

LEGISLATIVE COUNCIL ECONOMY AND INFRASTRUCTURE COMMITTEE

Inquiry into Wildlife Roadstrike in Victoria

Melbourne – Monday 1 September 2025

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WITNESSES

Associate Professor Graeme Coulson, Honorary Principal Fellow, School of Biosciences, and

Dr Helena Bender, Senior Lecturer, Environmental Social Sciences, School of Agriculture, Food and Ecosystem Sciences, University of Melbourne.

The CHAIR: I declare open the Legislative Council Economy and Infrastructure Committee's public hearing for the Inquiry into Wildlife Roadstrike in Victoria. Please ensure that mobile phones have been switched to silent and that background noise is minimised.

I would like to begin this hearing by respectfully acknowledging the Aboriginal peoples, the traditional custodians of the various lands we are gathered on today, and pay my respects to their ancestors, elders and families. I particularly welcome any elders or community members who are here today to impart their knowledge of this issue to the committee or who are watching the broadcast of these proceedings. I also welcome any other members of the public watching via the live broadcast.

To kick off, we will just have committee members introduce themselves to you. We will start with Mrs Deeming on the screen.

Moirá DEEMING: Thank you. Moira Deeming from Western Metropolitan Region.

Gaëlle BROAD: Hi. I am Gaëlle Broad, Member for Northern Victoria.

Katherine COPSEY: I am Katherine Copsey, Member of Southern Metropolitan Region.

The CHAIR: Georgie Purcell, Member for Northern Victoria.

Richard WELCH: Richard Welch, Member for North-Eastern Metropolitan Region.

The CHAIR: Thank you. Thanks so much for taking the time to appear before us today. All evidence taken is protected by parliamentary privilege as provided by the *Constitution Act* and further subject to the provisions of the Legislative Council standing orders. Therefore the information you provide during this hearing is protected by law. You are protected against any action for what you say during this hearing, but if you go elsewhere and repeat the same comments, they may not be protected by this privilege. Any deliberately false evidence or misleading of the committee may be considered a contempt of Parliament.

All evidence is being recorded. You will be provided with a proof version of the transcript following this hearing, and then transcripts will ultimately be made public on the committee's website.

For the Hansard record, could you both please state your full names and any organisation you are appearing on behalf of.

Graeme COULSON: Yes. I am Graeme Maxwell Coulson. I am appearing on behalf of the University of Melbourne, where I am an Honorary Principal Fellow, and I also have a consulting business called Macropus Consulting.

The CHAIR: Wonderful.

Helena BENDER: My name is Helena Bender. I am a Senior Lecturer at the University of Melbourne, and I am appearing in that capacity.

The CHAIR: Wonderful. Thank you. We now welcome your opening remarks but ask they are kept to around 10 to 15 minutes to ensure plenty of time for discussion and questions.

Helena BENDER: Sure. I might start if that is all right. Let me acknowledge that I work and live on the land of the Wurundjeri people, and I pay my respects to elders past, present and emerging.

I certainly thank you for the invitation to share my knowledge today. I have a PhD in behavioural ecology, and I do research on eastern grey kangaroos and the use of sound as a deterrent to reduce direct impact for wildlife

and drivers and indirectly for carers. I am very grateful to the panel for the breadth of their terms of reference, because they include all the key elements that I think are really important in this complex system; we are talking about animals, drivers, carers, vehicles, mitigation methods, roadways, landscape and the legislation that affects each of these. I am emphasising that it is a complex system, because changes to one element without considering the others may have an undesired effect.

I am going to focus on three of your terms of reference: the new and emerging technologies, the international best practice standards and the current methods of collating data. There are three key points that I hope to impart today, and they are: that data is crucial; secondly, that any action taken needs to be evidence based; and thirdly, that a comprehensive approach that considers the animal will be needed for a greater chance at an effective outcome.

Visual presentation.

Helena BENDER: Let me start with data. Eastern grey kangaroos are one of the most common species involved in road strike in Victoria. I have got a picture here of eastern grey kangaroos, just in case you were not sure what they look like. However, I cannot tell you with any accuracy how many are killed each year. As a trigger warning, the next slide has an image of road strike.

There is no centralised system to record road strike in Victoria or across Australia. There are various methods for recording, and there are a diverse array of organisations who capture roadkill data, yet none of these datasets are complete or integrated. We know that many kangaroos and many other species of wildlife of all sizes, from camels through to insects, are struck and injured by vehicles, and a proportion leave the road without any record, leading to a serious underestimate of the impact of road strikes. So there is a need for the creation of a centralised point into which all data is collated, and it is necessary because it provides a baseline and that data can then be used to generate location-based warnings for drivers in their vehicles. It can assist in identifying strike hotspots, where to target mitigation and, if maintained over the longer term, then spatial and temporal information, which can help in assessing the effectiveness of any strategies that are implemented.

