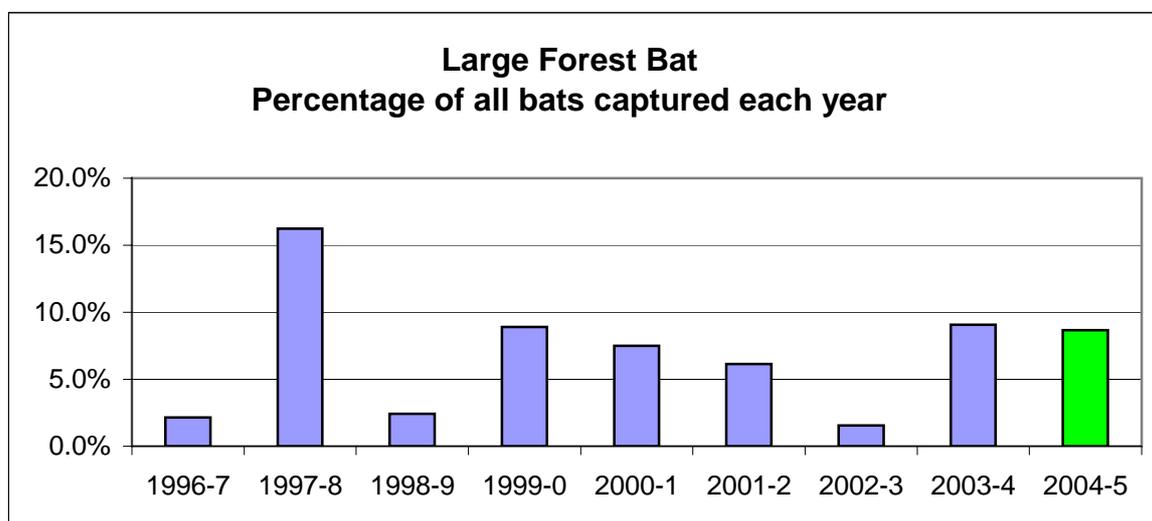


Figure 4. Large Forest Bat: percentage of total bats found each year

### Seasonal usage of boxes

Gould's Wattled Bats have established a 'breeding pattern' of box usage since the start in 1994, with a summer peak, declining through autumn to a virtually abandoning our boxes to over-winter elsewhere (Figure 5).

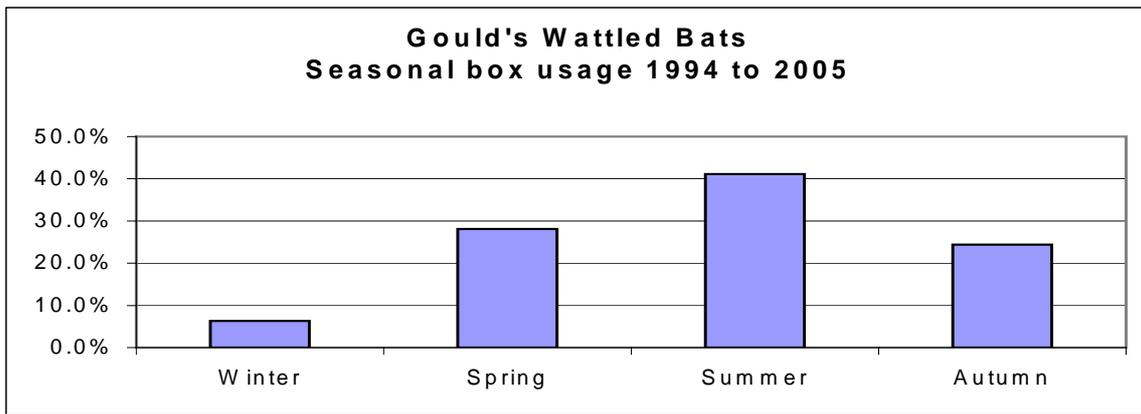


Figure 5. Seasonal box usage by Gould's Wattled Bats.

The pattern of box usage established by the Large Forest Bats is similar to that of Gould's, as they have also been using the boxes as breeding sites, as shown by the presence of juveniles each summer (Figure 6). However, dependent young have never been observed in the boxes and it is evident that the Large Forest Bats relocate to other roosts for the period of the breeding season.

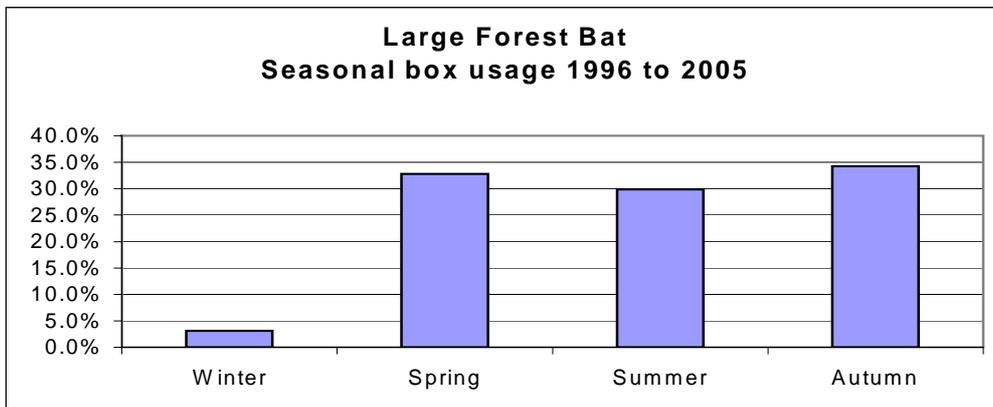


Figure 6. Seasonal box usage by Large Forest Bats.

This pattern of box occupancy by Large Forest Bats began soon after 7 of the boxes were modified to 12 mm entrance slits. This modification seemed to meet the requirements of this species as is evident from their increased occupancy. The other species have shown patterns very different from these two, confining their box usage to one or two seasons, generally autumn or spring (e.g. Southern Forest Bats *V. regulus*; Figure 7).

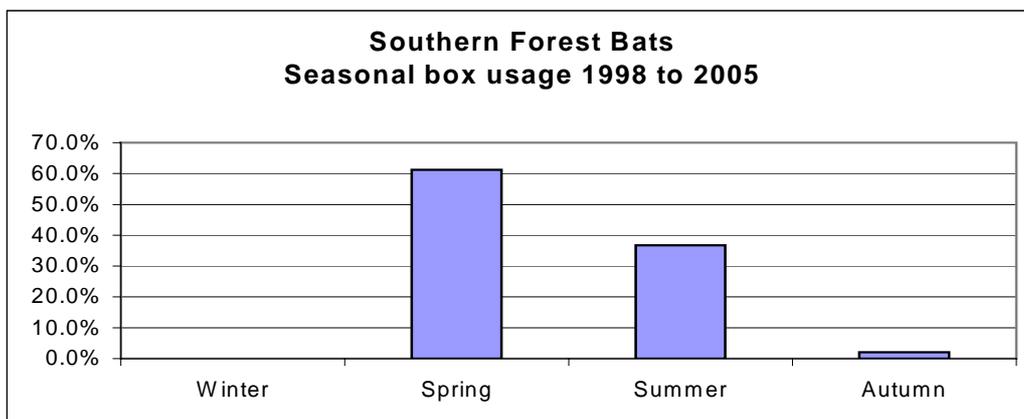


Figure 7. Seasonal box usage by Southern Forest Bats.

**'Winter Roost Boxes'**

As reported in Bender and Irvine (2001), we have attempted to attract bats to roost in boxes over the winter months by installing nine boxes made of thicker timber (45 mm), and have now monitored these over six winters. The results have been surprising, only one of the nine boxes having a maximum usage in winter. Three have maximum usage in summer, two in spring, one in autumn and the last two have a bi-modal pattern peaking in spring and autumn. Two of these boxes have never succeeded in attracting bats through the winter, and two others have only 1 or 2 records of bats occupying them in the cold months (June to August). Therefore, apart from boxes C28 and C29, they do not seem to be a great success.

Table 4. Seasonal usage of "winter roost boxes" 1998 to 2005

<b>Box</b>	<b>Winter</b>	<b>Spring</b>	<b>Summer</b>	<b>Autumn</b>
C28	53	34	23	14
C29	44	68	33	49
C30	0	82	76	111
C31	0	21	61	60
C32	11	114	13	100
C33	8	6	26	21
C34	2	45	22	30
C36	1	28	87	59
C37	11	3	34	15
<b>Total</b>	<b>130</b>	<b>401</b>	<b>375</b>	<b>459</b>

Most of the bats using our boxes seek winter quarters elsewhere, and the 'winter roost boxes' do attract a large fraction of all bats that remain in the park and use our boxes. But as Figure 8 shows, over 60% of bats wintering in our boxes do not use the thick-timbered box-type. These boxes are used by bats much more often in the warmer months, peaking in spring and autumn.

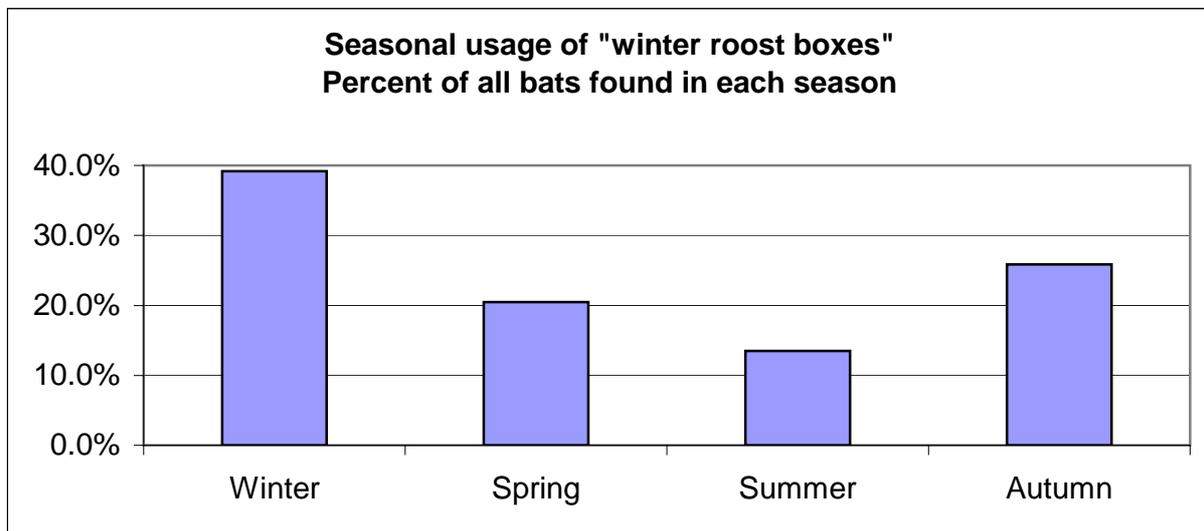


Figure 8. Seasonal usage of 'winter roost boxes' as percentage of all bats found each season.

