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Hollow Obsessions
Waters of Life
Canopy Bridges



GOULD LEAGUE

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bridging the rainforest

gap

ALL TOO OFTEN, a new road spells disaster for arboreal animals in the wet tropics: increased fragmentation and collisions with motor vehicles are, sadly, a common story. A research team is now working on a way to minimise these impacts through the use of canopy bridges.

The rainforests and associated habitats of the wet tropics region of north Queensland are a haven for possums and gliders. Fourteen species live here, including five that are found nowhere else. Of these unique species, all except one — the critically endangered Mahogany Glider (*Petaurus gracilis*) — are rainforest specialists. They comprise the remarkably beautiful Green Ringtail Possum (*Pseudocheirops archeri*), the imposing Herbert River Ringtail Possum (*Pseudocheirulus herbertensis*) and its close relative, the Daintree River Ringtail Possum (*Pseudocheirulus cinereus*), and the acrobatic Lemuroid Ringtail Possum (*Hemibelideus lemuroides*).

When the Wet Tropics World Heritage Area was declared in 1988, the future of these rare species appeared secure. However, concern was soon raised about the potential long-term adverse impacts of fragmentation and intrusion into the forest by developments including roads and powerlines, especially on animals with small distributions. This applied most particularly to the rainforest ringtails.

The most distinctive features of the rainforest are its closed canopy and structural composition that sharply define it from neighbouring habitats. Consequently, animals that occur there are often reluctant to venture beyond its bounds. While generalist species like the Common Brushtail Possum (*Trichosurus vulpecula*) readily descend to the ground to traverse a gap between trees (which unfortunately makes them prone to collisions with vehicles), the rainforest ringtails do so very rarely. Indeed, it was feared that the presence of a road or similar linear element which lacks any canopy connection may block movement for some species. This could have the effect of isolating animal populations and impeding genetic interchange, ultimately leading to local extinctions.

Bridging the problem

With this problem in mind, researchers set about finding a solution. In an article published in 1991, well-known rainforest possum expert Dr John Winter, questioned whether underpasses and overpasses made a difference to the ability of animals to cross a road. At about this time, the results of experiments aimed at helping terrestrial animals cross roads were appearing in scientific literature.



One of the most successful was the 'tunnel of love' constructed for the endangered Mountain Pygmy-Possum (*Burramys parvus*) in south-east Australia. The colony had its population dynamics disturbed by a road, so a tunnel was constructed to allow males access to females in their breeding season. The tunnel was used immediately after construction and was found to increase the winter survival rates of the females by nearly 50 per cent — mainly because dispersal of males after breeding reduced competition for resources.

However, little effort was being made on behalf of arboreal fauna, despite the fact this group of animals was considered most susceptible to the effects of fragmentation and intrusion.

Australian first

This situation changed in 1995, when park ranger and possum enthusiast Rupert Russell, financed by the Wet Tropics Management Authority and with the help of the then Far North Queensland Electricity Board, designed and installed a simple aerial connection across a logging road in a state forest behind Cairns. It was the first of its kind in Australia and consisted of a rope tunnel located about 10 metres above the roadway. It was hoped vines and creepers would eventually cover the overpass, encouraging faunal movements and offering protection from predators (as well as improving its appearance, an important consideration in a region where roads have a major tourism role).

Inspired by this experiment, in 1997, the Queensland Department of Main Roads (DMR) promoted the 'canopy bridge' in its 'Best Practice Manual' for the planning, design, construction, maintenance and operation of roads in the wet tropics. However, it noted the effectiveness of these had not yet been determined. This is where I (and some very able field assistants) became involved.

With the generous support of the DMR and other sponsors (including the Wildlife Preservation Society of Queensland), I was given the task of monitoring Rupert's bridge as part of my Masters research at James Cook University, in partnership with the Cooperative Research Centre for Tropical Rainforest Ecology and Management.

