



QGN News #10

December 2009

Welcome to Queensland Glider Network News



Photo sugar gliders: Chris Pollitt

Welcome to another QGN News. QGN members have sent us a diversity of interesting articles about their glider-related activities.

From advanced genetics studies by PhD candidate Paul Ferraro from James Cook University – to technology assisting nestbox monitoring in a Brisbane school – to the threats of barbed wire fences. We hope there's something for everyone in this issue of QGN news.

We look forward to hearing from other QGN members in 2010.

Many thanks to Rachael Attard for compiling this newsletter.

Kind regards

Ewa Meyer

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The mahogany glider: conservation through an evolutionary lens

Queensland's endemic mahogany glider inhabits a small pocket of open eucalypt forest to the south-west of the Wet Tropics, between Tully and Ingham. Outside of this region it is replaced by its nearest relative, the widely distributed squirrel glider. Since the discovery of the mahogany glider in 1883, there have been numerous reviews of the evolutionary relationship of these two gliders, primarily driven by their physical similarity, geographic proximity and shared preference for eucalypt forests.

While now recognised as a species, the mahogany glider was previously defined as a single squirrel glider population and an evolutionary subset of the squirrel glider. In other words, the mahogany glider has variously been seen as cousin, brother and son to the squirrel glider. This taxonomic uncertainty has the potential to complicate future conservation measures. For example, if it is possible that the mahogany glider is a subset of the more common squirrel

glider, then can we re-introduce nearby squirrel gliders to boost depleted mahogany glider populations? Or more controversially, how can the expenditure of valuable conservation resources be justified if the mahogany glider and squirrel glider are one and the same? Providing an unsatisfactory answer to this final question may have a range of consequences. From a scientific perspective, it may reduce the likelihood of receiving funding. From a conservationist perspective, it may reduce the likelihood of preserving biodiversity.

So, where does the mahogany glider currently stand? The most recent review of the mahogany glider's taxonomy was conducted in 1993. It not only re-instated species status, but also noted that fewer than 3,000 individuals remain within its 720 square kilometres distribution. Consequently, the mahogany glider has now been recognised as endangered both locally and globally.

Yet does this definitively confirm that the mahogany glider is a species? With

the advent of genetics - the study of DNA to measure heritability and variation across all organisms - the question of what defines a species has become more complex. Perhaps the numerous revisions of the mahogany glider's taxonomy are a consequence of limitations in the available biological information? Incorporating genetic analyses may help resolve this issue.

The results of a recent study found there was sufficient genetic divergence between the mahogany glider and squirrel glider to describe them as distinct entities. Furthermore, the results may contradict the current belief that the distributions of both gliders have not overlapped. This claim can be explained by the effects of natural climate fluctuations over the last 2 million years. These climate cycles are known to have altered the dimensions and distribution of Australia's many biotas and the species that inhabit them.

One evolutionary hypothesis supported by this research is that a

The mahogany glider: conservation through an evolutionary lens

Contd from page 1

reduction in rainfall and temperatures during certain historic periods may have allowed an expansion of the squirrel glider's habitat. Hybridisation with the mahogany glider may then have occurred where the distribution of the mahogany and squirrel gliders overlapped. The two glider's habitats would then have slowly separated as the climate gradually became warmer and wetter, until they were again isolated from one another. As the continent underwent numerous warm-wet periods followed by cool-dry periods this scenario would have repeated multiple times. Consequently, these periods of contact may have reduced the level of genetic differences accrued between the mahogany and squirrel

glider, thus temporarily retarding their evolutionary divergence from one another. If accurate, then this may be one factor which helps explain the lack of significant physical differences between the mahogany glider and the squirrel glider.

Although additional genetic analyses currently will refine and expand this hypothesis, results indicate that the evolutionary history of the mahogany glider is unexpectedly complex. It is hoped that combining the findings of these genetic studies with existing biological information will improve the efficacy of future mahogany glider conservation actions.

The role of environment in evolution

Gene flow is the process by which taxonomic groupings (for example, two populations of a single species) exchange DNA via sexual reproduction. The impediment of gene flow between these populations can eventually lead to the evolution of new species. However, it does not always follow that the two species become physically distinct from one another.

