

Barn Owls and major roads

John Lusby reports on the findings of a major new study on Barn Owl road deaths and ways to prevent them happening.

Throughout the Barn Owl's extensive range, where there are major roads, there are road fatalities. As one of the most susceptible birds to vehicle collisions, attempts to reduce casualty rates and minimise the effects of roads on Barn Owls have been largely unsuccessful, and remain a significant challenge.

*Research by **BirdWatch Ireland** and **Transport Infrastructure Ireland (TII)** now provides fascinating new insights on the relationship between Barn Owls and major roads which further our understanding of the mitigation requirements to protect this iconic species. However, it is still a long road ahead.*

Road infrastructure is essential to our everyday lives, but it comes with a cost for biodiversity. One of the most obvious direct effects of roads is the mortality of wildlife. The expansion of road infrastructure and the increases in traffic throughout the world have coincided with a continued increase in the extent of road casualties of wildlife. Vehicle collision is now the main cause of death for a diverse range of wildlife and can contribute to population declines and increase the risk of extinction for vulnerable species.

Barn Owls are considered to be one of the species most affected by roads and also one of the most difficult to mitigate for. Mitigation strategies to reduce collisions and impacts on wildlife are now standard in the planning and design of new road developments. In Ireland, recently constructed motorways are fitted with a range of structures to prevent road deaths of mammals, including fencing to restrict animal access to the road, underpasses to allow for safe crossing and an overpass green bridge for bats.

Although the potential impacts of new road developments and the inevitable mortality of Barn Owls are recognised by road authorities and developers, there are no measures in place

Barn Owl casualty on Tralee bypass, Co Kerry.
Photo: Michael O'Clery



to reduce the risk of collision, and this is simply because such evidence-based and evaluated mitigation measures do not exist. This is partly due to the inherent difficulties in designing and implementing road mitigation strategies for birds, but an additional obstacle has been a limited understanding of the response and behaviour of Barn Owls to major roads, and how this influences their risk of collision.

In an attempt to address these knowledge gaps, **BirdWatch Ireland** and **TII**, which shared similar concerns for the potential impacts of roads on Barn Owls, undertook a research programme over the past three years to assess the extent of collisions, and the factors which influence the risk of collision, of Barn Owls on roads in Ireland, to inform conservation requirements. This research was timely given plans for the continued expansion of the motorway network in the south-west, which is a stronghold for Barn Owls.

To advance our understanding of the relationship between Barn Owls and major roads it was necessary to employ innovative methods. However, we first needed to address some of the more basic underlying questions, such as the scale of mortality of Barn Owls on our roads.



Greater White-toothed Shrew trapped in small mammal survey

Extent of road mortality

A dedicated road casualty survey on a section of the M8 motorway and the Tralee bypass, carried out once per day over two years and once weekly over 2½ years, provided the first evidence of the extent of Barn Owl mortality on major roads in Ireland, with an estimated mortality rate of 50-60 Barn Owls per 100 kilometres per year on these roads.

Although likely to be higher than on most other roads in the country, this scale of mortality is nevertheless comparable or higher than estimates from roads elsewhere in Europe, which is concerning given the relatively



Barn Owl fitted with GPS data logger to assess habitat use and home range. **Photo:** Michael O'Clery

low population densities of Barn Owls in Ireland.

Several mortality 'hotspots' were identified on the M8 motorway, and assessment of the physical attributes of the road and surrounding landscape revealed that the proportion of grass and herbaceous cover in roadside verges significantly influenced the risk of collision. This indicated that birds were attracted to suitable foraging conditions along the verge, which resulted in increased casualty rates.

Modelling of Barn Owl movements showed that features in the wider landscape also determined the occurrence of mortality and hotspots. In particular, as juveniles avoid higher-altitude areas when dispersing from where they fledged, this can create a funnelling effect that dictates where birds encounter major roads.

This information can be used to predict potential problem areas on new road developments or to identify existing collision hotspots on existing roads.