We now find bats occupying some boxes right through the winter months each year, though in much reduced numbers. However, only one of the boxes intended as a winter roost, to attract bats primarily in winter, has succeeded in doing so. It faces NW, but this does not appear to be a decisive factor, as C34 which also faces NW, has had 2 of its 99 bat captures during winter (Figure 9).

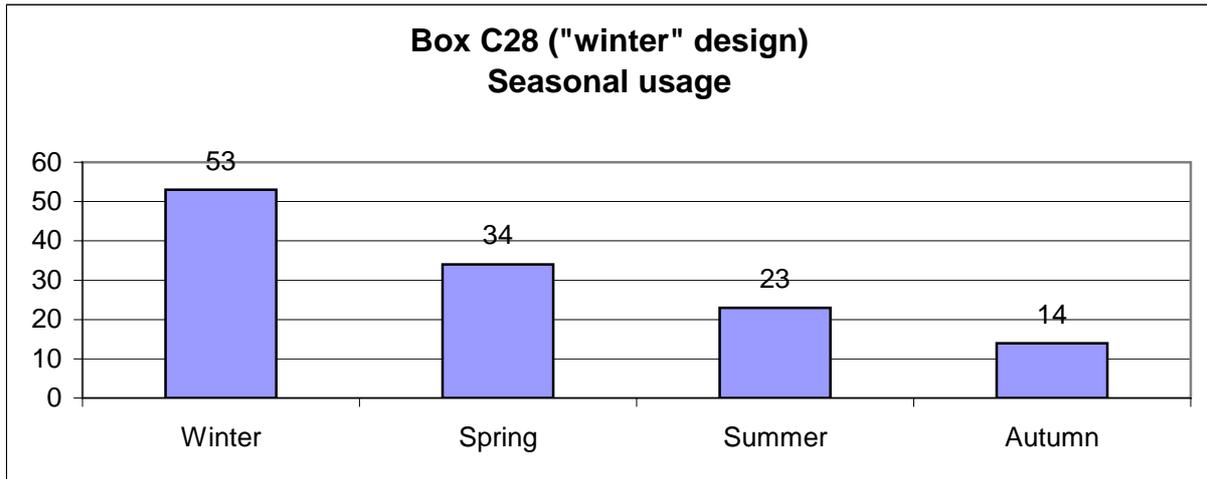


Figure 9. Seasonal usage of Box C28.

**Bat boxes in Wilson Reserve, Ivanhoe**

Finally, for comparison, I set up eight roost boxes of the same design as the ones at Organ Pipes (the non-winter boxes, made of 19 mm pine) in a municipal reserve in Ivanhoe, in August 2000. They are all attached to River Redgums about 6 metres from the ground. Wilson Reserve is a 40 hectare riparian reserve on the north bank of the Yarra River, surrounded by golf courses and sports fields.

After a wait of four and a half years, and 24 previous box inspections, during which the usual Huntsmen and Black House Spiders were found, I found one Gould's Wattled Bat in February 2005. In March I found one Gould's Wattled Bat in one box and another three of the same species in another box. None of the boxes at Organ Pipes took so long to attract bats. I suspect the summer rains caused a population explosion of insects, making breeding success among insectivores far greater than usual and putting pressure on available natural hollows, so one adventurous Gould's Wattled Bat found there was an alternative roost site when the others were overcrowded. Most of the boxes at Organ Pipes were used within a few months of being installed, but in an area almost totally depleted of natural hollows by over a century of deforestation.



Figure 10. Gould's Wattled Bat inside roost box, Wilson Reserve, Ivanhoe, Feb. 2005

### **Concluding Remarks**

In summary, the roost boxes at Organ Pipes have been very successful for over ten years, and the more recent set at Wilson Reserve are starting to show evidence that they will also be successful. Boxes designed as 'winter' roosts seem less successful in fulfilling their purpose and are used as all-seasons roosts or are even avoided in winter. The species most prepared to adapt to artificial hollows seems to be Gould's Wattled Bat, which uses them as breeding sites and has experienced a very large increase in population over ten breeding seasons at Organ Pipes NP.

Artificial roost boxes are a good substitute for natural hollows in regrowth forest, although expensive when comparing the value of timber removed and the cost of construction and long-term maintenance of a large enough set of boxes to sustain a sizeable population of bats. But if funding can be found, they do help several bat species to re-establish in severely disturbed areas long before natural hollows become available again.

The readiness of one species, Gould's Wattled Bat, to colonise such boxes and use them as breeding sites, is likely to give them a great competitive advantage in such regrowth forests, and alter the composition of bat communities so they become totally dominated by this one species. Harp trapping at Organ Pipes before the boxes were put in place showed Gould's Wattled Bats to be a very minor species in this area – only 3% of bats captured – but now the species comprises over 91% of the bats we capture in the area. Little Forest Bats (*Vespadelus vulturnus*) which was the species most frequently trapped in 1988, has never been found in our boxes and now forms a tiny percentage of our annual harp trapping captures. Therefore, artificial roost boxes are a very useful way to encourage bats to roost in a regrowth area but they radically alter the population composition in favour of one particularly adaptable species.

### **Acknowledgements**

Much thanks to Natasha Schedvin for critical review of an earlier draft of this paper and many helpful suggestions for improving it.

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## **Record of a long-eared bat in the Hunter Valley**

### **Jodie Rutledge**

Newcastle & Hunter Valley Speleological Society / ABS member. Email: Jodie@rutco.com.au

We had a field trip to Timor Caves (Hunter Valley, NSW) recently in February. Early on the Sunday morning walking over to a cave, one of our members spotted a dead bat on the road. I examined him but wasn't able to identify him on the spot as he was a species I had not seen before (I'm used to seeing Eastern Horseshoe Bats and Large Bent-wing Bats mostly), but I knew he would be easy to identify with my "Churchill" (thanks Sue) as he had a distinctive flap of skin across the top of his forehead stretching from the bottom of a long pair of ears.

Sure enough when I got him home and out of the eski, I was able to identify him as a "Lesser Long-eared Bat". He had a gash across his chest poor little fellow. We think he must have swooped down to catch an insect in front of a car.



**– Reports and Viewpoints –**

**A snapshot of the ABS**

**Damian Milne**

*ABS Membership Officer, c/o Biodiversity Conservation – DIPE, PO Box 496, Palmerston, NT 0831  
Email: [membership@ausbats.org.au](mailto:membership@ausbats.org.au)*

As Membership Officer for the ABS, one of my jobs is to manage the contact details of the ABS members (currently 264). I'm also one of these people who likes to stare at a road atlas for hours on end dreaming of the next 4WD adventure. So, based on postal addresses, I decided to locate all the cities, towns and other places (half of which I'd never heard of) of all the ABS members. The result of my weekend with a map and box of drawing pins is shown in Fig. 1 (my apologies if I've missed anyone).

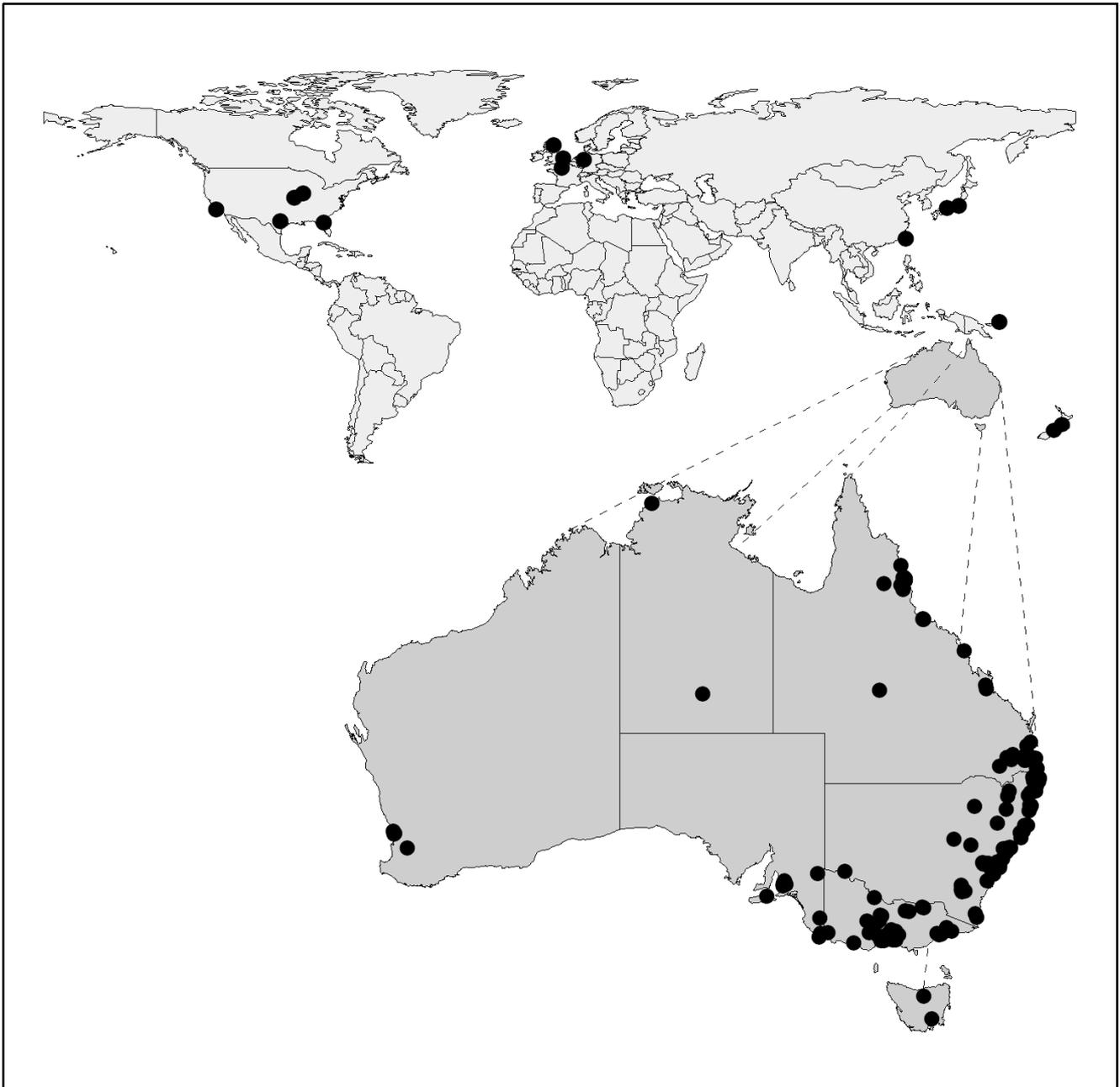


Fig. 1. Locations of ABS members.