Take these two images. Both are from Museum Victoria's collection of Australian gliders; one of Queensland's endangered mahogany glider and the other of a squirrel glider originally collected from inland Victoria. Although these gliders can be considered distinct genetic entities (see main text) both are broadly similar in appearance and have been misidentified in the wild. So, if the DNA of an animal contains the 'blueprint' of its appearance and these two gliders are genetically distinct, why are they so physically similar? Technically, this requires a brief explanation of the theory of genetic inheritance.

All DNA regions responsible for the formation of physical characteristics are under 'selective pressure'. This means that a genetic change, known as a 'mutation', will only persist if it does not hinder an individual's ability to survive and reproduce. If it does, then that individual will not contribute to the next generation and the mutation will be lost. Thus, DNA regions under strong selective pressures change at a slower rate than regions which are not. These regions of DNA are known as 'neutral markers' and because of their relatively fast rate of change, are predominantly used as evolutionary measuring tapes in genetic studies similar to the one described in the main text.

However, the role of environment is also an important one. Mahogany and squirrel gliders inhabit broadly similar habitat niches: dry sclerophyll forests with an open understorey consisting of certain plant species. Both share a dietary preference for eucalypt and wattle sap, invertebrates and nectar. These habitat and dietary overlaps are both causal factors in their broadly similar physical appearance and suggest a shared evolutionary heritage. However, as the mahogany glider's habitat occupies a region of marginally higher rainfall, a number of minor environmental variations – such as an increase in the density and diversity of plant species – exist. Those physical traits which distinguish the mahogany glider from the squirrel glider, such as its mahogany colouration and larger size, most likely evolved in response to these unique environmental variations.

Paul Ferraro is a postgraduate student with James Cook University and Museum Victoria. He uses genetic, morphological and climatic methods to research the evolutionary history and population structure of the mahogany glider, both of which he hopes will help in its conservation. For more information on Paul's research please email him at pferraro@museum.vic.gov.au



Mahogany glider (above)
Squirrel glider (below)



Home secrets of Pallara marsupials

A Little Chronology

In June 2008 an idea was floated at a school staff meeting by Ruth Miller, a member of the executive of the school's P&C. We visited the home of Ric Natrass to inspect the system he had installed. I was immediately struck by the curriculum potential of televising vision from native animal nests into the classroom. The Telstra's Kids Fund awarded us \$1 200 to establish the project. In November 2008 we installed six nest boxes - three designed for possums and three for gliders.

In May 2009, we conducted our first inspections of the boxes and found no occupancy. I was worried. Ric wasn't. In June 2009, we had purchased two cameras. On checking the boxes prior to the installation of the cameras, we found occupancy - a very exciting moment. Since then, we have introduced a computer with capture cards and software to record the video (much like the systems you see behind the counter in service stations). An online database is being developed to enable students to record and review data generated by observations.



Petaurus norfolcensis - as seen for the first time in our nest boxes



Possum box from Hollowlog Homes - note the camera cable emerging from the top of the box - complete with high-tech waterproofing (ie insulation tape).

Technical Setup of the Surveillance System

Hollowlog Homes have proved to make a product that effectively targets particular animals. Their product is constructed robustly from materials that have been recycled from building sites and timber that would otherwise be burned.

OzSpy Security Solutions has been the supplier of all of our video equipment. We use a waterproof infra-red camera designed for use inside pipe work. They are extremely robust and reliable (and reasonably cost effective at under \$300 each). We have four mounted in the nest boxes.

The cameras are mounted into the lids of the wooden nest boxes and the cable fed through the wall into the classroom where they are connected to a computer. The cables are 40m or less. 60-100m is technically possible. The cameras require a 12V feed and use a special cable which incorporates the feed and a video return which terminates in standard RCA plugs.



B/W Submersible Camera which (minus the stand) is mounted in the lid of the nest boxes. Note the infra-red LEDs surrounding the lens.

Future Directions

This project is really only in its beginning stages. In the classroom, my students have had just one term of learning through the project. Much effort has gone into the establishment and proving of the technological aspects. Some curriculum planning and resources have been developed with much more to come.

I would love to be able to web stream the video from the nest boxes in much the same way that the Australian Antarctic Division runs its webcams. This would enable other schools to directly access our video feeds and would require a dedicated broadband connection from the school.

I look forward to the challenges ahead in this important project and developing in students care and understanding for our environment and the native animals with whom we compete for habitat.

