



The provision of canopy bridges to reduce the effects of linear barriers on arboreal mammals in the Wet Tropics of northeastern Queensland.

*Thesis submitted by*

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## ***ABSTRACT***

In 1995, Queensland Environmental Protection Agency personnel designed and built an inexpensive aerial connection (canopy bridge) across a rainforest road near Cairns in northeast Queensland. This was done in response to studies showing that habitat fragmentation caused by roads was isolating animal populations and impeding genetic interchange. Tree-dwelling species appeared to be particularly susceptible and it was reported that canopy connections were probably crucial for some rare species in the Wet Tropics. The canopy bridge was subsequently promoted by the Main Roads Department, among others, as a means of encouraging safe fauna movement across road corridors in the region. As the effectiveness of these had not yet been determined, it was recommended that canopy bridge trials be undertaken.

A review of the existing scientific literature and secondary sources revealed that the first bridge for arboreal mammals was built in 1963 in Longview, Washington State, United States, to promote the safe crossing of a busy highway by squirrels. Since then, crossing structures have been erected in at least ten countries. These range from simple ropeways to more elaborate structures. As of this writing, at least four canopy bridges are being trialed or considered for use in Australia.

The trials I conducted at the existing bridge near Cairns, using methods such as spotlighting, analyses of hair and faecal pellet samples and remote photography, demonstrated that at least five arboreal and scansorial mammal species were using it to cross the rainforest road. When it became clear that arboreal species were indeed using

the existing bridge as a crossing route, additional studies were initiated. These were designed to test whether design and position influenced usage of the bridges by arboreal mammals. Two simplified bridges were erected along an abandoned snig track near Millaa Millaa on the Atherton Tablelands. This decision was based on several factors including prior knowledge of arboreal mammal assemblages within the area and the presence of suitable vegetation. Another consideration was the narrow configuration of the track resulting in overlapping tree canopies that were unlikely to impede the movement of arboreal mammal species. The animals generally preferred to use the natural crossings with only two verified crossing events recorded.

One of the simplified bridges used over the snig track was subsequently removed, lengthened and installed along an old highway between Millaa Millaa and Ravenshoe on the Atherton Tablelands. The most important consideration in this instance was the configuration of the road corridor – it was of a sufficient width and length to represent a likely impediment or heightened risk for the movement of arboreal mammals. Although it took five months for a verified crossing event to occur, these events increased in frequency the longer the trial continued until they became commonplace. In total, 52 completed crossing events involving at least four arboreal mammal species were recorded over an 80-hour period. Thirty-five involved rainforest ringtails, 16 involved brushtails, one a striped possum and another an unidentified small mammal. This equates to a crude possum-crossing rate of one every 1.5 hours. However, the rate increases to approximately one possum-crossing every hour when the time between the bridge being installed and the first crossing event (presumably a period of familiarisation) is discounted and to just under three crossings per hour over the final twelve hours of direct

observation at the site. It remains unclear how many individual animals made the crossing, although repeat sightings of the same individual were likely.

A constraint of this study was that replication was impossible due to financial and bureaucratic constraints. However, a pilot study such as this was needed to provide insight before a more large-scale highly replicated study could be attempted. The study showed that arboreal and scansorial mammals would use canopy bridges to cross roads in the Wet Tropics region, especially where no canopy connectivity remains. It could therefore be argued that the conservation of some arboreal species would benefit from canopy bridges becoming a standard feature of road design. Canopy bridges could also become tourist attractions and raise community awareness about the dual problem of roadkill and habitat fragmentation. In this way, canopy bridges have the potential to play an important role in the presentation and transmission of World Heritage values in the Wet Tropics.

*Keywords: canopy bridge, arboreal mammals, roads, Wet Tropics.*

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