

Bat Conservation Trust



BATS AND ROADS BAT CONSERVATION TRUST – 29.11.22

Impacts of road schemes

The potential negative impacts of road construction on bats include destruction, degradation and fragmentation of roosting, foraging and commuting habitat; mortality of bats through collision with vehicles and disturbance from noise and lighting associated with the road. Roads create an open space, which many bat species can be reluctant to cross. Traffic further increases the barrier effect due to sudden movement, noise, headlamps, street lighting and the risk of collision. Many species of bat fly relatively close to the ground or close to trees and hedges for protection against the weather and potential predators (depending on ambient light levels). Those that do cross roads typically do so at traffic height, with a high risk of collision with vehicles.

The impact of roads on bats was studied by Berthinussen and Altringham (2012a), who reported that bat activity and diversity reduced with increasing proximity to a major UK road, probably due to habitat degradation (through noise, light and chemical pollution), the barrier effect and/or road mortality. Finch *et al.* (2020) report that both bat activity and feeding behaviour are negatively affected by traffic noise playback. Fensome and Mathews (2016) analysed evidence on road mortality for bats from across Europe and found that juveniles are more prone to collision (making maternity colonies close to roads particularly vulnerable) and that rare species such as barbastelle have been discovered as casualties on the roads studied.

Bats are afforded protection by European and UK law in an effort to help bat populations recover from the losses sustained in the last century. Mitigation for the impacts of roads is therefore an essential part of helping to ensure the survival of our bat species.

Mitigation and compensation methods

Attempts to mitigate and compensate for the impacts of road schemes on bats generally include:

- the provision of alternative roosting habitat (for example, in buildings, bat boxes or through veteranisation of trees);
- planting of new commuting and foraging habitat (although it should be recognised that new planting cannot replace mature woodland);
- the provision of crossing points for bats (see below); and
- sensitive lighting schemes (see below and BCT & ILP, 2018).

Eco-passages in the form of different types of under-passes (tunnels and culverts) and overpasses (hop-overs, elevated verges and green bridges) can be important for providing safe crossing points for all types of wildlife, including bats. These have been the subject of various research projects.

One UK study by Berthinussen and Altringham (2012b) reported on the efficacy of road crossing points for bats, concluding that bat gantries were ineffective but underpasses do have potential (if they are of sufficient size and placed along pre-construction commuting routes) and green bridges warrant further research into their efficacy. A study by the same authors reported in 2015 showed that one green bridge in the UK was used by 97% of the bats crossing a road.

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Other studies have highlighted the importance of carrying out pre-construction surveys to establish pre-existing commuting routes and taking a landscape-scale approach to mitigation by quantifying the flow of commuting bats pre- and post-construction (Claireau et al., 2019). The type and size of the mitigation feature, the width of the road and the surrounding habitats and topography also appear to be important (Davies, 2019; Laforge et al., 2019).

Whilst impacts from light pollution are often addressed by sensitive lighting schemes (see Rowse et al., 2018), this does not reduce the negative impact of vehicle headlights. Impacts from noise and chemical pollution are often not addressed and we are not familiar with any mitigation measures that have been both proposed and tested for their efficacy.

Call for monitoring and research

We are keen to see further monitoring and research across the UK and Europe to consolidate knowledge on what constitutes effective mitigation for the fragmentation of commuting routes by roads. We would encourage more investigation of natural crossing points such as hop-overs, elevated verges and green bridges (also known as land or habitat bridges) that could deliver a benefit for the bat species involved, and also for other species impacted by such developments. This is an approach often used in Europe where the use of 'green bridges' is more widely adopted.

It is essential that adequate pre-construction surveys are carried out for every scheme and a landscape-scale approach is applied to mitigation. The effectiveness of mitigation in helping all biodiversity should be robustly monitored on each scheme and the results published, to enhance the design of future mitigation.

Monitoring of crossing points should compare bat activity and behaviour pre- and post-construction, it should compare numbers of bats using the mitigation feature to those crossing the road without using the mitigation feature, and bat activity at control locations should be monitored, i.e. what are bats doing at unmitigated crossing points? Repeat monitoring, adaptive management and publication of results should also be built into every scheme.

We are also keen to see more research into the impacts on bats of vehicle headlights and noise and chemical pollution from roads.

Further Reading

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- Conservation Evidence website (bat conservation and roads):
https://www.conservationevidence.com/data/index?synopsis_id%5B%5D=14&terms=road&country%5B%5D=&result_type=interventions#search-results
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- Rowse EG, Harris S, Jones G. 2018 Effects of dimming light-emitting diode street lights on light-opportunistic and light-averse bats in suburban habitats. *Royal Society Open Science* 5: 180205.