To break it down further, Table 1 shows the number of members in each state and territory as a proportion of population (not a rigorous statistical analysis, but interesting none-the-less).

Table 1. Number and proportions of ABS members by State and Territories

<b>State or Territory (population*)</b>	<b>Number of members</b>	<b>No. of members per head of population (x 100,000)</b>
NSW (6,716,277)	100	1.5
QLD (3,840,111)	59	1.5
VIC (4,947,985)	53	1.1
SA (1,531,375)	15	1.0
NT (198,700)	9	4.5
ACT (322,579)	7	2.2
WA (1,969,046)	4	0.2
TAS (474,305)	2	0.4
Rest of the world (6,415,994,280)	15	0.0002
<b>TOTAL</b>	<b>264</b>	

\*Australian Bureau of Statistics (2005) <http://www.abs.gov.au/>

NSW wins the prize for the state with the highest number of members, but in terms of population size the Northern Territory comes out in front (go the Territory!). Western Australia is lagging behind a little but the rest of the world really needs to pull its socks up! In the battle of the sexes the boys just pip out the girls with 51% of ABS members male and 49% of ABS members female.



## **Membership renewals**

While on the subject of membership, there are quite a few members that have not paid this years subscription. Please send your form to Damian (download another one from the website if you have lost it), or if you are not sure of your current status, give Damian an email. I am sure he would love to hear from you!



## **Introduction to the Bat Association of Taiwan**

**Chao-Lung Hsu**

*Bat Association of Taiwan. P.O.BOX 5-1225 Taichung City 407-99, Taiwan  
Email: maiochiou@bats.org.tw; see also <http://www.bats.org.tw>*

In the West Pacific Ocean, there is a small, beautiful, and fantastic island. The island is a bright pearl in the Pacific Ocean. It is Taiwan.

Taiwan is 394 km long and 144 km at its widest point (Figure 1). It is located between 21°53'50" and 25°18'20"N latitude, and 120°01'00" and 121°59'15"E longitude. The area of Taiwan Island is about 35,800 km<sup>2</sup>. Besides Taiwan Island, there are 85 smaller islands, coral reefs, and rock reefs. Except for Penghu (the Pescadores), Kinmen, Matsu, Lyudao (Green Island), and Lanyu (Orchid Island), most are unoccupied. The total area of Taiwan Island and other smaller islands is about 36,000 km<sup>2</sup>. Taipei is only 1/10<sup>th</sup> the area of Melbourne.

The geography of Taiwan makes it unique among the countries of the world. Although located in subtropical and tropical zones, Taiwan owns tropical, subtropical, and temperate climates. In the wintertime, most of the high mountains are covered by snow. Here, it is very easy to travel from tropics to temperate in several hours. If you want to visit Taiwan, remember to bring clothes for all seasons.

Taiwan is very young geologically. Due to continued pressure by the Eurasian plate and the Philippine Sea plate, Taiwan keeps uplifting about 8 cm per year. In Taiwan, there are 293 mountain peaks higher than 3,000 metres (Figure 2). Jade Mountain is the tallest peak: 3,952 metres. Less than 1/3 of the area is flat land. This flat land is crowded with more than 23,000,000 people.

Because of the pressure of the plates, Taiwan is not always in tranquillity. Earthquakes can happen anytime, anywhere. Another infamous natural phenomenon is the typhoon. Typhoons visit Taiwan each summer and autumn. The BBC recently made a nature video of Taiwan, entitled "Typhoon Island".

Although Taiwan is small and has such natural disturbances, it has one of the highest bat diversity, based on its area, in the world (Table 1). Because of the high mountains, it is easy to understand how we can find new species of bats in Taiwan. Even now, we are still finding new species of bats. Unlike other places, Taiwan has more species of chiropterans than rodents. There are at least 32 species of bats, but only 19 species of rodents. Taiwan is really a bat paradise!

Table 1. Land area and bat diversity of Taiwan and Australia, Britain, Japan, and USA.

<b>Place</b>	<b>Area (km<sup>2</sup>)</b>	<b>Bat Species (N)</b>	<b>Bat Species/10,000 km<sup>2</sup></b>
Australia	7,713,364	75	0.097
Britain	245,000	16	0.653
Japan	377,873	36	0.953
Taiwan	36,000	>32	8.889
USA	9,372,614	45	0.048





Figure 1: Map of Taiwan and outlying islands.

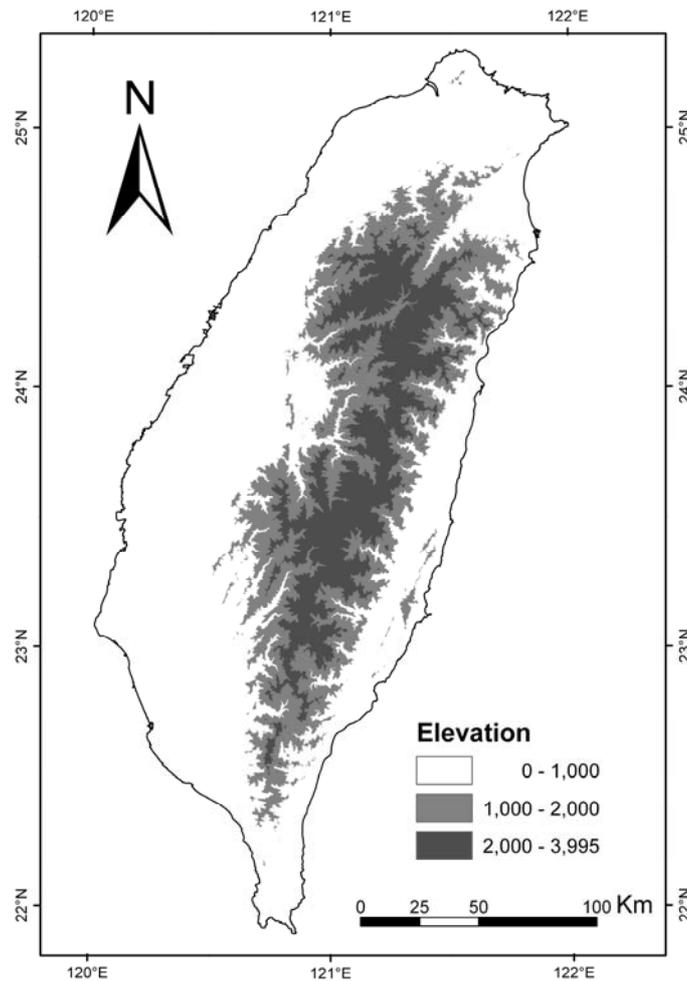


Figure 2: Elevation map of Taiwan (Drawn by Yu-Huang Wang).

It wasn't until 1988 that scientists really began to study Taiwan's bats. At that time, only 17 species were known. According to published papers, Taiwan had 22 species of bat in 1997. The 2004 count includes 30 species (Table 2). Now, more and more undergraduate and graduate students are interested in bat research. They focus on ecology, behaviour, physiology, echolocation, and molecular biology.

Primary and secondary schools in Taiwan never had any classes on bats. Unfortunately, even in Taiwan, some people are afraid of bats. Those who fear bats have watched too many scary movies about vampires. Taiwan does not have a vampire bat to make people worry. So, our bad impressions of bats are imported from Western cultures. Most people here do not hate bats. They think the bat is a mascot that can bring luck. This is because the word for luck and the word for bat sound the same. This makes bat education to the general public relatively easy. People here quickly accept that bats are harmless and cute.

The Bat Association of Taiwan (BAT) was founded in March 2004. Members of BAT include professors, teachers, students, and the general public. Members do not only include people in Taiwan. We also have members in Japan, Hong Kong, and Australia.

Our activities include:

1. Bat research, education, and conservation.
2. Interaction with international bat associations.
3. Development of a bat research and conservation centre in Taiwan.

The BAT does not just serve people who care about bats in Taiwan. With the help of the internet, people in Taiwan, China, Hong Kong, and Malaysia can visit our website to learn more about bats, receive bat e-papers, and find answers to any bat question. Since this is the only bat website in Chinese, many people outside of Taiwan also use our website.

In our website, people can find information on the organization, duties, purposes, staff, volunteers, research plans, and education projects of BAT. The website provides all the information on Taiwan's bats, including photos and drawings. People can also find information on the reasons, principles, and ways to help bat conservation, including how to take care of wounded bats or deserted pups. With the help of a guest book and web forum, it is convenient for general public to communicate with us. This helps us to answer their questions and solve problems relevant to bats.

We are keen to cooperate with other organizations, like the ABS (Australasian Bat Society). We have formed an alliance with ABS. We are eagerly looking forward to working with more partner organisations to make a wonderful future for bats.

In 2005, we have much work to do. Bat education and investigation are the most necessary ongoing duties. We continue to educate students and teachers at schools. We continue to collect records of bat species and sightings in Taiwan. Of course, we encourage more and more people to make and use bat houses. One goal for this year is to publish a bat book for young students and the general public. In addition, we are working with two county governments to protect the bat caves in their counties. We are training volunteers to be interpreters and bat watchers. This summer, we will have a bat watch in Taiwan. We hope our volunteers will be able to help educate people to ensure the well being of bats.

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The Bat Conservation Trust. <http://www.bats.org.uk/>

Table 2. Bat species in Taiwan.