After consulting with Rupert, among others, it was decided to employ several strategies to test the efficacy of the bridge. These included systematic spotlighting (using a filtered low-intensity light) and sampling that involved the collection of scats (droppings) from animals as they moved along the structure (using a net specially designed for the purpose by Gulf Net Menders, the local chandlers who built the bridge). This material was sent to Barbara Triggs, an authority on the identification of mammalian traces, for species identification.



Hunter's hardware

I also investigated the use of infra-red photography. Already aware of the difficulties encountered by colleagues using highly sophisticated (and expensive) technology in the field, I toyed with the idea of building my own automatically triggered system. Then I happened upon a USA-based web site advertising the game-scouting camera, 'Buckshot 35'. I contacted the site owners and found them willing to develop an experimental unit to suit my purposes, and my budget. Eventually, I received a self-contained photographic scouting system with a high-quality autofocus 35 mm camera enclosed in a waterproof, airtight housing with an infrared detector that senses heat and motion.

The results to date have been promising. In about nine months' sampling, my team and I have discovered that all three rainforest ringtail species that naturally occur at the site (i.e., the Green, Herbert River and Lemuroid) are using the canopy bridge. Scats of the three species — as well as Fawn-footed Melomys (*Melomys cervinipes*), a native rodent — have been collected and identified. While we have photographs of at least two species using the canopy, we, once, observed a Lemuroid Ringtail Possum using the structure to cross the road. It even paused to observe us on its journey (leaving a healthy deposit for us to collect the next morning and for Barbara to formally identify later on).

To see a Lemuroid Ringtail cross the full length of the overpass was an exciting and important observation, because although all three ringtail species live in the tree canopy, the Lemuroid Ringtail is the most markedly arboreal. Researchers have found that this species is also the least able of the rainforest ringtail possums to survive in remnant patches and appears to have been the most affected by clearing and disturbance. This is possibly because it is the most canopy-loving of the ringtails. It favours mature trees in its diet and it's reliant on tree hollows for shelter. (Both Herbert River Ringtails and Daintree River Ringtails build their own nests or rest in large epiphytic ferns, if dens are in short supply. Meanwhile the Green Ringtail relies on its cryptic colours, simply hunching its body into a ball to sleep on a branch by day). The 'Lemur' was therefore a target species, of sorts, for us.



Artwork: DMR

Some tree-dwelling mammals, such as possums and gliders, will not cross at ground level.

The Canopy bridge is located six or seven metres above a roadway.

Vines and creepers will eventually cover the canopy bridge, encouraging fauna movement and offering protection from predators.



Further Reading

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Key words:

- epiphytic** plant that grows upon another, but does not get sustenance from it
- chandler** a dealer or trader
- arboreal** tree-living
- scansorial** climbing
- terrestrial** ground-living

Promising future

We were also pleased to discover that, more than five years after it was installed, vines and creepers are indeed covering the overpass. The dominant species is Water Vine (*Cissus hypoglauca*), a favoured food plant of the rainforest ringtails. We have found no evidence of predators congregating in this area, apart from the occasional Scrub Python (*Morelia amethystina*) basking by the road. Other known predators of the rainforest ringtails, such as the endangered Spotted-tailed Quoll or Yarri (*Dasyurus maculatus*) or Rufous Owl (*Ninox rufa*) have been neither seen, nor heard.

Now, having ascertained that the existing canopy bridge is facilitating movement by arboreal (and scansorial) fauna, it's time to move on to the next stage of the study. This involves investigating how design and position affect usage. It's hoped the findings may contribute to a better understanding of how low-cost management options can be used in habitat modification strategies, especially in places where animals are prevented from crossing roads safely. In the meantime, it has been good to find some support for the adage that 'the simple things in life are quite often the best'. — **Nigel Weston**

NIGEL WESTON is a MSc student in the Department of Tropical Environment Studies and Geography at James Cook University in Cairns. His research is partly supported by a grant from the Wildlife Preservation Society of Queensland.