Now, I want to talk about mitigation and the need for an evidence base for that mitigation. There have been about three or four international and an Australian literature reviews in the last four years, and I am briefly going to outline the mitigation tools that have evidence of a significant effect, with a couple of exceptions. I do have a cautionary note: the international studies that have been done are for wildlife that are not the dominant wildlife we are talking about here in Australia. So they offer a place to start, but it does mean that we have to test anything you might want to roll out here in Australia. These mitigation standards or strategies can be split into three broad categories. The first one is around aiming to influence the animal, the second is trying to keep the animal separated from the road and the third is about influencing human behaviour. In terms of influencing animals, there are two subcategories there. One is to reduce the population, and that can be around relocation, culling and anti-fertility treatment, and Graeme has done quite a bit of research in that space, so if you have questions he is probably best to speak to that. There are two emerging deterrent efforts, and that is the RooBadge, which is testing sounds that are audible and meaningful for eastern grey kangaroos, and we can speak more to that if you have got questions. A second one around that is lighting of the vehicle rather than the roadway, to make the vehicle more visible to the wildlife. The Australian review that has been done around that suggested that that is useful, because kangaroos tend to take flight in an erratic pattern to avoid being caught by a predator.

Let me now turn to animals' separation from the road, and this is where we have the evidence that suggests the greatest impact in reducing wildlife vehicle collisions. This is using wildlife barriers, whether that is fences, walls, boulders, and using those alone or in combination with crossings, either over the roadway or under the roadway. On average we have got evidence that suggests in the US, at the very least, a reduction by 83 per cent using that mechanism.

Then let me turn to influencing drivers behaviour. There are two subcategories within that, and they are around somehow changing the road context or, secondly, changing something in the vehicles. In terms of changing the roadway we can use variable warning signs, and by that I am meaning that they produce flashing lights or they have messages that are adjusted for season or time of day. Those variable signs can be combined with other technologies to provide real-time information, and these are usually called roadside animal detection systems. There has been a trial here in Australia up in Far North Queensland, and there is one being planned at the

moment in New South Wales. Graeme and I are involved in the New South Wales trial, so we can talk a little bit about that. In terms of changing the vehicle, this is where there is emerging technology around mitigation, and this can be around onboard vehicle warning systems, which either signal to the driver or signal to the vehicle, and if you are signalling to the vehicle, that can be about automatic emergency braking or adaptive cruise control. What I have described relies on incoming signals, but there is a potential corollary benefit, which would be about an outgoing signal where you could automatically make an e-call to a rescue centre to alert both humans and wildlife rescuers about the issue that has occurred. Australian testing for all of these still needs to be done, and there are limitations of all of those mitigation strategies, which we can discuss if you wish.

The final category that I also want to talk about is in terms of influencing drivers as well, and that is around driver training. Evidence is not sufficient for this at the moment, but it is inexpensive and it may be worth testing. That involves guidance around what we would call 'roo o'clock', so that is at dusk and dawn, and providing guidance around appropriate speeds for those situations. The second one is around maintaining daylight savings time year-round and separating peak vehicle traffic from movement by wildlife who become active at twilight. It has been modelled for deer, but it has not actually been tested anywhere.

My last point that I wanted to make is around a comprehensive approach to considering animals, and that is because no single measure is universally applicable across all species and in all road conditions. Many mitigation attempts that have sought to change animal behaviour have failed because they did not keep the animal in focus. For example, red light reflectors are not visible because a lot of species cannot see red. Devices like the ShuRoo and the virtual fence have not been found to be effective evidence-wise, and that is because the chosen sounds are often not audible or they lack biological meaning or it produced inappropriate responses – and communicating with animals is generally much more challenging than it is communicating with humans. A comprehensive approach is needed, and that first seeks to avoid the impact by not constructing a road, or rerouting away from sensitive conservation areas, and changing planning codes to consider wildlife when zoning housing estates as well as roadways. An attempt to reduce the barrier effect caused by roads and the wildlife collision toll by mitigating would be your next strategy, and where those two are not successful or are not possible, then you would want to compensate by creating new habitat or improving connectivity between habitats. By addressing both human and animal factors that contribute to wildlife vehicle collisions, we can enhance road safety while also supporting biodiversity conservation and ecosystem connectivity. Thank you.

The CHAIR: Okay. Thank you.

Graeme COULSON: I will start by thanking the committee for the opportunity to provide evidence on this topic and also apologising for my pirate appearance. I had a detached retina operated on late last week, so I may be a little incoherent – we will see.