Family	Species	Endemic
Pteropodidae	<i>Pteropus dasymallus formosus</i>	Endemic subspecies
	<i>Cynopterus sphinx</i>	
Hipposideridae	<i>Hipposideros terasensis</i>	Endemic species
	<i>Coelops frithi formosanus</i>	Endemic subspecies
Rhinolophidae	<i>Rhinolophus formosae</i>	Endemic species
	<i>Rhinolophus monoceros</i>	Endemic species
Vespertilionidae	<i>Arielulus torquatus</i>	Endemic species
	<i>Barbastella leucomelas</i>	
	<i>Eptesicus serotinus horikawai</i>	Endemic subspecies
	<i>Harpiocephalus harpia</i>	
	<i>Harpiola</i> sp.	Status unknown
	<i>Kerivoula</i> sp.	Status unknown
	<i>Miniopterus schreibersii</i>	
	<i>Murina puta</i>	Endemic species
	<i>Murina</i> sp.	Status unknown
	<i>Murina</i> sp.2	Status unknown
	<i>Murina</i> sp.3	Status unknown
	<i>Myotis watasei</i>	Status unknown
	<i>Myotis flavus</i>	Status unknown
	<i>Myotis latirostris</i>	Endemic species
	<i>Myotis taiwanensis</i>	Endemic species
	<i>Myotis</i> sp.	Status unknown
	<i>Myotis</i> sp.2	Status unknown
	<i>Myotis</i> sp.3	Status unknown
	<i>Nyctalus noctula</i>	Status unknown
	<i>Nyctalus velutinus</i>	
<i>Pipistrellus abramus</i>		
<i>Pipistrellus</i> sp.	Status unknown	
<i>Pipistrellus</i> sp.2	Status unknown	
<i>Plecotus taivanus</i>	Endemic species	
<i>Scotophilus kuhlii</i>		
<i>Vespertilio superans</i>	Status unknown	
Molossidae	<i>Tadarida</i> sp.	Status unknown



## **Bat Society of Taiwan**

### **Yearly Summary 2004 (March – December)**

#### **Chao-Lung Hsu**

*Bat Association of Taiwan. P.O. Box 5-1225 Taichung City 407-99, Taiwan*

*Email: maiochiou@bats.org.tw; see also <http://www.bats.org.tw>*

and

#### **Cara Lin Bridgman**

*P.O. Box 013, Longjing, Sinjhuang 434, Taiwan*

*Email: caralinb@ms68.hinet.net*

#### **Research**

- Bat Research and Education Project, Nan-Ying Tsung-Yeh Arts and Cultural Center (<http://tyart.tnc.gov.tw/good/>), Tainan County (March-Jun).
- Bat Survey of Dongshan, Tainan County (July).
- Bat Research Conference in Taiwan (18-19 September).
- Bat Fauna of Northwest Yushan National Park (Year 1) (September-December).
- Conducted bat surveys in Hsinchu, Nantou, Yunlin, Tainan, Kaohsiung, and Hualien Counties (March-December).

#### **Education**

- Conducted educational activities in cooperation with the Butterfly Conservation Society of Taiwan and the Hsinchu and Taichung Branches of the Society of Wilderness.
- Lead bat watching activities in Taipei, Yunlin, Tainan, and Hualien Counties.
- Gave lectures on bats to four high schools, several elementary schools, two kindergartens, and bookstores.
- Lectured the general public on bat box construction and use.
- Cooperated with the Yunlin County Bird Club during the bird migration season by lecturing on Yunlin County bats. (November 21).
- Supplied basic information on Taiwan's bats for films produced by the Taiwan Endemic Species Research Institute, for use in the Public Television Service series "Our Island," and for shows produced by DA-AI Television and GALA Television.
- Helped the National Museum of Natural Science, Taichung, develop details and educational activities for a special exhibit on bats.

#### **Other**

- Local newspapers interviewed Dr Liang-Kong Lin and Mr. Chao-Lung Hsu on the society's activities.
- The society received two visits by members of the Australasian Bat Society: Dr. Lindy Lumsden, President, and Dr. Kyle Armstrong, Editor. We continue to exchange articles and information with them.



## **Extreme bat watching: Thai-style**

**Jon Hall**

*Analysis Branch, Australian Bureau of Statistics (the other ABS), ph: 02 6252 7221, fax: 02 6252 8015  
Email: jon.hall@abs.gov.au*

“Jon Hall spots mammals like some people spot birds. Many members of the ABS have indulged his hobby and helped him see a fair proportion of Australia’s bat species.”

I first got a taste for Thai bat watching in 2003, when I came uncomfortably close to death. My journey up a 200 metre cliff in the rain rapidly deteriorated from walk, to scramble, to full-on rock climb. My nervousness never quite descended to terror though because I was too preoccupied with the embarrassment of trying to keep up with the 70 year old villager leading the way. He had a crafty knack of managing to remain just far enough ahead of me so I that couldn’t see the important details of his route up the cliff face, leaving me to puff, slip and curse my way up after him. His *piece de resistance*, and the final obstacle between me and the cave entrance, was having to negotiate a 10 metre long plank, balanced across the top of two shrubs (I wouldn’t dignify them with anything as solid-sounding as ‘trees’). As I took my first steps across the 100 metre drop, my remaining Thai companion (the other three had turned back), a born again Christian, began some seriously ominous prayers “Dear god please let us survive this journey, especially Mr Jon who mustn’t die and leave his baby”. The million or so Wrinkle-lipped Bats inside the cave were probably worth it, at least until I found out that the much vaunted ‘easier way down’ didn’t exist.

You might think that I’d learnt my lesson, but spurred on by the thought of a few more mammals to add to my little list, I went to Hala Bala National Park, on the Thai-Malaysian border in October. It is a pretty park, more famous for its hornbills than its bats, but particularly quiet at that time because so few foreigners were visiting. Official DFAT advice was not to visit this bit of Thailand because of a low level guerrilla war being mounted by Muslim separatists. But Thai friends assured me it would be okay. Terrorists however were to be the least of my worries.

One of the rangers – Kla – was studying Hala Bala’s bats. He was a young man, passionate about his bats, and keen to try to catch me some. And I of course, spurred on by a potential frenzy of new species for my list, was keen to help. Kla and I rendezvoused just before dusk to travel to the trap site and set up his home made harp trap. Unfortunately the park vehicle was otherwise engaged, and so we had to travel by motorbike. Kla asked if I could carry the aluminium poles from the harp trap, and recommended I hold them up in the air. I must have looked a bit like a 2 wheeled TV aerial .... or a mobile lightning conductor.

The rain clouds were gathering as we set off up the mountain. Sure enough, 5 minutes out of camp the first spots started ... closely followed by some awesome sheet lightning directly overhead. We pressed on up the hill with the lightning cracking every few seconds, and me trying to remember my year 10 physics and whether the rubber motorbike wheels would stop the lighting from travelling through me once it hit – as it surely would – the trap poles I was still carrying (though I was no longer carrying them quite so high in the air – indeed they nearly went through the spokes a couple of times). Kla picked up speed to beat the weather; the rain became torrential; the road disappeared under a couple of inches of water. And, as the sun sank, and Kla opened up the throttle again, he shouted his apologies that we didn’t have a working headlight.

It was then that I began to get concerned that I wasn’t wearing a helmet. Not because I thought it would help my chances of survival – by this point in the journey I realised that death was certain, helmet or not. Just as certain as death, and more concerning, was the embarrassing certainty of the mutterings at my memorial service “But what was he doing not wearing a helmet. Him and his bloody mammal list”. And as I took a last look around me and closed my eyes to watch my life flash past, Kla gave up and took shelter under a bridge. I sat under the bridge and thought how wonderful it was to be alive, while the small creek became a raging torrent.

The rain eventually turned into drizzle and we set up the trap. A few hours later we'd caught a single *Rhinolophus malayanus*. Not quite the treasure trove I'd imagined but a new species nonetheless and one I will remember. Kla recommended I return in the dry season. I'd be inclined to agree.



The *Rhinolophus malayanus*.



The spectacular *Megaderma spasma* that I also saw with Kla in Thailand (though this photo was taken a week later in Malaysia).



## **Out to bat for Gold Coast flying-foxes**

**Vicki Bressan**

Bat Rescue Inc., Gold Coast, PO Box 415 Harbour Town, Biggera Waters Queensland 4216.  
Email: batrescue@pjburnsgoldcoast.com.au

Bat Rescue Inc. Gold Coast (BRGC), a branch of Bat Rescue Inc. based on the Sunshine Coast, was formed in 2003 and is a rapidly growing band of dedicated carers committed to the welfare of local bat populations.

Although bat rescues and rehabilitation are an important part of the group's activities, the main focus of BRGC at present is to conserve local flying-fox colonies by promoting their ecological importance through a range of education and conservation initiatives.



The primary project undertaken by the group in 2004 was "*Cascades Gardens Flying Fox Colony Enhancement and Management Project*". With the construction of the new Gold Coast Convention & Exhibition Centre (which is adjacent to the Cascades Gardens colony in Broadbeach, near Surfers Paradise), a proposal for a fly-out observation deck and interpretative signage was submitted to the developer, Jupiters Limited. Agreement in principle was received from Jupiters, who felt that the project was in keeping with their scope of work and was a positive contribution to the community. BRGC members commenced work on the finer details of the project, including an additional four

interpretative signs to be erected at the colony itself. This effort culminated in the production of a 55 page project plan with a total value of \$60,000. Funding for the project was sought from the Threatened Species Network for the interpretative signage and bushcare aspects of the plan, and a total grant of \$16,000 was approved in the funding round announced September 2004. The balance of the funding needed was made up of in-kind donations by other agencies. Jupiters have subsequently also generously donated the sum of \$8,000 towards the erection of similar signs at another Gold Coast colony.

The bushcare aspect of the project, comprising weed control, vegetation improvement within the colony and the provision of a buffer zone, will commence in the coming months. It is intended that this work will stabilise colony usage of the site, thereby encouraging the animals to remain within a limited area, thus reducing the incidence of bat/human contact. Great interest has also been aroused amongst local tour operators who are starting to include a visit to the Cascades Gardens colony as a regular part of their sightseeing itinerary. Feedback from the local tour operators indicates that international tourists are delighted at the opportunity and amazed to see these Australian native animals in the heart of the Gold Coast tourist strip, and it is helpful that there is now some information onsite about the behaviour and ecology of these animals.

Positive feedback and keen interest has since been expressed by other wildlife groups in replicating the signage and project methodology at their own local colonies, the most recent being the Wildlife Preservation Society Hervey Bay.

With this project now well underway, BRGC are already working on an assortment of other projects aimed at creating positive public image, stimulating eco-tourism at the Cascades Gardens colony site and promoting the understanding and an appreciation of flying-foxes in general through a range of education initiatives and community involvement.

Another initiative currently in progress is the “*Bundling Project*”. Armed with photographs and data collected over a period of months, BRGC met with Energex (Queensland’s electricity supply company) executives last year to request bundling of electrical cables at a prime Surfers Paradise trouble spot where it had been observed over a period of time that an alarming number of flying-foxes had been electrocuted. Energex immediately rectified the problem and now collaborate with BRGC on a regular basis identifying and rectifying trouble spots as part of their maintenance program.

