European Commission

Science for Environment Policy

Drainage tunnels provide safe road crossings for wildlife

Drainage tunnels running under roads can provide small animals with safe road crossings, mitigating habitat fragmentation, a new study has confirmed. The researchers suggest that the tunnel design can be further improved to aid animal movements, for example, by providing dry ledges to ensure the routes are still available in times of high rainfall.

31 October 2013
Issue 348

Source: Serronha, A.M., Mateus, A.R.A., Eaton, F., *et al*. (2013). Towards effective culvert design: monitoring seasonal use and behavior by Mediterranean mesocarnivores. *Environmental Monitoring and Assessment*. DOI: 10.1007/s10661-012-3020-3.

Contact:
anaserronha@cibio.up.pt

Read more about:
Biodiversity

The expansion of road networks through rural areas represents a severe threat to biodiversity, fragmenting habitats and wild populations. Roads act as barriers to animal movement as a result of the risks of collision with vehicles and avoidance behaviours. Such fragmentation can lead to damaging ecological impacts, including increased inbreeding and extinctions.

Drainage tunnels are structures designed to allow water to flow under roadways and other trails, however, it has been suggested that they can also help to mitigate fragmentation by allowing some animals to pass safely beneath roads. In this study, researchers focused on the use of these tunnels by animals such as badgers, foxes and otters.

Previous studies of tunnel use have generally relied on the use of marble powder to detect animal movement tracks and footprints. However, since this technique will fail if the powder is washed away, it has typically only been applied during the summer and spring months when tunnels are dry. This, argue the researchers, has given a distorted view of how animals make use of under-road tunnels.

To address these limitations, they set up video camera recording equipment at 15 tunnel sites along two highways in Alentejo, southern Portugal. They recorded tunnel usage over ten days in each season (autumn, winter, spring, and summer) between 2005 and 2006 to determine tunnel usage and the environmental factors influencing it. They also assessed the effect of tunnel design and road and landscape factors on tunnel use.

Tunnel crossing activity varied throughout the year, depending on the species. Water levels of three centimetres or more deep or where more than 70% of the culvert was submerged was the biggest deterrent to tunnel use for all species, other than the semi-aquatic otter.

In terms of individual species usage patterns, red foxes used drainage tunnels less frequently in open areas with little cover, martens avoided tunnels with vegetation cover over the entrance, while otters crossed more frequently where tunnels fed into streams and rivers and when river banks had more vegetation.

The findings confirm previous studies indicating that drainage tunnels reduce the impacts of roads for carnivores in Mediterranean areas, and provide a more complete picture of tunnel use throughout the year, avoiding the seasonal bias of previous studies.

The researchers suggest that animal requirements should be incorporated into tunnel design, for example including 'dry' ledges for those species put off by deeper water levels. Placing tunnels at regular intervals to facilitate the daily movements of animals could reduce the effects of their habitat fragmentation.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.