Helena mentioned the trials going on in New South Wales, and I think it is worth just reiterating – and the committee has the links to all this – that Transport for New South Wales sponsored a symposium, followed by a workshop last year, and that led to a document with a really helpful framework about how to go about these mitigation methods. There are three approaches: one is physical, such as the fencing that Helena mentioned; another is signal based, which can be a signal to the driver or to the animal; and the third is signal based with some sort of detection, which is certainly where things are moving. Each of those three approaches can target either the wildlife or the driver and/or the vehicle as vehicles become more intelligent, if they do. Transport for New South Wales are running two trials. They are working on a test of pale pavement, which is intended to provide more contrast between the animal and the roadway. This is a physical approach aimed at the driver. The research station at Cudal, which is in central-western New South Wales, is currently testing animal skins to determine the degree of contrast between these pale pavements and the animal. The other thing they are doing, which Helena mentioned, is working on a detection system that activates a sign with a bright message. Helena and I are on a steering committee for that project, together with two biologists from Queensland, and we are working on the experimental design and the site selection. It is worth saying that things are no better in New South Wales. Finding a site where there are a reliable number of road strikes, while you do not necessarily want one, is proving to be quite a challenge, because they have about four or five different databases which do not talk to each other, and we are slowly settling on a site, or more than one site, I hope. That will start later this year and will run for at least two years, and we are certainly quite excited by what that produces.

The second term of reference I wanted to talk about was number 6, international best practice. In a way this is not really anything new at all. It is using the scientific method, because we have found over and over again that

this has been lacking in work that has been done on road strike mitigation. For those who can remember their school science, I will just go through some of the basics but make it relevant to the topic. The first is that science always starts with a question. So here we are essentially asking: how can we reduce road strike in Victoria? That is too big a question; you have to narrow it down to things that you can tackle. It might be: does a recording of a dingo howl reduce the road crossing tendency by kangaroos? That is something you can tackle. And that leads to an experiment or a trial or a test – it is all the same thing; they all follow the same sort of pattern. They first of all need very good design. You have been given some guidelines by Kylie Soanes at a previous hearing. There are very good guidelines for this sort of work, and they are rarely used, unfortunately.

Then there is the question of methods, and this is all the nitty-gritty of how you set it up in the field or in the lab, depending on the question, making sure that you get good data for the things that you do and making sure that things like breakdown of equipment and interference by people or whatever it might be can be overcome.

Then there is a question of the variables: what are you actually measuring and how do you go about it? For road strike it is not simple. You can have multiple people, for example, who record the same incident. Some agencies remove carcasses from the side of the road, not necessarily recording it, so you do not know whether it has happened or not – those sorts of questions.

And finally, in the experimental side of things, there is the question of analysis. Your experiment, your trial, will generate data which then needs to be properly analysed. I think Kylie might have mentioned the example of the wombat study in Bega, where the reported results looked impressive – there were less road strikes of wombats after the virtual fence went in. But they also had a control area, and it showed less road strikes. Helena and I analysed the raw data that they provided, and there was simply no effect whatsoever. You need to know that; you need to do it properly.

Finally, reporting – none of this is useful if it is not reported. It should be, ideally, in peer-reviewed journals, but if not that, at least out in the open. It should be transparent and it should be publicly available, and we are certainly working towards that with the New South Wales trial. Thank you.

The CHAIR: Great. Thank you so much for that. I might kick off with questions if that is okay. You obviously covered off that there are a few proposed mitigation measures that, based on the evidence, do not work, such as the ShuRoo or virtual fencing, and we have heard really conflicting views throughout this process on both of those devices. Is there anything that you think really does work or is the leading mitigation technique in this space?

Helena BENDER: Well, the literature reviews indicate that fences with crossovers of some kind are your best mitigation strategy that is out there. One of the things in the slides that I have provided today – but I was not good in directing them to continue – is some summary tables which give you costs and effectiveness of all the different strategies that are out there. So that data is there. You can look at it now or you can look at it later. It is in the slides.

The CHAIR: And when you say fences with overpasses, are those simple sorts of overpasses or more ecoduct structures?

Helena BENDER: The challenge here is that different species are going to need different things. Koalas and gliders – anything aerial – can get away with a ladder, a roped structure that goes across, whereas kangaroos or other larger animals are going to need something much more substantial to get across, whether that is a bigger culvert that goes underneath or it is a full bridge that goes across with landscaping.

The CHAIR: Great. You also spoke about the need for a centralised road strike database. Something else that has been really clear is that there are a whole lot of people collecting data and there is not a whole lot of sharing or putting it together, and it has made it really hard to identify the areas of need and then what we can do to address road strike. If this was going to be something that we would create in Victoria, who do you think would be best responsible for overseeing that? And secondly, why in your view is it important to collect this data?

