

# Beyond passage use: How to evaluate effectiveness of road mitigation for wildlife populations

Rodney van der Ree ([rvdr@unimelb.edu.au](mailto:rvdr@unimelb.edu.au)), Edgar van der Grift ([Edgar.vandergrift@wur.nl](mailto:Edgar.vandergrift@wur.nl)), Jochen Jaeger ([jjaege@alcor.concordia.ca](mailto:jjaege@alcor.concordia.ca)), Lenore Fahrig ([lenore\\_fahrig@carleton.ca](mailto:lenore_fahrig@carleton.ca)), Francisco Madrinan ([madrinan@alcor.concordia.ca](mailto:madrinan@alcor.concordia.ca)), Glenn Cunningham ([glenn.cunnington@gmail.com](mailto:glenn.cunnington@gmail.com)), Scott Findlay ([findlay@uottawa.ca](mailto:findlay@uottawa.ca)), Jeff Houlahan ([jeffhoul@unb.ca](mailto:jeffhoul@unb.ca)), Nina Klar ([ninaklar@gmx.de](mailto:ninaklar@gmx.de))

Rodney van der Ree: Australian Research Centre for Urban Ecology, Royal Botanic Gardens Melbourne. School of Botany, University of Melbourne, 3010, Victoria, Australia. Corresponding author. [rvdr@unimelb.edu.au](mailto:rvdr@unimelb.edu.au)

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## ABSTRACT

Mitigating the negative effects of human activities on the natural environment is a major focus in many parts of the world. These mitigation programs are focused on a wide range of species, ecosystems and issues and encompass a diversity of temporal and spatial scales. The last 20 years has seen a dramatic increase in efforts to mitigate the effects of roads and traffic on wildlife, including fencing to prevent wildlife-vehicle collisions and under-and over-passes to facilitate landscape connectivity. While not necessarily explicitly articulated, a fundamental motivation behind the mitigation of the negative effects of road and traffic is to prevent the decline and extinction of local populations. Concomitant with the increased effort to mitigate has been a focus on evaluating the use and effectiveness of the mitigation structures. Recent reviews of the literature have unequivocally demonstrated that wildlife crossing structures are used by many species of wildlife. While most mitigation programs are likely to also have an effect at the population level, it has rarely been demonstrated or quantified. Therefore, the critical question that remains unanswered is ‘to what extent does mitigation improve the viability of a population?’ A scientifically rigorous assessment of mitigation effectiveness and efficiency is essential to ensure (i) populations do not decline or become extinct despite our efforts to prevent it; (ii) we know when to continue (or stop) improving the design and efficiency (and by how much) of mitigation designs; and (iii) to maximise the conservation gain for the money spent. In this paper we outline the essential elements of a good experimental design and prioritise the parameters to be measured. The framework we propose will facilitate collaboration between road agencies and scientists to undertake research programs that more fully evaluate effectiveness and efficiency of mitigation efforts.