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QUANTIFYING AND MITIGATING THE BARRIER EFFECT OF ROADS AND TRAFFIC ON AUSTRALIAN WILDLIFE

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Abstract

The network of highways, freeways, and other major roads in Australia and around the world continues to expand in length and width as new roads are built and existing roads widened. The effects of roads and traffic on the survival and movement of indigenous wildlife are potentially numerous and profound. Successful mitigation of these effects relies on the detailed definition of the nature and extent of the problem and appropriate analysis of the effectiveness of amelioration.

Habitat loss across large areas of Australia has been so extensive that many landscapes currently support less than 5 to 10% of indigenous vegetation. Ironically, much of the remaining vegetation occurs adjacent to existing roads or in unused road reserves. Consequently, new roads will dissect these vegetation remnants, potentially disrupting the movement of animals along these linear corridors. Similarly, the widening of existing roads will typically result in the removal of valuable habitat for wildlife.

In our study, we investigated the effect of a new road on the movement and ecology of the Squirrel Glider *Petaurus norfolcensis* in southeastern Australia. The squirrel glider is an endangered species restricted to forest and woodland in eastern Australia. Its primary form of movement is by gliding between trees. We radio-tracked nine individuals for a two-month period in the vicinity of a new dual-carriageway freeway and an existing single-carriageway highway. A total of 488 radio-tracking fixes revealed that animals were resident adjacent to both roads and that the rate of road crossing varied by sex and road width. Females were never observed to cross the dual carriageway, while a single male was located on opposite sides at a ratio of 1:0.4. Both females and males crossed the single carriageway regularly. Two of the nine gliders disappeared during the study.

The results of this study are being used to design a major collaborative research project that aims to more fully quantify the negative effects of roads and traffic on Australian wildlife. At present, there is a poor understanding of the ecological effects of roads and traffic in Australian ecosystems and on Australian wildlife. In particular, we are focusing on the population-level effects in order to determine the extent that population viability has been reduced. A range of taxa with different levels of vulnerability are being studied, including arboreal marsupials, ground-dwelling mammals, geckoes, and invertebrates. We will incorporate studies of movement patterns with genetic techniques and meta-population-viability analyses to elucidate effects at the population level. The project will then test the effectiveness of various mitigation measures by determining the extent to which population viability has been improved.

Biographical Sketch: Dr. Rodney van der Ree is the ecologist at the Australian Research Centre for Urban Ecology (ARCUE). He obtained his Ph.D. in 2000 from Deakin University, where he studied the impacts of habitat fragmentation on arboreal marsupials in northeastern Victoria. He used the principles of landscape ecology to investigate the response of fauna to a landscape where the habitat was arranged as a network of linear strips along roads and streams. Rodney now brings this knowledge and skill to ARCUE to investigate the response of mammals to urbanization. Rodney will be investigating the distribution and abundance of mammals within the greater Melbourne area, with a focus on the rate of species decline, their habitat requirements, and survival prospects.