Helena BENDER: I am going to let you comment on that.

Graeme COULSON: Sure. Well, the second one first: why? Because it allows you to identify hotspots and areas where you could best direct your efforts. In the case of the New South Wales study, it is: where do you put in those trials? Who should be best to do it? I know Rodney van der Ree mentioned another app, and I am not sure if that was such a good idea. There are already a lot of apps, and somebody has to administer them and curate them. So I think it would be better to look at existing platforms and see whether they can be modified. DEECA, for example, has the atlas of Victorian wildlife. There is also the ALA, the national one. There is iNaturalist. And then there are all these specialised ones like WomSAT and various others. So I think either encouraging those separate apps to link into a central database or – I am not sure – start up a dedicated site and host it, but who would do that? I have not answered your question.

The CHAIR: It is still very, very helpful.

Helena BENDER: I would just add to Graeme's answer that not only do I think such a database is useful for identifying hotspots, but I think it also gives you temporal and spatial data that you can then use as part of an evaluation process, so it has multiple-fold benefits in my view. Whether it should be DEECA as an organisation that manages that, I am not sure. I think there are ways to bring it together. And certainly I am hearing a congealing towards using iNaturalist as the simplest and easiest sort of app, but it depends on people finding it and feeling comfortable with using it. It is really much more about having an aggregator and someone responsible for that aggregation.

The CHAIR: Yes.

Graeme COULSON: It would also be useful to evaluate approaches, too – so helping to identify areas and times to work to work at, but then to evaluate the outcomes of the interventions.

The CHAIR: Wonderful. That is about my time. The committee staff have said, though, they will provide your presentation to members after the hearing, so we will have a look at it for sure. Thank you. We will go to Ms Copsey.

Katherine COPSEY: Thank you. Thanks so much. I am very heartened that you talked about a comprehensive approach, because I think there is a lot of desire for a silver bullet here and something that is going to magically erase this problem that I think we are creating for the wildlife that are getting essentially trapped, funnelled or driven towards infrastructure with regional encroachment. So I would really love to know if you have seen in your work examples of where planning is being done better – jurisdictions – or any lessons that we can learn from other countries or states that are doing the planning work a bit more upstream to identify populations and not create situations of conflict.

Helena BENDER: Mostly we hear about planning that is not working well. I mean, the only thing that is jumping to mind is I know that Helsinki has recently introduced a 30-kilometre-per-hour speed limit across the whole city, and generally reducing speed just means that drivers and the wildlife have more time to respond. So it should, in a logical sense, follow that you have reduced wildlife–vehicle collisions, but on a broader sort of commentary or documentation around the planning code, I have not seen something that I can offer that I think is a great model.

Graeme COULSON: No, I am afraid I cannot either.

Katherine COPSEY: That is okay.

Graeme COULSON: It is an area that needs a lot more work.

Katherine COPSEY: Talking about, then, the structural mitigations, – you know, bridges, culverts, all that sort of thing – one of the challenges I see in a Victorian context is just the distance and the prevalence of the problem and therefore the amount of infrastructure that would be needed. Have you seen success in terms of relocations? I guess I am not speaking here so much about – well, maybe I am – trapping and physically relocating animals, but also looking at that in the sense of habitat creation and corridors that can assist wildlife to have somewhere else to go that is not into contact with human infrastructure.

Graeme COULSON: Well, I can certainly speak to the translocation one. We ran a trial three years ago now of the kangaroos that were trapped at Kinley, which is a new housing development. We moved – I have

forgotten the exact numbers – 35, I think, kangaroos, almost all of the ones that were there. We released them at a reserve close to Healesville, which had a resident population of kangaroos, an ideal habitat and no obvious threat to any vegetation values. The story was fairly alarming. In the space of the first year about half of them were dead and about half of them had moved as well. It was not the same half; the deaths occurred in both groups. There seemed to be a very strong urge to get back home. One made it back home and a couple of others nearly got there. This is a well-known problem for any translocation. It is much better studied for threatened species rather than common species like eastern grey kangaroos. It is called hyperdispersal. We know that some kangaroos, especially males, will go quite a long way from their natal range, but females never do, and we had some females that moved 25 kilometres, which is absolutely unheard of. So I think there are real issues in doing that. There has been some work in Western Australia and in Queensland as well showing similar sorts of problems. There are also practical issues to do with capture and welfare of the animals, but we pretty much got around those by doing it in what we consider to be a more measured way, rather than – we did not push them into a holding yard or anything like that. So it can be done, but what happens next is very much up to the kangaroos. They literally voted with their feet and tried to go back home. Sorry, what was the other part of the question?

