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Thank you for the invitation to make a submission to this inquiry. I am writing based on my expertise in road ecology and my position as an internationally recognised leader in the field. I have researched the effectiveness of wildlife crossing structures within Australia (Mitchell et al., 2022; Soanes et al., 2013, 2018), and conducted three global evidence syntheses exploring the impact of roadkill on wildlife populations, and the effectiveness of measures to reduce mortality and barrier effects (Grilo et al., 2021; Rytwinski et al., 2016; Soanes et al., 2024).

Wildlife road strike is an emotional issue, and one that wildlife rescuers and carers bear the brunt of. It is heartening to see councils and road agencies taking action to lessen the toll. My primary concern is that in our desperation to do something, anything, to prevent the ongoing casualties, we take action that makes us *feel* better, rather than one that is effective. I believe there is a real risk of authorities embracing solutions that while popular and high-profile, are ineffective or untested. The only thing worse than not addressing the wildlife road toll would be to gain a false sense of accomplishment while the problem persists.

In line with my expertise, I am responding to two terms of reference. However I would be happy to discuss the broader topic in more detail, or provide further evidence where required.

3. New and emerging technologies and infrastructure used to prevent road strikes

Virtual fencing is the most prominent emerging technology to prevent wildlife road strikes. It frequently gains media attention and is subject to many 'trials' across the country. However, these trials are rarely accompanied by evaluation and evidence of their success is scant.

Where they have been evaluated as part of a scientific test, 5 out of the 6 studies have shown no effect of virtual fencing on wildlife road strike. The five studies that showed roadkill was not reduced include:

- A before-after-control-impact trial in Phillip Island, which found no reduction in roadkill rates for brushtail possum or swamp wallaby (Connelly et al 2023)
- A before-after comparison of wallaby strikes in Redland City Council showed no decline in the two years following installation of a virtual fence (Appelby and Jones, 2020).
- Roadkill rates were compared during periods where virtual fences were switched on and switched off. No effect was found for wallabies, pademelons, or possums during the 126 day period (Englefield et al., 2019)
- Roadkill of pademelons compared during periods when virtual fences were switched on and off showed no effect of virtual fences (Candy et al., 2024)
- A before-after-control-impact study of wombats showed no effect (Stannard et al., 2021). This was reported as a success story, as mortality declined after the virtual fence was installed. However, mortality also declined at the control site – where no fence was installed – during the same time frame, meaning the change in mortality was not due to the virtual fence.

Only one study from Tasmania showed a reduction in roadkill of 50% (Fox et al., 2019) with some researchers raising concerns about the methods used (Coulson & Bender, 2020). This is the study from which the commonly cited '50% reduction in roadkill' is sourced.

The evidence to date suggests that either the virtual fencing is not effective, or that it is only effective under certain conditions – for example, for certain species, in certain environment or road types. However there is simply not enough evidence to support their widespread use. Any installation of this technology must be accompanied by a robust, scientific evaluation that involves:

- counts of road killed animals
- collected before and after virtual fencing is installed,
- at locations with and without virtual fencing
- for a significant period of time (e.g. at least one year)

This is the basic scientific standard of evidence required for determining effectiveness (Rytwinski et al., 2015; van der Grift et al., 2013).

Relying solely on the number of calls received by wildlife carers is not sufficient evidence to determine effectiveness, because it is not a systematic, controlled measure, and there are a number of broader factors that could affect the rates of call outs.

I understand the allure of an inexpensive, easy-to-install solution. However our research synthesis of measures to reduce roadkill showed that this type of solution was typically ineffective (<1% reduction in roadkill) (Rytwinski et al., 2016). Virtual fences were not yet common when our study occurred, but similar measures that rely on deterring wildlife included reflectors and auditory deterrents.

The current number of highly popularised trials that are not paired with thorough evaluation, or where the data is not made publicly available, is concerning. Many feature in media reports claiming the method has been a success, despite a lack of data. Given the evidence to date, it is not appropriate to implement virtual fences unless it is done as part of an *evaluated* trial, in which the data are scientifically sound and made publicly available to inform future decision making.

6: International best practice standards to decrease wildlife road strike

I have led and co-led two international reviews of the evidence to reduce wildlife road strike (Rytwinski et al., 2016; Soanes et al., 2024). Of the evidence available, the most effective method is to physically separate the path of wildlife from the path of traffic. Physical fencing, when appropriately designed to the target species, is the clearest way to reduce roadkill. Wildlife crossing structures (over and underpasses) allow wildlife to safely move over roads, however we found that they only reduce roadkill when combined with appropriate fencing that prevents wildlife from accessing the roadway and serves to 'funnel' animals towards the structure.

There are several good sources of standard designs, fauna-sensitive road design guidelines, and evidence bases to support mitigation projects (both in Australia and internationally). However to date these are largely applied to new road projects (or road upgrades) and limited to threatened species. The most common species reported to wildlife carers are generally not the target of these migitation measures (e.g. kangaroos, wallabies, wombats, and possums) and some of the animals most vulnerable to roadkill are unlikely to be reported at all (e.g. frogs and reptiles). In short, the problem is far larger than most people are aware of, and we are only addressing a fraction of it with current measures.

Supporting literature

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