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 pay 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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ACKNOWLEDGEMENTS

I owe a debt of gratitude to many more people than can be listed here. First, I would like to acknowledge the support, encouragement, patience and guidance provided by Professor Helene Marsh (TESAG) throughout the duration of this study. More than this, I thank her for inspiring me to undertake postgraduate studies at James Cook University. I would also like to acknowledge the interest shown in my work by Associate Professor Steve Turton (TESAG & Rainforest CRC) and Associate Professor David King (CTURP, TESAG).

I have unashamedly followed in the footsteps of Rupert Russell, who not only thought about building bridges but also followed through with the construction of the first canopy bridge on the B Road in 1995. This was just one of the myriad ideas Rupert has shared with me. I am also indebted to Miriam Goosem for giving me the opportunity to undertake this fascinating study and for her assistance throughout. Both Rupert and Miriam also provided constructive and generous comments on the text.

David Rivett and staff at Environment North deserve special mention. David not only helped intiate the study (which was not altogether altruistic, given that Main Roads was his major client at the time!) but also gave great support while I was in his employ and continues to do so. I must also acknowledge the financial assistance provided by Main Roads, Cooperative Research Centre for Tropical Rainforest Ecology and Management, Australian Geographic and the Wildlife Preservation Society of Queensland.

Many people assisted me with fieldwork and I am especially grateful to the Clague family - Doug, Sandy and Chris, as well as Olivia Whybird- who housed and fed me and provided stimulating conversation for long periods during the study. Much of the work undertaken would not have been possible without their help. I am particularly thankful to Doug who assisted with bridge construction, scat collection, plant identification and so on and so on.

As my principal field assistant, Joe Sambono provided much of the grunt (both intellectual and physical) that powered this thesis. It was Joe who invented the hair curtain and suggested it be called a SETI (Super Effective Trapping Implement); perhaps his only advice I did not heed. Other people who helped with fieldwork were: Geoff Ahearn, Syb Bresolin, Tonya Chellingworth, Amanda de Silva, Mike and Sue Frankcombe, Corinne Hanlon, Lars Kazmeier, Birgit Kühn, Martin Kroker, Troy Minniecon, Andrea Moorhead, Steven Nowakowski, John Pink, Romina Rader, Jason Shaffer, Lydia Sutakowsky, Wally Usatov, Sylvia Walker, Angela Willett, Robyn Wilson and Andrea Yates.

I am grateful to Bob Jago and Bruce Wannan for their botanical inventory of the B Road site that appears at Appendix 4.1.

My thanks go to all the people who have aided my research in their professional capacities. This includes staff of the then Department of Natural Resources (Forestry, now QPWS) in Atherton and at Tinaroo Falls who assisted with permits and information, as well as staff from Main Roads, the Environmental Protection Agency (particularly Mike Trenerry who shared with me his considerable knowledge as well as his photo

library) and the Wet Tropics Management Authority (particularly Steve Goosem, Bruce Jennsion and Terry Webb for providing technical information, and M'lis Flynn who prepared the map that appears on p. 67). Thanks also to Trevor Parker from CSIRO, Atherton, who prepared the climate change maps, and of course Barbara Triggs, who conducted the hair and scat analyses.

I thank the many staff and students from James Cook University and the Rainforest CRC who have provided friendship and lively discussions throughout the five years of this study. Particular thanks go to: fellow possum researchers Robyn Wilson, Andrew Krockenberger and John Kanowski for their personal observations, suggestions and criticisms; Emily Bolitho for preparing the 'lemur' distribution map and Steve Williams and co. for use of the unpublished data upon which it is based; Steve Delean and Michael Steele for their statistical advice; Jann O'Keefe for her technical support; Yoshimi Izumi for allowing me to reproduce the figures that appeared in her thesis; and Karen Coombes and Neil McLaughlan for their help and hospitality 'up the hill'. I also thank Deb Harrison for putting up with me (and my mess) during the latter stages of the completion of this thesis.

I have benefited from the exchange of information and ideas with a number of researchers working on similar projects in Australia and around the world. I am especially grateful to Chris Moon, Rodney van der Ree, Tom O'Sullivan and Zoe Tanner for sharing their experiences with me. I would especially like to thank Associate Professor Paul Beier of the Northern Arizona University for pointing me in the direction of overseas work; Helen Adams of the Wight Squirrel Project and Paula Kahumbu and Francis Ndiege of the Colobus Trust for so freely giving of their time and information;

Peter Reynolds for providing me with a copy of his Churchill Fellowship report; and Professor Claudio Valladares Padua of the Brazilian Centre for Conservation Biology for sending me his paper on pole bridges and a delightful video of a tamarin using one.

I would also like to thank those who responded to my questioning and cajoling on the subject of possums and crossing routes, such as Margit Cianelli, Kay Coomber, Alastair and Amanda Freeman, Tania Simmons and John Winter.

The Tableland Yidinji and Mamu Tribal groups generously gave me permission to work on their traditional lands. Special thanks go to Syb for guiding me through her country and to Troy for helping me out on his (Ma:Mu luck!). Similarly, I thank Thorold Brotherton for allowing me access to his property. This research would not have been possible without the assistance of these and many other people.

Finally, on a personal note, I thank my family, friends and neighbors for their support and encouragement and Lydia for this and so much more.