Katherine COPSEY: The other one was –

Graeme COULSON: Corridors, yes, and habitat creation. I think we have to be careful with this.

Katherine COPSEY: Yes. I will follow from that that they are not really inclined to move if they are in some location where they are happy.

Graeme COULSON: Kangaroos will take advantage of habitat that is available to them. They will not necessarily move to it, they will just make use of it, and that effectively builds up the carrying capacity of the area, so you will end up with more kangaroos. They will not decide to go to patch of bush B just because patch of bush A is under pressure. They are very much stay-at-home animals normally, with hyperdispersal aside. You have probably all seen examples of urban and industrial development where they have been surrounded by diggers and machinery and all sorts of things, and they just stay – until they get run over. So yes, I think it is not that simple.

Katherine COPSEY: I am interested in the sources of – and I probably can go and look at this myself in your very thorough reports that are compiled – virtual fencing trials that you have reviewed with the literature reviews and so on. They are global examples. Are there many from the Australian context so that we can have some confidence in it?

Helena BENDER: If you can go to the slide that has Australia and a few images of macropods with ticks and crosses on it, that one will cover Australia. While he is pulling that up I will just say that when we looked for the studies that were overseas, the only ones we could find for deer were in a hunting magazine. It had not been peer-reviewed.

Graeme COULSON: There was only one.

Helena BENDER: And there was only one. So the evidence, even from overseas, is very scarce.

Graeme COULSON: The selling point is that it is used in Europe and it is now available in Australia, but it is not used in Europe, as far as we can tell – or if it is, it certainly has not been published.

Helena BENDER: Yes.

Katherine COPSEY: So there is a real need for more rigour around an approach to these before they are rolled out by many, many –

Graeme COULSON: And that goes to my point about design. Some of the experiments have been very weak. The design is quite poor, which limits the conclusions you can draw from the results, whereas the example you heard about from Phillip Island was an impeccable design and the results are absolutely clear-cut.

Helena BENDER: That slide does not seem to have come up, but there have been a few studies in Tasmania, there has been the study with wombats in New South Wales and there has been a study on Phillip Island.

Katherine COPSEY: So some local ones where we can have some confidence in the strength of the results there.

Helena BENDER: Yes.

Graeme COULSON: Yes.

Katherine COPSEY: Thank you. That is good for me. Thanks.

The CHAIR: Thanks. Ms Copsey. Ms Broad.

Gaelle BROAD: Thank you very much. Are they still trying to get the slide up? Because I am interested. You were talking about the different types and the cost connected with each of the different types.

Helena BENDER: Yes, there are a number of tables in there. I can tell you the slide number if that is helpful.

Gaelle BROAD: Maybe you could speak to it?

Helena BENDER: I can try if there are particular ones that you want to know.

Graeme COULSON: There are a lot of numbers.

Gaelle BROAD: Sure. Okay. All right. Could you give an indication of the different types that you have got there?

Helena BENDER: It is a very long list.

Gaelle BROAD: Okay. Righto. Maybe we will save that. You have kind of touched on it, but how difficult was it in researching this, when kangaroos are unique to Australia, to find comparisons internationally?

Helena BENDER: There is table 3, and table 3 continues, so it is organised – but this one is fine. That is a nice summary one. You can see the mitigation method or measure down the side there. You have got the costs column. You have got the percent of deer vehicle collision reduction in that third column. You have got a benefit in terms of dollars per kilometre per year and then the balance in terms of whether your cost is in the negative or in the positive from the outcome of those. You can see in the context of the US, which is where this was done with deer, that is where it comes out. And these have all been adjusted for 2025 value, so the costs are accurate for the moment.

Gaelle BROAD: Okay.

Graeme COULSON: I think the question of how hard it is to find comparable studies – it is not that hard. Kangaroos are often regarded as ecological analogues of deer, and things that work for deer at least would be a really good starting point to test things for kangaroos. There are obviously a lot of differences too, but they are essentially herbivores, social animals, and they do all the same sorts of things. They are basically out there to eat grass and to move around and survive and just be deer or kangaroos. So we have borrowed heavily from the work overseas on deer in particular.

Helena BENDER: This is the virtual fence trials.

Gaelle BROAD: Do you want to speak to this?

Graeme COULSON: Yes, I will just say a bit about that. We have mentioned the wombat studies. If they have got a red cross, they showed no effectiveness. The next one down is the Phillip Island one. Then there are three Tasmanian ones. The one up in the north-west I have given little green ticks to because it was published as reporting an effect. But Helena and I have criticised that study, on methodological grounds primarily, and nobody has been able to repeat it. The other two studies down there: no effect on pademelons and wallabies or possums, and the other one is no effect on pademelons. I have got kangaroos with a question mark because we do not yet have a well-designed study of virtual fencing on kangaroos. Being a good scientist, I would not say that it did not work for kangaroos; I would say we do not know.

