

# Reducing roadkill

Millions of animals die on our ever-expanding road networks every year. What can be done to reduce this, and how can we be sure it is working?

## Why did the toad cross the road?

Animals travel across their habitat for a variety of reasons. They may be seeking food, shelter or a mate, evading predators, finding their own territory, or migrating. These drivers vary over time, with hotspots at key stages, such as the breeding season. Amphibians, for example, have to move to a body of water in order to complete their life cycle.

Movement also varies depending on environmental conditions. The movement of mammals and reptiles usually increases at higher temperatures, while in drier conditions amphibian movement declines. Roads also provide a warm surface on which to bask – tempting for an ectothermic reptile – and they are responsible for increased animal fatalities.

It has been estimated that more than a million animals become roadkill each year in the UK, causing £17 million in damages. In Australia an estimated 10 million native animals are killed each year, with 37 people reportedly dying from vehicle collisions with kangaroos between 2001 and 2017. Statistics like these have contributed to a huge rise in research projects in the fast-growing field of road ecology.

In the spring, toads can cross roads in large numbers, especially near breeding ponds



## Mitigation methods

Three approaches to changing wildlife behaviour – in order to reduce or avoid vehicle collisions – are employed:

- Making the road and surroundings less attractive to wildlife. Light-coloured road surfaces aim to deter species that would be more exposed than on a dark surface. Reducing food and water resources next to roads aims to discourage loitering.
- Discouraging crossing. Reflectors, flashing lights, ultrasonic whistles (on vehicles or motion-sensing roadside poles) and fences aim to prevent animal/vehicle encounters.
- Provision of safe, or safer, crossings. Bridges, overpasses, underpasses and escape routes aim to provide safe passage for wildlife over, under or around the road.

Erection of signage bearing warnings about wildlife aims to alert drivers to risks and reduce speed. Road closures and human transportation aim to ensure the successful arrival of amphibians at breeding ponds. The extent to which any of these approaches works very much depends on the timing, location and the animals at risk of becoming roadkill.



Kangaroos are at risk on roads in Australia



Volunteer collecting toads to transport safely across a road during the breeding season

## Case study

One research study illustrates some of the challenges involved in identifying effective mitigation for roadkill. Researchers in Spain spent a year recording the casualties found on paved roads within Doñana National Park – located in a Mediterranean biodiversity hotspot. They found 2368 roadkills belonging to 66 species, with the abundant lizards and snakes – ectotherms – most likely to die.

The Park has numerous wildlife crossing structures (WCS), which would be expected to mitigate roadkill, but Figure 1a shows that the effects were contradictory. While both groups of ectotherms were less likely to be killed where there were WCS, small mammals were less fortunate. The researchers suspected that this was because the WCS had been designed to allow large and medium-sized mammals to cross. Since the latter include carnivores, the WCS effectively became ecological traps for some other species. This was exacerbated by the **drift fences**, designed for large/medium-sized mammals, which were not as effective in funnelling the smaller species into the WCS.

Road signs seemed effective for both groups of ectotherms (see Figure 1b), and previous studies, both in the study area and elsewhere in the world, have shown benefits to large mammals. However, their effectiveness varies. Where there is a plethora of road signs, drivers fail to notice them, and if they are not positioned at crossing hotspots, they have limited success.



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Alligator Alley in Florida has almost 40 wildlife crossings that serve not only alligators, but also bears, deer and cougars

## The future

It is clear that local knowledge is key to effective roadkill mitigation. We need to decide what is most threatened, and when, for each location. Some studies show a positive effect of roads on populations of small mammals – likely because their predators have been killed. In general, however, species with low reproductive rates, greater mobility and larger body sizes are the most susceptible to negative road and/or traffic effects.

One day such species could be detectable by AI in smart cars. Automatic emergency braking and alerting of other drivers to the risk may become possible. Until then, see what you can do in your area to help potential victims of roadkill by joining a citizen science project.

## TERMS EXPLAINED

**Drift fence** A fence that redirects animals, typically used in conservation and research to study animal populations or manage their movements. They are embedded in the ground and can be used in combination with camera traps (to record the animals that pass), pitfall traps or funnel traps.

## RESOURCES

Wildlife monitoring – drift fences and tiny critters:

<https://tinyurl.com/roads-wildlife-monitoring>

The road lab:

<https://www.theroadlab.co.uk>

Mitigating roadkills:

<https://tinyurl.com/mitigating-roadkills>

Drivers deliberately swerving to hit animals:

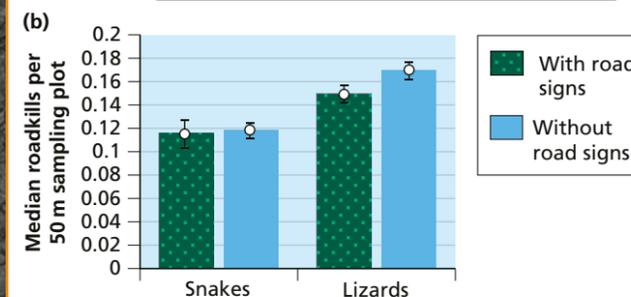
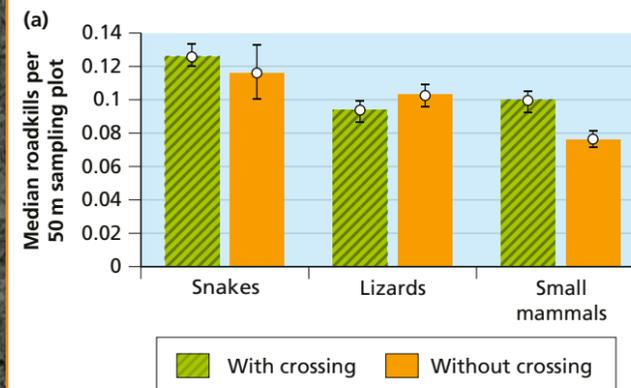
<https://tinyurl.com/deliberate-roadkills>

Underpasses reducing amphibian mortality:

<https://tinyurl.com/amphibian-underpasses>

Toad patrol helps 50 000 to breeding grounds:

<https://www.bbc.co.uk/news/articles/cjeww5515zoo>



Source: Data from D'Amico, M. et al. (2015), 'Vertebrate road-kill patterns in Mediterranean habitats: who, when and where', *Biological Conservation* Vol. 191, pp. 234–42.

**Figure 1** Spatial roadkill patterns and wildlife road crossing predictors, showing the relationship between the median number of roadkills per 50 m sampling plot and the presence/absence of (a) crossings and (b) road signs