Although this information on the extent and factors which influence mortality of Barn Owls on Irish roads is essential, it is only a piece of the puzzle. Alongside this information an understanding of the individual behavioural response and interactions of Barn Owls to road networks is necessary to identify the potential for evidence-based mitigation solutions, and such data has been lacking up until now.

For species such as **Kestrel**, it is easy to observe their behaviour as they hover directly above motorway verges, but for Barn Owls which are active during darkness, this is not the case. For the first time, we used specialised GPS dataloggers (under licence from the National Parks and Wildlife Service and the BTO) to gather information on the movements and behaviour of Barn Owls in relation to roads.

The results were both revealing and different to previous assumptions or information on how Barn Owls interacted with major roads in Europe.

Barn Owl use of roadside verges

As expected, Barn Owls in Ireland had considerably larger home ranges than their UK or continental counterparts, but interestingly, the tagged birds did not avoid major roads. Quite the opposite, in fact. Individual birds spent more time than expected in close proximity to major roads, crossing regularly and actively hunting along the verges. Investigation of small mammal populations showed motorway verges support a similar abundance and greater diversity of small mammal species than the surrounding countryside, which reaffirms their suitability as a foraging resource for Barn Owls. Therefore, as well as the obvious negative effects, major roads can also provide some benefits to Barn Owls (and wider biodiversity) in the form of the provision of suitable habitat.

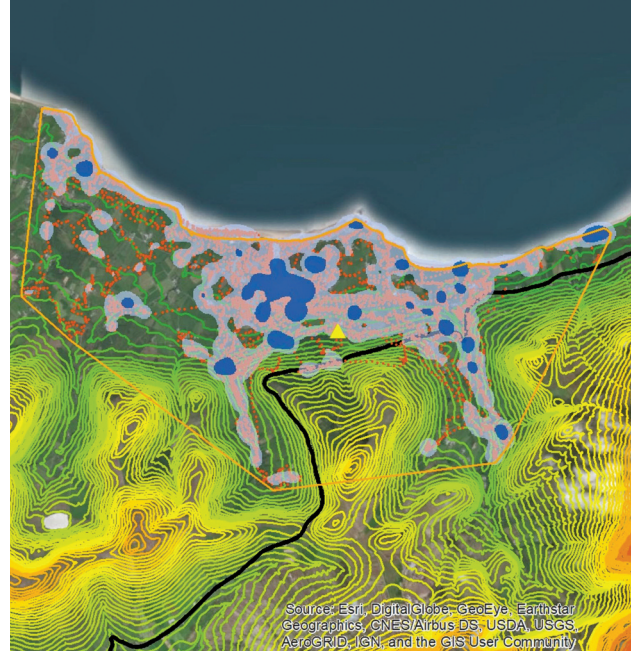
The importance of major road verges for Barn Owls may be as much to do with the quality of the surrounding habitat as it is to do with the roadside verges, and the large home-range size further indicates poor landscape conditions. This is an important consideration for the development of

mitigation and suggests that enhancement of habitat conditions in the wider landscape would likely reduce the use of roadside verges, and thus encounters with roads, while also delivering benefits which could offset losses to road mortality.

Despite the fact that Barn Owls are killed in relatively high numbers on major roads, their nesting distribution is not affected by the major road network, as was determined by assessing the distribution of breeding pairs in relation to the national road network.

Major road developments do not necessarily cause the displacement of Barn Owl pairs in close proximity to major roads, as has been shown in Great Britain. The main negative effects of major roads on Barn Owl populations therefore appear to be from direct mortality through vehicle collisions and not by other means such as displacement, disturbance, or through a reduction of breeding range or suitable habitat.

We are now armed with the necessary ecological knowledge base to inform mitigation requirements. The next challenge will be to devise practical mitigation solutions to meet



The home range of a male Barn Owl in west Kerry, showing movements in relation to roads and avoidance of upland areas within the home range.

these requirements. To this end we are working with TII, which is using this information to identify suitable mitigation scenarios that can be implemented on future road developments.

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