Gaelle BROAD: I am interested in the ShuRoo. We have not really heard much about that. Over the years I heard about the ShuRoo and did get one on the car for a while. You have mentioned it is not that effective. What investigation has been done into that, and what did they find?

Helena BENDER: I analysed the sound that was produced, and I compared that with what we know about the hearing of tammar wallabies and eastern grey kangaroos. The sensitivity of those two species is not aligned with the sound, which means it is much harder to hear it. Then I did trials with the device on the front of vehicles at the You Yangs proving ground and tried to measure the sound produced, and I could not hear it above the vehicle noise at all, so it was not detectable above the noise of a vehicle. I did playback trials in a captive situation and I looked at the response both when it was on and when it was off, and there was no difference in the behavioural response. Then we did a road survey where we found companies that had bought the ShuRoo and companies that did not have it that were doing long, long distances, and we got them to record how many kangaroos they hit. Again, there was no difference statistically in the number of hits.

Gaelle BROAD: So I wasted my money?

Helena BENDER: You wasted your money, yes.

Katherine COPSEY: You might have helped VicRoads.

Gaelle BROAD: That is right. I thought I doing something.

Graeme COULSON: My advice is to buy those little plastic whistles instead. You save a lot of money on those, and they work just as well.

Gaelle BROAD: Actually, it might have been that. Was it the RooBadge you were talking about before?

Helena BENDER: Yes.

Katherine COPSEY: I did not ask about that.

Gaelle BROAD: You did not? Okay. Can you talk to the RooBadge, because your submission goes to that – Volkswagen, I think.

Helena BENDER: Yes.

Gaelle BROAD: Can you expand on what is being –

Helena BENDER: Volkswagen approached us because of the research that came out of my PhD, which was looking at animal species that kangaroos listen to. These are natural calls, so these are bird alarm calls by the magpie and the masked lapwing, and also an alarm signal made by kangaroos, which is a foot thump. I had done trials with those in my thesis and found 66 per cent became vigilant in response to playbacks of those and 23 per cent were taking flight very quickly, within the first 3 seconds. There is an example of that – that is the product RooBadge that Volkswagen is promoting.

Gaelle BROAD: So it is just a sound, is it? It is on the car?

Helena BENDER: The idea is that you are playing those sounds, and what is used that is different is they are using something called a parametric speaker. The reason they are doing that is that when a car is moving down the road, you have got to project the sound up in front and there is a whole bunch of air pressure pushing past, and that means you have got to project it a long way. The parametric allows it to go further, and as I understand it, it is a bit like a piggyback ride. They use one frequency that can go a long way, and then that frequency sits on it, and then it starts and goes further. It goes about a hundred metres, but that is still not very far. That is like 4 seconds worth of response time of a vehicle travelling at 80 to 100 k. The idea is that those signals do produce a response. The question is whether that would happen fast enough with this product. We are still doing the trials now to know whether we are going to get that kind of response, so I cannot tell you absolutely that this is going to work. Volkswagen has gone way ahead of us and done lots of marketing for it. We are still doing testing.

Gaelle BROAD: How long does it take to do the testing and the trials of it?

Graeme COULSON: It took several months late last year and many more months going through the video that we recorded during each playback. And Helena mentioned the foot thump – we had to drop that from the trial because these types of speakers just could not convey that deep sound. The one that we thought was probably going to be the best signal, at least from a kangaroo’s point of view, was not appropriate for that type of speaker.

Gaelle BROAD: So people that play rap music might have less –

Graeme COULSON: Yes, a bit of doof doof might be –

Gaelle BROAD: All right, less accidents. Just looking at the terms of reference for this inquiry, are there any things that stand out to you that you think would be useful recommendations for us to consider?

Helena BENDER: I would advocate the driver education, definitely. It is very inexpensive, just changing what you put in there in terms of everyone who goes through and does their drivers licence has to know about roo o’clock and has to know what is a safe driving speed. I would say from the US, that is 60 kilometres per hour with an unfenced road. They should be going at a reduced speed in any area that is unfenced that is at high-risk, really, during those risky hours. Do you want to add something?

Graeme COULSON: I would like to see some quite vigorous overview of the expenditure of public money on road-strike mitigation. If we are going to get this right, I think we need to be really clear on the sorts of things we are testing, how we are going about it, make sure it is reviewed by a people who know what they are talking about and make sure it is properly reported. I am afraid to say that has not happened much up to now.