The Cascades Project was undertaken by BRGC members Robert and Jenny James, Gary and Vicki Bressan who wish to publicly and gratefully acknowledge the input and support of the following:

- Craig Devlin, Development Executive, Jupiters Limited
- Scott Hetherington, Wildlife Ranger Queensland Parks and Wildlife Service
- Dr Greg Richards, Greg Richards and Associates Pty Ltd
- Dr Nicola Markus, National Coordinator, Threatened Species Network
- Keryn Hyslop, State Co-ordinator, Threatened Species Network
- Ron Jacobs & Phil Watts, Gold Coast City Council
- Dr Adrian Volders, Natural Resource Management, South East Queensland
- Sally Spain & Doug White, Wildlife Preservation Society of Queensland, Gold Coast and Hinterland Branch
- Bat Rescue Inc Sunshine Coast
- Louise Saunders, Artist/Illustrator



Fly-out Observation Deck, Gold Coast Convention and Exhibition Centre



## **Time to stop the killing**

**Carol Booth**

Queensland Conservation, 166 Ann St, Brisbane Queensland 4000. Email: carol.booth@gmail.com

### **Introduction**

Australian wildlife laws have been very poorly, if at all, enforced. Despite widespread acknowledgement and some evidence of illegal killing of flying foxes on orchards, there has never been prosecution of a fruit grower or anyone else for killing flying foxes.<sup>1</sup>

[STOP PRESS: after this article was submitted, the first prosecution for the killing of flying foxes took place. On 11 April, a 17-year-old male was convicted and fined for killing 48 Little Red Flying Foxes near Lowood, Queensland.

See details at: <http://www.epa.qld.gov.au/projects/media/?release=801>]

It is a small relief, then, that recent reforms in federal and Queensland laws allow members of the public to take action in the courts to stop illegal killing of flying foxes. This was done for the first time under federal legislation in 2000, resulting in an injunction to stop the use of electric grids on a lychee orchard in north Queensland.<sup>2</sup> In 2003 in response to advocacy by the Environmental Defenders Office (EDO) and Queensland Conservation the Queensland government finally reformed the *Nature Conservation Act 1992* to give similar 'standing' to citizens and NGOs.

One late afternoon in December last year, Dominique Thiriet and I scouted rapidly around a lychee orchard in north Queensland. Dead Black Flying Foxes lay underneath the electric grids. At first light the next day we returned to find newly dead flying foxes on the grids. In Queensland it is now illegal to use lethal electric grids. Later inquiries revealed that this fruit grower had never had a permit to kill flying foxes, a requirement since 1994 when flying foxes were finally replaced on the protected list under Queensland law. In addition, this same farmer was reported to the EPA in 2003 for electrocution and shooting of Black Flying Foxes.

Thus, the capacity of citizens to stop such illegal activity under Queensland law will be tested for the first time in *Booth v Frippery*.<sup>3</sup> The case will be heard in August in Townsville, run by the legal team of solicitors from the EDO Qld and barrister Chris McGrath. We are seeking an injunction against further killing of Black Flying Foxes (unless authorised by the Environmental Protection Agency), an order to dismantle the grids and some redress in the form of a donation for flying fox rehabilitation.

In this article I want to explore some of the vexed questions around killing of flying foxes on orchards, with most of my focus on Queensland.

### **War against flying foxes**

Ever since Europeans started planting fruit in Australia they have conducted a fierce war against the native critters who eat these crops, particularly flying foxes. In the 1890s, the Pialba Fruitgrowers Association advocated that the Queensland government legislate to get rid of the "noxious pests." Subsequently the Department of Agriculture set up 'The destruction of flying foxes account' to subsidise shotgun cartridges to shoot flying foxes.<sup>4</sup> Francis Ratcliffe (1931) listed some of the varieties of methods used to kill flying foxes: shooting ("expensive and ineffective"), strychnine poisoning ("partially

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<sup>1</sup> It is not just flying foxes. As far as I know there has been just one prosecution in Queensland for killing of wildlife on a farm: a recent prosecution of staff and a company director of Barramundi Waters fish farm for killing pelicans, striated herons, masked lapwings and other birds in 2002 and 2003.

<sup>2</sup> *Booth v Bosworth (No 2)* [2001] FCA 1453 (17 October 2001): [http://www.austlii.edu.au/au/cases/cth/federal\\_ct/2001/1453.html](http://www.austlii.edu.au/au/cases/cth/federal_ct/2001/1453.html).

<sup>3</sup> It is fitting that bats are the subject of the first third party action under the Queensland Nature Conservation Act. The one previous attempt by a third party in court to stop the killing of wildlife in Queensland under wildlife legislation was also about bats, when the Queensland Speleological Society unsuccessfully tried to stop Queensland Cement blowing up a cave at Mt Etna. The attempt failed due to the lack of standing that the group had to have to bring the action.

<sup>4</sup> Cited in Shirreffs (2002)

successful”), poison gases – chlorine and hydrogen cyanide (ineffective), infectious diseases (unsuccessful), flame guns (“distinctly promising” but cruel) and explosives (“complete failures”).

We have progressed since then: there is no longer open slather on flying foxes; they join the rest of our native species on ‘protected’ lists; and there is no longer community acceptance of attempts to exterminate them.

The war is more constrained now. There is a quota approach to licensed culling of flying foxes<sup>5</sup>, and shooting is the only lethal method allowed. In Queensland, for example, during the past three seasons, an orchardist has been able to apply for a permit to shoot at most:

- 15 Spectacled Flying Foxes/month (total Queensland quota of 1800)
- 20 Grey-headed Flying Foxes/month (total Queensland quota of 1280)
- 30 Black Flying Foxes/month (total Queensland quota of 3500)
- 30 Little Red Flying Foxes/month (total Queensland quota of 4000)

These totals represent less than or about 1% of the lowest estimate of state populations and therefore seem quite conservative.

However, the whole approach to culling on orchards is founded on highly dubious assumptions that (a) growers will not kill illegally, and will abide by permit conditions, (b) the quotas do not undermine recovery of the two vulnerable species, (c) killing by shooting is humane and (d) limited culling is an effective method of crop protection.

### **Problems with the lethal approaches to crop protection against flying foxes**

*The anomaly of electric grids:* In Queensland we have the anomaly that use of lethal electric grids is illegal, but their possession is legal.<sup>6</sup> Thus, with the flick of a switch fruit growers are able to activate these large ‘walls of death’. Often out of sight, on private property, at night, their use is largely undetectable by wildlife agencies. In response to calls for amendment of laws to require that grids be dismantled, Minister Desley Boyle has said “indications are that this [use of lethal electric grids] is not widespread practice.”<sup>7</sup> It’s easy to assert a negative when the positive is almost impossible to establish. Unfortunately it will be largely up to the public to test it.

*The likelihood of illegal killing:* Given the culture and history of killing wildlife in Australia, and the disdain of some farmers for environmental laws, there is a high probability that substantial illegal killing of flying foxes is occurring. For example, Patrina Birt (2000) reported that culling usually exceeds the permissible take by 5 to 6-fold. My own investigations in 2000, focused on grids, found that 7 out of 10 orchards visited had probably either killed flying foxes without a permit or exceeded permit numbers. And that was in the days when permitted numbers were quite liberal. Now the quota approach means that a grower in north Queensland is allowed to kill a Spectacled Flying Fox on average every second night. What are the chances that growers will consistently stop at their quotas? The number of legal dead will not save them much fruit.

Look at the extent of illegal land clearing in Queensland. Even though this is a detectable activity – satellite photos can show the loss of individual trees – there are apparently thousands of offences. Based on data from satellite monitoring from 1999-2001 alone, there were more than 4000 likely breaches. About 60 cases thus far have reached court.<sup>8</sup>

Given that there has not been a single prosecution for killing flying foxes and that magistrates tend to award very low penalties for environmental crimes in Queensland, a mere law against killing flying

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<sup>5</sup> Negotiated by the federal Department of Environment and Heritage and state environmental agencies.

<sup>6</sup> This problem is addressed for other equipment used to kill wildlife; for example use and possession of steel jaw traps is illegal in Queensland.

<sup>7</sup> Letter to Queensland Conservation, March 2005.

<sup>8</sup> Land clearing data from 2001-2003 has just been released showing that about 1 million hectares was cleared (60% remnant); it is unknown what proportion has been illegally cleared, though internal sources suggest the proportion is very high.

foxes does not provide much of a disincentive. Furthermore, amongst growers who still adhere to lethal methods of crop protection there is often disdain for environmental laws, expressed publicly. There is, for example, a movement pushing for property rights which would allow unfettered dispatch of wildlife (and trees) on private land. In an appeal against the injunction imposed by the Federal Court on lychee grower Mr Bosworth, his barrister argued (unsuccessfully) that the Constitution prohibits the Parliament from exercising jurisdiction over private land. The judgment against Mr Bosworth is now being appealed again.

Laws which are opposed need particularly strong enforcement activity. The Queensland EPA assert that they are monitoring orchards. However, the only way to effectively monitor shooting (or electrocution) of flying foxes is to observe a property at night while the killing is occurring, and this is not likely to be done by wildlife officers.<sup>9</sup> It is particularly difficult to enforce a quota approach to killing. At least with a zero-tolerance approach, any shooting signals illegal activity.

*Sustainability:* Despite a recommendation 3 years ago by the Queensland Scientific Advisory Committee for the listing of Spectacled Flying Foxes and Grey-headed Flying Foxes as vulnerable under the Act, the Queensland Minister has still not listed them.<sup>10</sup> This is because killing of a threatened species can only be done under a conservation plan, the Queensland government currently accepts killing as a form of crop protection, and there is no conservation plan for flying foxes.

Recovery, not facilitation of killing, should be the government's focus for threatened species. Population modelling by Allen McIlwee and Len Martin (2002) suggest that flying fox populations are highly sensitive to imposed mortality above natural rates of mortality because of their low capacity for increase. "[T]he life history of flying foxes has evolved to match a much higher longevity and reproductive success than is presently possible in many regions of Australia, due to current threats." Their work strongly suggests that the current quota culling approach to damage mitigation is not justified, as even apparently low-level threats can contribute to cumulative population decline. Both threatened flying fox species are suffering other population pressures, such as seasonal food shortages, heat stress deaths (grey-headed) and paralysis tick deaths (spectacleds).<sup>11</sup>

*Humaneness issues:* The *Queensland Nature Conservation Regulation* 1994 requires that damage mitigation permits be issued only if the chief executive is satisfied that the proposed way of taking the animal is humane and not likely to cause unnecessary suffering to the animal (amongst other things).<sup>12</sup> Shooting a dark, flying creature at night is undoubtedly a hit and miss affair. The target for instant death is moving and less than 10 cm<sup>2</sup> in area. Shotgun pellets spray and cannot be so finely targeted. Thus it is inevitable that a large proportion of shot flying foxes would be injured and endure a slow, suffering death. Furthermore, with the flying fox lactation period coinciding with the ripening season of many commercial fruits, the shooting of any lactating female means the death of a young flying fox by starvation. There is no way of making the shooting of flying foxes humane.

