DOI: 10.1111/aje.12628

ORIGINAL ARTICLE

WILEY African Journal of Ecology

Factors influencing the spatial patterns of vertebrate roadkill in South Africa: The Greater Mapungubwe Transfrontier Conservation Area as a case study

Wendy J. Collinson[1,2] | Daniel M. Parker[2,3] | Ric T. F. Bernard[2,3] | Brian K. Reilly[4] | Harriet T. Davies-Mostert[1,5]

[1]Endangered Wildlife Trust, Modderfontein, South Africa
[2]Wildlife and Reserve Management Research Group, Department of Zoology and Entomology, Rhodes University, Grahamstown, South Africa
[3]School of Biology and Environmental Sciences, University of Mpumalanga, Nelspruit, South Africa
[4]Department of Nature Conservation, Tshwane University of Technology, Pretoria, South Africa
[5]Department of Zoology and Entomology, Mammal Research Institute, University of Pretoria, Pretoria, South Africa

Correspondence
Wendy Collinson, The Endangered Wildlife Trust, Private Bag X11, Modderfontein, 1645, Johannesburg, South Africa.
Email: wendyc@ewt.org.za

Funding information
Bridgestone South Africa; De Beers Group of Companies; E. Oppenheimer and Son; Endangered Wildlife Trust

Abstract

Few studies have investigated the factors that influence roadkill occurrence in developing countries. In 2013, we monitored a 100-km section of the road (comprising the R572 and R521 regional highways and the D2662) that pass through the Greater Mapungubwe Transfrontier Conservation Area in South Africa, to assess the possible factors influencing roadkill. Over a period of 120 days, and across the three ecological seasons, we recorded 981 roadkills (rate = 0.08 roadkill/km/day) from four vertebrate taxonomic groups. We generated predictive models of roadkill from one combined data set that considered eight variables identified from the literature as potential correlates of roadkill. The model that included the distance of the fence from the road, habitat type adjacent to the road, and the presence of a hill in the road (i.e., elevation of a bank on the side of the road best explained roadkill occurrence. More roadkill was predicted to occur in both open and dense mopane and dense mixed bushveld habitats, on a hill, when there was a bank on the side of the road, and as the distance between the road verge and a fence decreased. Our model provides some insight into the significant predictors of roadkill occurrence and is therefore a valuable tool in identifying sites of high-potential roadkill frequency and formulating mitigation measures for reducing road mortalities.

Résumé

Peu d'études ont enquêté les facteurs qui influencent l'occurrence des animaux tués sur les routes dans les pays en voie de développement. En 2013, nous avons surveillé un tronçon de la route de 100 km (comprenant les autoroutes régionales R572 et R521 et la D2662) qui traversent la zone de conservation transfrontalière du grand Mapungubwe en Afrique du Sud afin d'évaluer les facteurs pouvant influencer la mortalité des animaux sur les routes. Sur une période de 120 jours et au cours des trois saisons écologiques, nous avons enregistré 981 victimes de la route (taux = 0,08 mortalité routière / km / jour) de quatre groupes taxonomiques de vertébrés. Nous avons généré des modèles prédictifs de mortalité routière à partir d'un ensemble de données combinées prenant en compte huit variables identifiés dans la littérature comme corrélats potentiels de la mortalité routière ; ceux-ci consistaient en 1) groupe taxonomique, 2) proximité d'une source d'eau, 3) habitat en bordure de route,