Jonathan Clark has been teaching primary school students since 1988 from Mt Isa to Beenleigh and Brisbane. He has had stints coordinating professional development with a focus on learning with ICTs for teachers. He spent two years lecturing in the School of Mathematics, Science and Technology at QUT and is currently teaching at Pallara State School.



In 2008, Jonathan met Ric Natrass and was turned onto the possibilities of managing a possum and glider monitoring project within the classroom.

Vale Ric Natrass

Staff, volunteers and members of Wildlife Queensland were saddened at the recent passing of Ric Natrass.

Ric was a well known wildlife expert and respected advocate for the environment.



Photo: Ed Parker

A second chance

After five months in care and many trips to Tully Vets, the only endangered mahogany glider to come into care this year is ready to return to the wild. 'Pitt', as he has been known while in care, has recovered well since his rescue from a barbed wire fence in the Murray Valley earlier this year.

He was rescued by caring landholders who discovered him entangled on the top strand of their barbed wire fence in May this year. Barbed wire injuries are always serious for gliders but there was worse to come for this poor little glider. He developed paralysis in his hind legs and tail hours after being rescued and there was grave doubt that he would recover. The paralysis was thought to have been caused by a whiplash injury that occurred when he hit the fence.

Pitt was hand fed with a syringe for the first weeks until movement started to return to all his limbs and he has, over



Mahogany glider 'Pitt'

time, made a complete recovery from his whiplash injury. He is now a robust and healthy glider and his flying membrane, although not perfect, has made a good recovery too and he is ready to return to the wild.

Release is not always easy as there is limited habitat available and it is wise to make sure that wherever a mahogany glider is released that they have room to move away if they find themselves in another glider's home territory.

Corridors and connectivity are essential for the future of this endangered glider. Isolated pockets of valuable mahogany glider habitat need to be linked by corridors to ensure the future health of the mahogany glider and many other species.

Note: If you are thinking about fencing – please think about wildlife friendly fencing. For more information go to www.wildlifefriendlyfencing.com

Written by Daryl Dickson

Wildlife friendly fencing

The wildlife friendly fencing project increases public awareness of the impacts that barbed wire can have on Australian wildlife, including gliders, owls, cranes, foxes and kangaroos.

As there is no funding to coordinate the project, they need all the help they can get. Here are some ways you can help:

- ◆ Familiarise yourself with the project and spread the word.
- ◆ Use fencing that is safe for wildlife, and encourage others to do the same.
- ◆ Keep an eye out for any entangled animals, and if you see one, report it to your local wildlife group. Also send in photographs.
- ◆ Contribute your ideas on wildlife friendly fencing.
- ◆ Raise awareness of wildlife friendly fencing in your local community through Landcare or natural resource management groups.
- ◆ You can also support this project by making a donation, or purchasing promotional products at www.wildlifefriendlyfencing.com

If any QGN members have information about fencing issues, please let us know. We'd like to hear about what is happening in your area to improve this situation so we can help the wildlife friendly fencing campaign.

Special report in next QGN News.



Glider caught in barbed wire fencing. Photograph by Tyrone Lavery

All QGN Members

Do you know of any good locations to spot gliders? Please let us know!



**Protecting wildlife
Influencing choices
Engaging communities**

The **Queensland Glider Network** is a program run by The Wildlife Preservation Society of Queensland (*Wildlife Queensland* or WPSQ).

We are a community environmental organisation with a diverse membership drawn together by a common interest in wildlife. *Wildlife Queensland* started in 1962 and since then has been working to protect Australia's precious and vanishing natural environment.

If you would like to join or subscribe to *Wildlife Australia* Magazine or are interested in volunteering, please contact us:

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Whether you are a conservationist, researcher, carer, or simply interested in gliders, you will find QGN has something to offer you, and in turn, you may have information to share with all of us.



We hope that you find this newsletter of interest and that the QGN will provide a valuable meeting place and resource centre for all people with an interest in gliders, their habitat and the issues facing their conservation.

Email us your glider news to glider@wildlife.org.au

To join QGN (it's free) - download the membership form from www.wildlife.org.au/qgn/join

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Help support the Queensland Glider Network by purchasing this set of glider posters. Only \$20 set inc p&p and gst. Order by phone 07 3221 0194.

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