*Financial issues:* Even if one accepts that killing of flying foxes does provide some crop protection – which is largely predicated on killing enough of the overall population of flying foxes to reduce their local impacts in some areas – this is no longer the argument. With the need to protect flying foxes from uncontrolled slaughter having been recognized by environmental agencies, the economic debate is whether shooting a small quota of flying foxes is an effective method of crop protection and whether a financial cost-benefit analysis justifies lethal over non-lethal methods of protection.

In fact killing a flying fox on average every second night or so (to reach the allowed quota of 15 Spectacled Flying Foxes or 20 Grey-headed Flying Foxes) offers laughable crop protection and laughable economic benefit. Let's say a grower kills the permitted 15 spectacleds the first hour of the

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<sup>9</sup> For occupational health and safety, and resource reasons, among others.

<sup>10</sup> Both species are listed federally as vulnerable.

<sup>11</sup> In bad paralysis tick years, up to 10% of affected colonies may be killed. Heat deaths, which seem to be increasing in frequency, may kill almost the entire population of young in affected colonies. In recent events, heat caused an estimated 5,000 dead at Lismore and 3,000 dead at Coffs Creek in 2002; 2,000 dead at Cabramatta in 2003; and 5,000-7000 dead at Bellingen, and 2,000 dead each at Coffs Harbour, Singleton and Cabramatta in 2004 (Judi Wood, via FFICN, pers. comm.).

<sup>12</sup> s 281(e) of the *Nature Conservation Regulation* 1994.

first night of the month and that each of those flying foxes would have eaten their own weight in lychees each night for the rest of the month had they not been killed. Thus the permitted cull that month would have saved at most 450 kilograms of fruit. With an average yield of 7.7 tonnes of lychees per hectare, on a 7 hectare orchard<sup>13</sup>, killing those flying foxes would have saved the grower about 1% of the crop.<sup>14</sup> 'But by shooting the first few we get the scouts,' say some of the growers, 'and that stops the rest of them.' The scout theory has no scientific basis and, as demonstrated particularly in years of food shortages, no shooting of the early arrivals will stop other hungry flying foxes from finding a good source of food in the vicinity of their roost.<sup>15</sup> Whether flying foxes will target a particular orchard depends on poorly understood site- or season-specific factors, such as proximity to a camp, availability of other foods and their relative preference ranking.<sup>16</sup>

The sort of society I want to live in is one which exercises compassion for both human and non-human beings. In this society it is not acceptable to kill wildlife merely for the sake of crop protection and private financial advantage. But we also seek to assist those humans who suffer from changing or difficult circumstances. In the case of fruit-growers whose crops are damaged by flying foxes there are a number of approaches we could take.

For example, there could be taxation relief for non-lethal methods of crop protection. We could help set up means for growers who can't afford to net to hire crop protection systems – either to let them try out methods before purchase or to provide protection where damage is only occasional. There are currently at least a dozen deterrent systems commercially available. Most would be far more effective than killing a few flying foxes. The topic of crop protection is very complex and I cannot do it justice here. But the choices are such that we should progress beyond the simplistic fruit growers' livelihoods vs flying fox lives debate.

#### **Political action**

Queensland Conservation has asked the Queensland Environment Minister to do four things:

1. Amend the *Nature Conservation Regulation* 1994 to prohibit the possession of electric grids.
2. Urgently list Spectacled Flying Foxes and Grey-headed Flying Foxes under the Nature Conservation Act, as recommended by the Scientific Advisory Committee.
3. Cease issuing permits for the killing of any flying fox species on the basis of existing regulatory requirements.
4. Develop a public register, accessible on the Internet, for all permits issued under the Nature Conservation Act.

If you support these actions, please write to the Queensland Environment Minister urging her to implement them. Her address is Hon Desley Boyle MP, Environment Minister, PO Box 15031, City East QLD 4002. She can also be emailed at ELGPW@qld.gov.au.

Zero tolerance of killing flying foxes (and birds) on orchards can be justified on conservation, welfare and moral grounds. It's about time we said it is unacceptable to plant flying fox attractive food in flying fox country and then kill them when they dare to eat some.<sup>17</sup>

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<sup>13</sup> The production figures come from Menzel and McConchie (1998). They suggest a viable lychee farm needs to be at least 7 ha.

<sup>14</sup> This could be doubled if the grower went into a second permitted cull of the same proportions the following month.

<sup>15</sup> We could speculate that early flying fox arrivals in an orchard might help attract others, e.g. by biting into fruit and releasing attractive chemicals or providing tell-tale clues back at camp. However, it is unlikely that generalities could be drawn from this – as stated, there are a range of factors that would determine whether a particular orchard is targeted. Needless to say, much more research would be needed to understand the dynamics of orchards and flying foxes.

<sup>16</sup> I won't discuss the economics of non-lethal crop protection here as it is complex. Many growers are in the fortunate position of being able to protect their crops with nets or other non-lethal methods such as deterrent lights and sound, with the capital costs of this more than repaid with fruit saved. Others on marginal returns are not able to afford netting, but should be able to afford other crop protection methods such as light and sound deterrents. Queensland Conservation supports the provision of low-interest loans through bodies like the Queensland Rural Adjustment Authority and taxation assistance for capital costs of non-lethal devices. We do not support the subsidising of fruit crops with the death of flying foxes.

<sup>17</sup> Of course this applies to other states besides Queensland.

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## Bats in the Canal: Studies in Gatun Lake, Panama

### April Reside

Smithsonian Tropical Research Institute, Barro Colorado Island, Unit 0948, APO AA 34002, USA,  
Email: [aerbatchick@hotmail.com](mailto:aerbatchick@hotmail.com)  
(Photographs courtesy of Christoph Meyer)

The Neotropics are known for their biological diversity and the bat fauna is no exception. Barro Colorado Island (BCI) in Gatun Lake, which forms part of the Panama Canal, is a hotspot of tropical biology research, supporting 73 bat species. Eight bat families are represented (all microchiropteran), including the families endemic to the Americas: Phyllostomidae (leaf-nosed bats), Noctilionidae (fishing bats), Mormoopidae (leaf-chinned bats), Natalidae (funnel-eared bats) and Thyropteridae (disk-winged bats) (Reid 1997).

BCI (1,564 ha) hosts a research station run by the Smithsonian Tropical Research Institute ([www.stri.org](http://www.stri.org)). Currently there are several students working on masters or PhD bat projects based on BCI supervised by Prof. Elisabeth Kalko from Ulm University, Germany, who has had a long association with bat research on BCI and in other parts of the Neotropics. One PhD student, Christoph Meyer, is using small islands in Gatun Lake as a model system for investigating the effects of habitat fragmentation on bat communities. He is using a total of 18 sites, 12 islands and 6 control sites on the nearby mainland.

I have been lucky enough to join Christoph for a couple of months on his work in Panama. We net from dusk till dawn (pretty much 6 pm till 6 am), using 6 ground nets and 4 canopy nets in a half-hectare quadrat. During his work over the past year and a half, Christoph has caught over 40 species, from 4 families. So far I have encountered 17 species while netting with Christoph, all except 2 belonging to the family Phyllostomidae. The phyllostomids have the widest dietary breadth of any other bat family (Reid 1997), with different species feeding on fruit, nectar, pollen, insects, vertebrates (including frogs and fish) and even blood! The phyllostomids also cross a broad size range, from the tiny frugivore the Striped Yellow-eared Bat (*Vampyressa pusilla*, 6 g) to the largest bat in the Neotropics, the Great False Vampire Bat (*Vampyrum spectrum*, 235 g). The most frequently encountered species during Christoph's study is the Jamaican Fruit-eating Bat (*Artibeus jamaicensis*, 65 g). Some nights over 90%

of the captures are the “A.j’s”, as they have the tendency to call each other into the nets. So if you have one screaming A.j, quickly you have many screaming A.j’s chewing holes in the nets.



The Jamaican Fruit-eating Bat *Artibeus jamaicensis*. Photo by Christoph Meyer

So far, Christoph has found that bat species richness and composition appear to be governed more by distance from the mainland than island area. Therefore large islands that are isolated tend to be inhabited by fewer species when compared to the mainland. There is also a difference in the way that bats from different foraging guilds are distributed among the islands. The insectivorous gleaners, Phyllostomid species such as *Tonatia saurophila* and *Lophostoma silvicolum*, which have broad wings that are adapted for slow, manoeuvrable flight, are mainly restricted to the obstacle-rich forest interior of continuous forest on the mainland and are occasionally also found on islands very close to the mainland. Large frugivores, such as *Artibeus jamaicensis*, have greater dispersal abilities and therefore can dominate the more isolated islands.

Christoph has also found a shift in bat species composition when moving from the forest interior to the edge of the habitat. The forest interior sites tend to be more diverse, whereas the edge sites have lower species richness. Edge sites have fewer insectivores than interior sites, and are dominated by frugivores. Nectarivores are also found to be in lower abundance in edge sites than in the forest interior sites. This “edge effect” has implications for the species composition of smaller islands, which may not be large enough to have forest that is not exposed to edge habitat.

Information on how fragmentation affects bat communities is of increasing importance as more habitat is being broken into smaller sections by development and agriculture, a worldwide phenomenon. This and other bat studies have been an important part of the research that has taken place on Barro Colorado Island for many years. For more information on the bats in Panama and the studies there, check out the website <http://www.batsofbci.org/> and [http://www.stri.org/english/scientific\\_staff/staff\\_scientist/scientist.php?id=18](http://www.stri.org/english/scientific_staff/staff_scientist/scientist.php?id=18)

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Common Long-tongued Bat *Glossophaga soricina*. Photo by Christoph Meyer



*Lophostoma silvicolum*. Photo by Christoph Meyer



## **FNCV / ABS Workshop a great success!**

### **Prue Simmons**

*Field Naturalists Club of Victoria, 1 Gardenia St., Blackburn, Victoria 3180,  
Email: prue\_simmons@hotmail.com*

The Field Naturalists Club of Victoria (FNCV) in association with the Australasian Bat Society held its second very successful Bat Workshop on the 26<sup>th</sup>-27<sup>th</sup> February 2005. Set in the picturesque surrounds of Kinglake National Park in Victoria, researchers, zoologists, naturalists, bat carers, students and those interested in learning more about mega- and microchiroptans gathered for another highly enjoyable and informative weekend.