Gaelle BROAD: And just when you consider the extensive road works of Victoria and the low population compared to overseas, with those mitigation measures are there any that you think are more realistic for us to consider in Victoria? There does not seem to be a big list of options – but yes, from those cost comparisons that you had?

Helena BENDER: The cost–benefit analysis that I have read for the US suggests that you get twice your value back by doing those bridges or any of the crossovers with fencing and that it ends up being worthwhile in the long run. It is a big expense up-front, but the value comes back in lots of saved costs around not having the damage to the vehicles, not having the clean-up of the roads and the people having to get out to do all of those sorts of works. That seems to be the one that is coming through clearly as the one with the greatest effect. I will put my teacher hat on for a minute and give you a really radical idea, because I was listening earlier, and say that having people go out and work with carers and having that as part of their educational requirements, to see the consequences of road strike, I think the experience, that emotional reaction, has a big impact on what people then go out and do.

Gaelle BROAD: Thank you.

Graeme COULSON: And I think that would fit with your driver training point earlier. For reasons I do not understand, there is a lack of awareness about the road strike risk in your average driver. I would be pushing quite strongly for inclusion of that in the drivers test and regular refreshers on that as well. And if it needs backing up by some gruesome experience like that, then that is a good thing.

Gaelle BROAD: Thank you.

The CHAIR: Thanks so much. Mr Welch.

Richard WELCH: Thank you, Chair. Thank you both. A couple of questions – I think I will lean into the data point. We have heard consistent submissions in the inquiry about the fragmented nature of the data. The idea of unifying databases, as someone who sort of did that for a living, drives me with fear – by the time you have done it and the cost involved. You would just start afresh, unless you felt there was value in the historical data. That is my question: given that the historical data will have been captured in different ways with different methodologies to different qualities, do you think there is any value in us trying to go to the cost of restoring that data?

Graeme COULSON: That is a really good point. No, I do not think there is. I think we could start tomorrow and we would be dealing with the current problem. We are not trying to rectify a historical situation.

We want to know where it is now and where it is happening in the near future, particularly if we put in mitigation measures that can be tested in that timeframe.

Richard WELCH: Good. I like that answer.

Helena BENDER: I do not think I have a contradiction.

Richard WELCH: Do you have a different point of view?

Helena BENDER: I have not thought about it before. I am thinking about it in the sort of study sense, and yes, there are patterns, but I do not know that the patterns – like, they will change. I can see that there is a value in identifying historical hotspots as a start, but I do not know that starting with a new data set necessarily precludes that. I am not sure.

Richard WELCH: The objective is to get to actionable data, isn't it?

Helena BENDER: Yes.

Richard WELCH: So whether that historical data is useful or not – because you have got to have like-for-like comparisons, and it is cyclical and things change. We quite often have heard that visible flashing signs or dynamic signage may be an effective solution, but I am just wondering: is there any data to support that?

Helena BENDER: There is a trial that has just reported from up in Far North Queensland which was doing that for cassowary. They had a reduction of 5 to 8 kilometres per hour with that signage. The reflections I had on looking at that data are that I do not think the vehicles were going very quickly to start with. The cassowaries cross the road relatively slowly so that the vehicle drivers get to see those cassowaries, and that means that they have feedback to know that the sign is trustworthy. Whereas with kangaroos crossing, you may never see them, so you lose the value of that sign very quickly because it is like, 'Why should I trust that? I never actually see the wildlife.'

Richard WELCH: That is what I am wondering about, because in the Victorian experience it will be: how is that different to the fixed signs?

Helena BENDER: I think it can be overcome. So one of the conversations we have had is about rather than a picture or text you show the video footage of the actual wildlife doing it, because then you can actually see that it is there. You do not see it down the road but you see the image come across. So I think that has more potential, but then you have the cost of being able to stream the video footage.

Richard WELCH: And that actually leads to another question I have got. I think everyone is very keen to find the technology that solves or helps mitigate. I think we are all enthusiastic and we grasp at anything. I am worried that in testing something that is effective, are we factoring in a sufficient degree of intermittent ability into it? This is a solution that works in a trial over 3 kilometres, but could you feasibly deploy that on a statewide basis? It is a bit like the overpass question of: can the cost actually be justified? What is the point of pursuing this technology if it is not implementable at scale? I am just interested in your views on that.

Graeme COULSON: When testing a particular piece of technology, it is always going to be a localised test, and that is unavoidable. Whether it is scalable is a separate question, but you would not go about doing it unless it was something that potentially gave you a broad benefit. So if it was something that was simply not useful at a large scale, it should not be tested, I do not think. I am trying to think of an example where we had something like that, but I cannot think of it right now.

