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# Taking soundscapes into account in landscape connectivity mapping

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## Résumé

Anthropogenic development is causing significant habitat fragmentation, jeopardising landscape connectivity for many species, particularly highly mobile species such as ungulates. Roads are a major source of fragmentation and also responsible of a large number of animal deaths by car collisions. Landscape connectivity studies have investigated the effects on animal movements of land cover and landscape structure around roads. But another source of heterogeneity among and along roads, that has been neglected until now, is the amount of noise disturbances they generate. Understanding the behavioural responses of animals to noise disturbance could be crucial to effectively characterising landscape connectivity for various species, and could thus make it possible to better predict potential meeting points between animals and vehicles. In this study, we investigated two questions: i) do road noises alter roe deer spatial behaviour? ii) do connectivity models including the effects of noise disturbance on roe deer spatial behaviour perform better (than the models without noise effects)? Our study was based on the GPS locations of 365 roe deer (*Capreolus capreolus*) from a heterogeneous landscape in south-western France. The inclusion of a sound volume variable was highly significant in explaining habitat selection by roe deer, among numerous other environmental variables. Our study also showed that the modelling of landscape connectivity is improved when a sound volume variable is included. Moreover, landscape connectivity is established more reliably, and makes it possible to better predict the hotspots of collisions between animals and vehicles. This study highlights the need to include soundscapes in the study of animal movements, which will be facilitated by the ongoing development of several acoustic modelling software packages.

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\*Intervenant

**Mots-Clés:** Connectivity, Spatial Ecology, Fragmentation, Soundscape