The weekend started well, with 20 participants arriving in the early afternoon, settling into the park residence provided generously by Parks Victoria and then congregating in the Visitor Centre for the day's presentations. Ian Kitchen, chairperson of the Fauna Survey Group of the FNCV, welcomed everyone and opened the workshop before handing over to the first speaker Lindy Lumsden. Lindy gave us an excellent overview on the natural history of bats – both flying foxes and microbats, focusing on Australasian species, morphological differences between species, echolocation, diet, habitat and the issue of flying foxes in Melbourne and the hugely successful project of relocating them along the Yarra River. This talk was both interesting and insightful and provided a great background to these amazing creatures!

Chris Grant from Deakin University then made a presentation on his research on Southern Bent-wing Bats (*Miniopterus schreibersii bassanii*). Chris's research into population monitoring and desire for an accurate method of counting led him to utilise new methods of population monitoring using remote infrared lights and cameras. By recording the number of bats that exit the cave mouth at dusk and replaying the video images slowly, Chris can count the numbers of individuals leaving the roost site to forage, and make population estimates based on those observations. In addition to population monitoring, Chris also used radiotracking to investigate foraging behaviour and winter roost sites of *M. schreibersii bassanii*, finding that this species forages widely in areas of native vegetation and uses a variety of caves, with much movement between caves. Sadly, farmers polluting caves on their property with rubbish are reducing the number of functional roosts for this species.

After some afternoon tea and the opportunity to meet Lindy's freetail and long-eared bats up close, we reconvened and Susan Campbell from Melbourne University made a presentation on her research on the Large-footed Myotis (*Myotis macropus*). Susan's PhD study is helping to better determine habitat requirements, roosting and nightly foraging of Australia's fishing bat as well as investigating diet and genetic variation across Victoria. With sites in North-east, South, West and Central Victoria and using a variety of techniques such as harp trapping, scat analysis, light tagging, radiotracking and tissue sampling, Susan's discoveries have added much to the existing knowledge of Myotis biology.

Following Susan's presentation, Lindy informed us on the roosting ecology of bats, both around the world and in Australia. From the leaf tent-making bats of Costa Rica and the millions of cave dwelling bats in New Mexico and Borneo to the many species that rely on tree hollows here in Australia, bats have adapted to a vast array of habitats. Tree hollows are vitally important in Victorian microbat habitat as 19 out of the 21 species that occur here rely on hollows for roosting sites. Lindy instructed the group on ways of spotting likely roosting trees for particular species. Lesser Long-eared Bats *Nyctophilus geoffroyi* favour large, dead trees with a narrow fissure opening for maternity sites, whereas Gould's Wattled Bats *Chalinolobus gouldii* prefer large, live trees with dead spouts. Radiotracking data from Lindy's study in rural Victoria showed that bats will often change roost sites every couple of days, perhaps to avoid predation or parasite build-up.

As this workshop was also designed so that people could gain hands-on experience in handling and processing microbats, Lindy finished her presentation with a quick discussion on the potential risks of infection regarding Lyssavirus. This was particularly useful for individuals who have not been vaccinated and had concerns about restrictions on handling, learning that by using careful procedures and precautionary equipment such as gloves, the bats could be handled safely.

At the end of the seminars, each speaker was presented with a FNCV mug and their own set of personalised calico bat bags, wonderfully made and hand-designed by Ian Kitchen!

Back at the park residence, Ian Kitchen and Mimi Pohl slaved over hot stoves to prepare the wonderful meal for the night. A sumptuous meal of chicken cacciatore, vegetable and tofu kebabs, sausages, burgers and cous cous was accompanied by a delicious array of salads including prawn and mango salad, tossed and caesar salad and two delicious potato salads. As hungry mouths devoured the feast, talk amongst the groups focused on the interesting talks presented that day and just how amazing these chiropteran critters are.

After everyone had eaten their fill we headed off to nearby Toorourrong Reservoir to set up bat traps. Although the night was cooler than we hoped for, the group still remained optimistic and a number of traps were placed in likely fly-ways around the reserve. Stuart Judd, a ranger at Kinglake National Park, lent a helping hand setting up the traps and enabled us to get into more restricted areas of the reserve.

As twilight approached we watched as Lindy set up the ANABAT system and waited for indication of activity in the skies above us. A number of bats swooped overhead during their foraging runs throughout the night and Lindy was able to show and interpret the different frequency signals and explain the huge benefit the ANABAT system has made, particularly with remote survey techniques. During the night a number of White-striped Freetail Bats *Tadarida australis* were heard overhead and Large Forest Bats *Vespadelus darlingtoni* and Little Forest Bats *V. vulturnus* were detected on the ANABAT.

A quick check on the harp traps found a few bats already waiting under the protective flaps of the catching bags and these were transferred to the new calico bags. For the enthusiastic group that remained late in the cool night air, Susan attached a glowing light tag to one of the *Myotis* to see where it flew and foraged. After a quick circle over land it flew out over the lake and began foraging. A Lesser Long-eared Bat was also released – it circled a couple of times and then promptly settled in a tree, ending the lightshow extravaganza!

The next morning the optimistic bat lovers headed back to the reserve to check and disassemble the traps and then regroup for breakfast. Twenty-seven bats were caught, including *Chalinolobus gouldii* (5), Chocolate Wattled Bat *Chalinolobus morio* (2), *Nyctophilus geoffroyi* (12), *Myotis macropus* (4), Eastern Freetail Bat *Mormopterus* sp. (1), Common Bent-wing Bat *Miniopterus schreibersii* (2) and *Vespadelus darlingtoni* (1). This fantastic collection of species enabled differences between the species to be easily seen and shows the great diversity of microbats that can exist in just one small area.

After breakfast, under the watchful and instructional eye of Lindy, the captured bats were put through their paces with everyone getting a chance to handle them and learn techniques in inspecting sex, maturity and parturition, as well as comparing morphological differences between species.

When everyone had experienced handling the bats and all the bats were processed, the very happy bat team handed the bags of bats to Stuart to release that night, packed up and bid each other farewell, agreeing that it was a fantastic weekend! We'd like to extend our thanks to everyone who contributed on the weekend especially the Parks staff at Kinglake who helped to make it such a success, as well as the many enthusiastic participants. Proceeds from the workshop were divided up with \$500 being donated to both the Australasian Bat Society and Field Naturalists Club of Victoria. Hope to see you all there next time.



## **Australian Wildlife Health Network (AWHN), a new resource in the Australian bat environment**

**Gemma M. O'Brien**

*School of Biological, Biomedical and Molecular Sciences, University of New England, NSW, 2351,  
Email: [gobrien@une.edu.au](mailto:gobrien@une.edu.au)*

The Australian Wildlife Health Network (AWHN) is a national initiative of the Commonwealth Government and is managed under the Wildlife Exotic Disease Preparedness Program (WEDPP) of the Australian Department of Agriculture, Fisheries and Forestry. Its mission is to promote and facilitate collaborative links in the investigation and management of wildlife health in support of human and animal health, biodiversity and trade.



Watch for the pawprint within the handprint, reflecting our stewardship

### **Request for information – bibliography of diseases involving Australian wildlife**

The network is interested in receiving hard or electronic copies of literature relating to Australian Bat Lyssavirus (ABLV), avian influenza and other diseases with Australian wildlife as part of their ecology. All references will be catalogued and the *citations* made available through the AWHN web-based bibliography. If you can help, please send copies to AWHN at the address below (see Table 1).

### **Assistance available**

The AWHN now collates all Australian Bat Lyssavirus and other bat viral disease test results for Australia and is interested in receiving reports of disease testing or events in the following categories: 1) OIE (Office International des Epizooties) list diseases; 2) mass mortality events; 3) arboviruses; 4) Salmonella cases; 5) interesting or unusual events; 6) bat viral diseases. Copies of all testing can be sent to the national coordinator, Dr Rupert Woods, at the AWHN address below (negative results are also required).

*The bat community will no longer be alone* when facing (animal and human) health issues of the sort confronted in the past decade. The AWHN has small amounts of funding available for investigation of significant wildlife disease events in the six categories listed above.

### **Newsletter and website**

*Wildlife Health in Australia* is the quarterly newsletter of the Australian Wildlife Health Network. The newsletter aims to facilitate communication between people with an interest in Australian wildlife health issues. It is distributed to professionals and others around the country and overseas. Contributions and critical feedback are welcome, and everyone is encouraged to share it widely.

The network maintains a national database of wildlife health surveillance. A website has been set-up, and will grow over the next few months: <http://www.wildlifehealth.org.au/AWHN/home.aspx>. This site provides access to the bibliography that we have been invited to assist in compiling, fact sheets, disease incident reports, *Wildlife Health in Australia* newsletters etc.

### **Special bat contacts:**

Networking is organized around two representatives per state/territory, one of whom is currently Hume Field (see Table 1). Then there is a register of wildlife expertise; this is a database of contacts who volunteer expert inputs and outputs, two-way networking about wildlife health, disease, pathology,

emerging issues etc. A number of the people listed in this database include bats amongst their areas of expertise, and can act as facilitators between battoes and the larger network.

Table 1. Some contact details for bat representation in AWHN.

<b>AWHN</b>	<b>State coordinator, Qld, and primary bat contact</b>	<b>Contact for flying-foxes, NSW</b>
Australian Wildlife Health Network, PO Box 20, Mosman NSW 2088 T: 02 9978 4788 F: 02 9978 4502. <a href="mailto:awhn@zoo.nsw.gov.au">awhn@zoo.nsw.gov.au</a>	Hume Field QLD Dept Primary Industries, Animal Research Institute, LMB 4 Moorooka QLD 4105 T: 07 3362 9566 F: 07 3362 9457 M: 0412 556 641 <a href="mailto:Hume.Field@dpi.qld.gov.au">Hume.Field@dpi.qld.gov.au</a>	Gemma O'Brien Physiology, UNE NSW 2351 T: 02 6773 2505 F: 02 6773 3234 <a href="mailto:gobrien@une.edu.au">gobrien@une.edu.au</a>
National coordinator: Dr Rupert Woods Admin assistant: Amabelle Jones		

**An example of AWHN activity relevant to ABS - ABLV focus group**

An *ABLV focus group* has been set up to focus on issues associated with ABLV for the region. Its current priorities are:

- update AUSVETPLAN for ABLV (see <http://www.aahc.com.au/ausvetplan/index.htm#strategies>)
- a national research strategy for ABLV, and
- review of ABLV surveillance activities.