Richard WELCH: We had a submission – it was the test with the posts where they were emitting a sound outwards.

The CHAIR: Virtual fencing.

Richard WELCH: Virtual fencing – where half of those sensors do not work. Someone would have to go out and maintain them, and if you extrapolated that out to doing that over, it becomes a never-ending, expensive process.

Graeme COULSON: You just could not do it.

Helena BENDER: The other thing with Far North Queensland is they had lots of trouble with the powering of that sign. It was relying on solar panels and batteries and they expected to have lots of sunshine being in Far North Queensland but they just had huge storms come through, so it impacted on the power supply for that. So I guess that would be a scale problem. If you are going to roll out these sorts of high energy demanding signs across your network, then yes, that is absolutely a problem for you.

Richard WELCH: And I guess the hard-nosed question around this is if we are going to invest money into research, should that not be almost at the top of the criteria – which technologies to explore?

Helena BENDER: Well, the other thing you can do is your road structure determines how fast a vehicle can drive on it. You can change the road structure to limit how quickly vehicles go on it. There is an operational speed and there is a design speed. You change the design speed of the road, the vehicles cannot drive as quickly on that road without it stopping being safe, right?

Richard WELCH: But that is not going to be very helpful on the Hume.

Helena BENDER: No, but the Hume is not your main hit location. You are thinking about these in high-risk hit locations that you are going to want to do this.

Graeme COULSON: It comes back to that hotspot question. I think you have to work out where to direct your efforts at a local scale. I do not think we are anywhere near a universal solution to these problems.

Richard WELCH: So the actual definition of scale itself is not understood because we do not know what we do not know.

Helena BENDER: And in different locations you are going to do different things. You are not going to roll out the same thing everywhere.

Richard WELCH: Yes. Depending on species and topography.

Helena BENDER: All of that. Exactly. Yes.

Richard WELCH: Okay. Thank you very much. Thank you, Chair.

The CHAIR: Wonderful. Thanks, Mr Welch. Mrs Deeming – I am not sure if Moira is still here.

Moira DEEMING: I am, but I cannot come back on until the next one.

The CHAIR: No problem. Thanks, Moira. Did any members have follow-up questions?

Katherine COPSEY: I will just ask one follow-up question, if I may.

The CHAIR: Of course.

Katherine COPSEY: Something we have not talked much about during this inquiry but I think is a real emerging area is increased vehicle safety features and increased sensor capability, which are going to alert drivers. I do not know if you have done any in-depth work on this, but I did note that it was something that was talked about a little bit at that New South Wales symposium. Are you aware if this is a promising area? Do you know if, for example, current sensor technology and newer vehicle models are capable of sensing an animal in time to avert a collision or to reduce speed, or if vehicles are doing that?

Graeme COULSON: I do not think it is yet, but it is certainly moving that way, and the other thing that is developing is broadcast information to vehicles. The RooBadge trial has that built into it down the track as well so that sensors that would detect wildlife on the road ahead would then communicate with vehicles on that same stretch of road and give them real-time alerts. Potentially combined with autonomous braking and those sorts of things it may well be where it all goes, which is way out of my field.

Katherine COPSEY: I am thinking aloud here, but a central database could actually monitor reports, and if that was fairly up to date and current, that could talk to GPS systems in the way that drivers receive alerts about traffic conditions and those sorts of things.

Graeme COULSON: Yes. Well, ironically, you would not need a database in that sense, you would just need a central clearing house that would disseminate that information to vehicles in that area, and with things like Google Maps it is halfway there already.

Helena BENDER: My understanding is that some insurance companies or vehicle companies are subscribing to GPS and are providing alerts already through services like that and –

Graeme COULSON: They are fairly generic, though, aren't they?

Helena BENDER: I think so.

Graeme COULSON: 'This area is a known risk' – but it is still valuable.

Helena BENDER: Yes, it is still valuable.

Katherine COPSEY: Particularly if someone is driving in an area that they are not familiar with or for touristed locations and those sorts of things.

Helena BENDER: That is right. Apparently there is data around autobrakes and they can respond within 1 second to impact in applying those brakes. I did see that in one of the readings. I think the Scandinavians are looking much more in the space of electronic vehicle sensors and things.

Graeme COULSON: They are, yes, because they have real issues with moose strike, and that is a real hazard for humans as well as moose.

Katherine COPSEY: Yes. Great. Thank you.

The CHAIR: Great. Thank you so much. That concludes our time for the hearing. I just want to say a really big thankyou for making the time to submit to the inquiry and appear before us today. It was very, very valuable. That concludes the public hearing.

Witnesses withdrew.