As part of ABLV surveillance, historical data of all ABLV testing data for Australia are being collected. These data are being entered into WHIS (the national Wildlife Health Information System). A plea is being made for anyone who has conducted any testing for ABLV in bats (all testing regardless of the results) to forward results to AWHN for inclusion in this database (any Menangle and Hendra testing is also of significant interest). Attempts are being made to track down several thousand test results. Once centralized and collated the results can be made available to those people who need these data for making decisions on issues relating to bat diseases.

A special contribution that ABS members and associates could make too would be to send in any interesting bat case results that people see.



**– News and Announcements –**

**4th International Symposium/Workshop on  
Frugivores and Seed Dispersal  
9-16 July 2005, Brisbane, Australia**



Frugivores & Seed Dispersal  
Australia 2005

**“Theory and its application in a changing world”**

<http://www.learnaboutwildlife.com/frugivory2005.htm>

In 1985, Drs. Fleming and Estrada called an international meeting in Mexico of about 50 scientists studying the interactions between frugivores (fruit-eaters) and the seeds they disperse. The next two symposia, in Mexico and Brazil, demonstrated the growth in research on this important topic, with several hundred researchers and students attending the third meeting in 2000.

The Fourth Symposium/Workshop will be held at the Nathan campus of Griffith University, Brisbane, Australia. It will be structured along much the same lines as the three previous events, with approximately 35 plenary speakers, open and poster sessions and workshops. The plenary speakers have been selected to cover a broad range of geographical areas, plant and animal groups and approaches (e.g. evolutionary aspects, field ecology, genetics, modelling), and also to include both established authorities and promising new researchers. There will be several sessions for contributed oral papers and plenty of time dedicated to perusal of contributed poster papers. One whole day will be dedicated to the roundtable discussions on varied topics (workshops).

The sub-theme of this symposium will be “theory and its application in a changing world.” It will encompass leading-edge theoretical studies and emphasize the application of our ever-expanding knowledge to environmental management.

**Conference Secretariat:**

Ronda Green            [ronda.green@griffith.edu.au](mailto:ronda.green@griffith.edu.au)  
Andrew Dennis        [Andrew.Dennis@csiro.au](mailto:Andrew.Dennis@csiro.au)  
David Westcott        [David.Westcott@csiro.au](mailto:David.Westcott@csiro.au)

**Registration Secretariat:**

Jenny Marsden, Event Solutions, PO Box 165, Arana Hills, Queensland 4054 Australia.  
E-mail: [jenny@eventsolutions.com.au](mailto:jenny@eventsolutions.com.au) ph: 07 3855 3711 fax: 07 3855 2811



**IMC9: IX International Mammalogical Congress**

The 9<sup>th</sup> International Mammalogical Congress will be held in Sapporo, Hokkaido, Japan this year (31 July – 5 August 2005). There will be one symposium on bats: “Ecology and conservation of bats in the Pacific Rim” (Symposium number 39). More details are available on the IMC9 website:

<http://www.imc9.jp>



## **35th Annual North American Symposium on Bat Research**

The 35th Annual North American Symposium on Bat Research will convene in Sacramento, California, U.S.A., 19-22 October 2005. Winston Lancaster will host the Symposium. All meeting activities will be held at the Holiday Inn Sacramento Capitol Plaza in downtown Sacramento, and a block of rooms has been reserved at the Holiday Inn for meeting participants. Guestroom reservations may be made by contacting the hotel. Meeting activities will begin on Wednesday evening, 19 October, with registration and an informal No-Host reception. Platform paper presentations will begin on Thursday morning, 20 October, and continue through Saturday, 22 October. Poster sessions also will be held at the meeting (please see the NASBR web site for links to schedules of previous NASBR meetings). On Saturday evening, there will be an optional banquet. Registration and abstract submission information will be available in June 2005, and will be posted on the NASBR web site at when available:

<http://www.nasbr.org/>

Or you may contact Margaret Griffiths for additional information:

[mgriff@illinoisalumni.org](mailto:mgriff@illinoisalumni.org)



## **Wildlife Disease Association International Conference**

**26 June to 1 July 2005, Cairns, Australia**

**"Wildlife Health in a Shrinking World: Ecology, Management and Conservation"**

The Wildlife Disease Association International Conference will be held in Australia for the first time since 1981! It is sponsored by the Rainforest CRC and James Cook University. This is a great opportunity to be exposed to wildlife disease research worldwide. Conference themes will be:

- Ecology of introduced wildlife diseases
- Environmental drivers of emerging infectious diseases
- Amphibian diseases and population declines
- **Lyssavirus emergence and management**
- Lessons learned from management of diseases in wildlife
- Health of marine ecosystems
- Wildlife health in the tropics

**Registration and information:** Registration is \$390- \$440 (includes lunch), student registration is \$190. Details on the conference including registration form and format for abstracts are available at:

<http://www.rainforest-crc.jcu.edu.au/events/conferences.htm>

**Venue:** The conference will be held at the Cairns Colonial Club Resort, a short walk from rainforest, mangroves, the tropical botanical gardens and Cairns city. Accommodation costs at the resort are from \$35 share to \$112 single.

**Activities:** A mid-week field day will offer the option of a rainforest or outer barrier reef excursion. Families are most welcome.

**Deadlines:** Extended deadline for abstracts - February 28, 2005. Deadlines for early/late registration: February 28, 2005/May 30, 2005

**Contact:** Lee Skerratt, School of Biomedical Sciences, James Cook University, Townsville, Queensland, Australia 4811. Ph: 07 4781 4838, Fax: 07 4779 1526, Email: [Lee.Skerratt@jcu.edu.au](mailto:Lee.Skerratt@jcu.edu.au)

**Secretariat and registrations:** Shannon Hogan, Communications Officer, Rainforest CRC, James Cook University PO Box 6811, Cairns, Queensland, 4870. Ph: 07 4042 1671, Fax: 07 4042 1247. Email: [Shannon.Hogan@jcu.edu.au](mailto:Shannon.Hogan@jcu.edu.au)



**Where is this bat located? – The answer ...**



Last issue Ken Sanderson asked: Where is this bat located? Correct answer is from Judith Hallinan (Wildlife Assistance and Information Foundation Inc, Berowra, New South Wales). Her comment:

“Bat is located on the 'water feature' in the Hornsby Mall [Sydney], locally known as the water clock. Actually not a clock as "... it would have cost extra to have it keep correct time ....". Most of us think the thing is a noisy joke (Council take it seriously) but it does have some nice animals and is useful as an easily identifiable meeting point.”



**Draft Biodiversity Assessment Guidelines available – NSW NPWS**

A downloadable working draft of the New South Wales National Parks and Wildlife Service Biodiversity Assessment Guidelines is available on their website:

[http://www.nationalparks.nsw.gov.au/npws.nsf/Content/biodiversity\\_survey\\_guidelines\\_draft](http://www.nationalparks.nsw.gov.au/npws.nsf/Content/biodiversity_survey_guidelines_draft)

The bat section may be of interest to members. Submissions were to be made by 18 February. (Thanks Rob Gratton for the info. I included this as I thought it might still be of interest – ed.).



**Latest Anabat software**

**Chris Corben**

*corben@hoarybat.com; www.hoarybat.com*

I am encouraging anyone using Anabat to download the latest software from my website:

[www.hoarybat.com](http://www.hoarybat.com)

Click on Anabat, then follow links to the latest software. There are new versions of AnalookW and of CFCread and the Storage ZCAIM firmware. Don't forget, you might have to refresh the page to see the latest version if an older version of the page is stored in your computer.



## **Information on boab pollination required**

**Gerald E. Wickens**

*gerald@gwickens.go-plus.net*

I am revising my earlier work on the baobabs (*Adansonia* spp.). The boab (*A. gregori*) appears to be adapted to being bat-pollinated but I have no confirmation of this. An unidentified blossom bat, *Macroglossus* sp., possibly *M. minimus*, has been trapped in the vicinity of flowering boabs, which is suggestive but not proof. Flying foxes (*Pteropus* spp.) are another possibility. If anyone has information on bats (or any other fauna) visiting boab flowers, it would be very much appreciated.



## **News from around the traps**

### **JAPAN**

**Kyle Armstrong**

*Kyoto University Museum Email: kyle@inet.museum.kyoto-u.ac.jp*

I have been in Japan now for about 11 months, and have been lucky enough to visit quite a number of islands, mostly in the Ryukyu archipelago south of the Japanese main islands. A small species of *Rhinolophus* is found on most of the bigger and some of the smaller ones that have not suffered the scourge of clearing. The taxonomic status of *Rhinolophus* in the Ryukyus is still a little confused, with different authors suggesting various species or subspecies. Thus I have focussed firstly on phylogenetics using mtDNA and echolocation, and I have a story for IMC9. I am now looking at movement within islands and island groups using microsatellites. My wife Yuki has accompanied me on most trips, and we have had a nice time eating our way through the Ryukyus and experiencing its unique cultures, squeezed in between the time we are normally squeezing ourselves into little holes. Gumboots have been the order of the day, handy when sloshing through guano juice, mud, cave streams and sometimes snow (in the Japanese main islands). The *Rhinolophus* were at first difficult to capture in some situations, which called for a bit of ingenuity – I spent a relaxing morning making a harp from fishing poles and duct tape – McGyver would have been proud. It was a nice trap, but the buggers were too smart for it most of the time. I also visited Tsushima Island (between Japan and Korea) thanks to Kuniko Kawai from Hokkaido. It has been a privilege to work in another country and interact with such friendly people. I have more trips planned – it's a shame I cannot visit all 3900 or so islands in Japan.

The study on the Ghost Bat that I reported on at the Poland and Toowoomba conferences has progressed well. After Toowoomba, I completed a 'mega' collecting trip that went around the Pilbara twice – once the long and once the short way. My colleague Olivier Chavand has completed the microsatellite labwork (in the midst of being a new Dad), and Jessica Worthington Wilmer has been kind enough to provide many comments in addition to her PhD datasets. We have a good Pilbara dataset that we are currently analysing, which is showing genetic structuring within the region. This is going to be useful, since the Pilbara is going berserk with iron ore projects at the moment, and several colonies might be subject to encroachment. The project is supported by Pilbara Iron, and we are currently putting together a submission to the TSSC for a reconsideration of the conservation status of the Pilbara population. It is heartening to see a mining company supporting a project that might result in an elevation in the conservation status of a species found on its leases.



**– Recent Literature –**

Compiled by Maria Adams from Current Contents (November 2004 – March 2005).

**Acoustics and neurology**

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