

Hello IV media manager,

I am a freelance journalist who has just spent the last six months investigating wildlife road kills and safety of pedestrians and cyclists on council managed rural roads outside town boundaries. As IV is unlikely to be interested in the road kills component of my investigation it may wish to read what I have found about the safety of pedestrians and cyclists on minor rural roads they share with vehicles. The problem is these road have a default 100km/h speed limit or a posted 80km/h speed limit which council engineers contend as safe for all road users because the decision on speed limits is determined by Transport Victoria's Speed Zoning Policy and Guidelines 2021. Engineers cannot make recommendations outside the guidelines so the pedestrians and cyclists who use these local rural roads for exercise and for the opportunity to involve themselves with nature are constantly under threat from passing and overtaking vehicle which can travel at high speed far in excess of the Safe System speeds. IV's recommendation for a 30km speed limit on roads shared by pedestrians and cyclists is in accordance with the Safe System Speeds but needs to be applied more broadly than is indicated in the draft document and should apply to rural roads outside town boundaries used by pedestrians and cyclists.

I have made reference to the IV Draft 30 year Infrastructure Strategy in my first article so you are aware of the situation. This article has been posted on my web site and circulated widely among NGOs and others interested in the topic.

Sincerely
Patrick

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Moffitts Media



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Biomechanical tolerances to impact* or Safe System speeds

Crash type	Impact speed
Car/pedestrian/cyclist	20–30 km/h
Car/motorcyclist	20–30 km/h
Car/tree or pole	30–40 km/h
Car/car (side impact)	50 km/h
Car/car (head-on)	70 km/h

Source: Austroads (2005).

* The chance of a fatal outcome is less than 10% at these speeds, and increases sharply above them.



Our vision is for
**ZERO ROAD
DEATHS
BY 2050**



The default speed limit for outside built-up areas is 100 km/h. A default speed limit should only be applied to a road where it is considered safe and appropriate. Source: Transport Victoria Speed Zoning Policy 2021



Signs signs everywhere wildlife signs and dead wildlife

In this the first of six articles reviewing 'Wildlife road kills versus Vision Zero 2050' freelance journalist Patrick Francis examines why there are tens of thousands of yellow wildlife warning signs along Australia's rural and regional roads but no guidance from state transport departments, state environment departments, vehicle insurance companies, and wildlife and environment NGOs to drivers about what actual speed should be embraced to prevent vehicle wildlife collisions, vehicle occupant casualties and road kills.



Figure 1: Motorists on Australia's regional and rural road network are presented with tens of thousands of yellow wildlife warning signs that can be interpreted anyway they like or simply ignored. Photos: Patrick Francis.

Australia's rural and regional roads are adorned with tens of thousands of yellow signs depicting mostly a kangaroo symbol but sometimes a koala, wombat, emu or Tasmanian devil. But what do they mean for vehicle drivers given a local or state government road engineer made the decision to have each sign installed? What driver behaviour change, if any, is expected or could be anticipated of drivers after seeing the sign? Are there any legal requirements for drivers behaviour or for protecting animal welfare "behind" the signs?

On and around the same roads with yellow signs an estimated 10 million Australia's native animals lie dead, rotting and smelling each year. Of these around 4 million are large species - kangaroos and wallabies. All are food sources for scavenging feral animals and breeding grounds for flies. This is the reality for Australian fauna including endangered species when all levels of governments down play wildlife vehicle interactions in favour of driver mobility and convenience. Even vehicle occupant safety is mostly ignored at the vehicle wildlife collision interface on rural and regional roads where one in every 41 casualty crashes involves a vehicle hitting an animal.

In this and the next five articles readers will find out why a wild west mentality exists within all levels of governments when it comes to the vehicle wildlife interface on regional, rural and remote Australian roads. These roads where speed limit is highest at 100km/h and 110km/h are where most native animals are killed and injured, are also the roads where most vehicle occupant fatalities happen.

In June 2024 one of the nation's largest comprehensive vehicle insurance companies Suncorp's AAMI issued a media release titled "Animal collisions jump 22% as AAMI urges drivers to stop ignoring wildlife signs". It said in 2023 there were more than 21,000 animal vehicle collisions claims and 36% occur on rural and regional roads. In 2018/19 AAMI reported 9600 collision claims and in 2022 it reported 17,000 collision claims. Across Australia's entire vehicle insurance companies there is likely to have been around 50,000 wildlife vehicle collision claims in 2023.

The 50,000 claims is an estimate as apart from AAMI no other insurance companies were prepared to release their animal vehicle collision claims data. No state government refers to wildlife vehicle collision on its roads within its Road Safety Strategy 2021 – 2030, nor does the Federal government within its Road Safety Strategy 2021 - 2030.

A gradual increase in collisions in line with population increase and movement of people into peri-urban regions is demonstrated by Wildlife Victoria with over 10,000 animals hit in 2022/23 compared with 6000 in 2017/18, figure 2A. The majority of wildlife vehicle collisions are happening in hotspots surrounding regional growth centres.

This is best demonstrated by Australian National University research into wildlife vehicle collisions in the Australian Capital Territory published in 2021 which highlighted that *"Motor vehicle collisions with kangaroos are a threat to people and kangaroos, causing not only costly vehicle damage but also potentially leading to injury or loss of human life as well as animal welfare issues."* In this research 3346 vehicle collisions with kangaroos were logged around Canberra by rangers in a 15 month period, figure 2B.

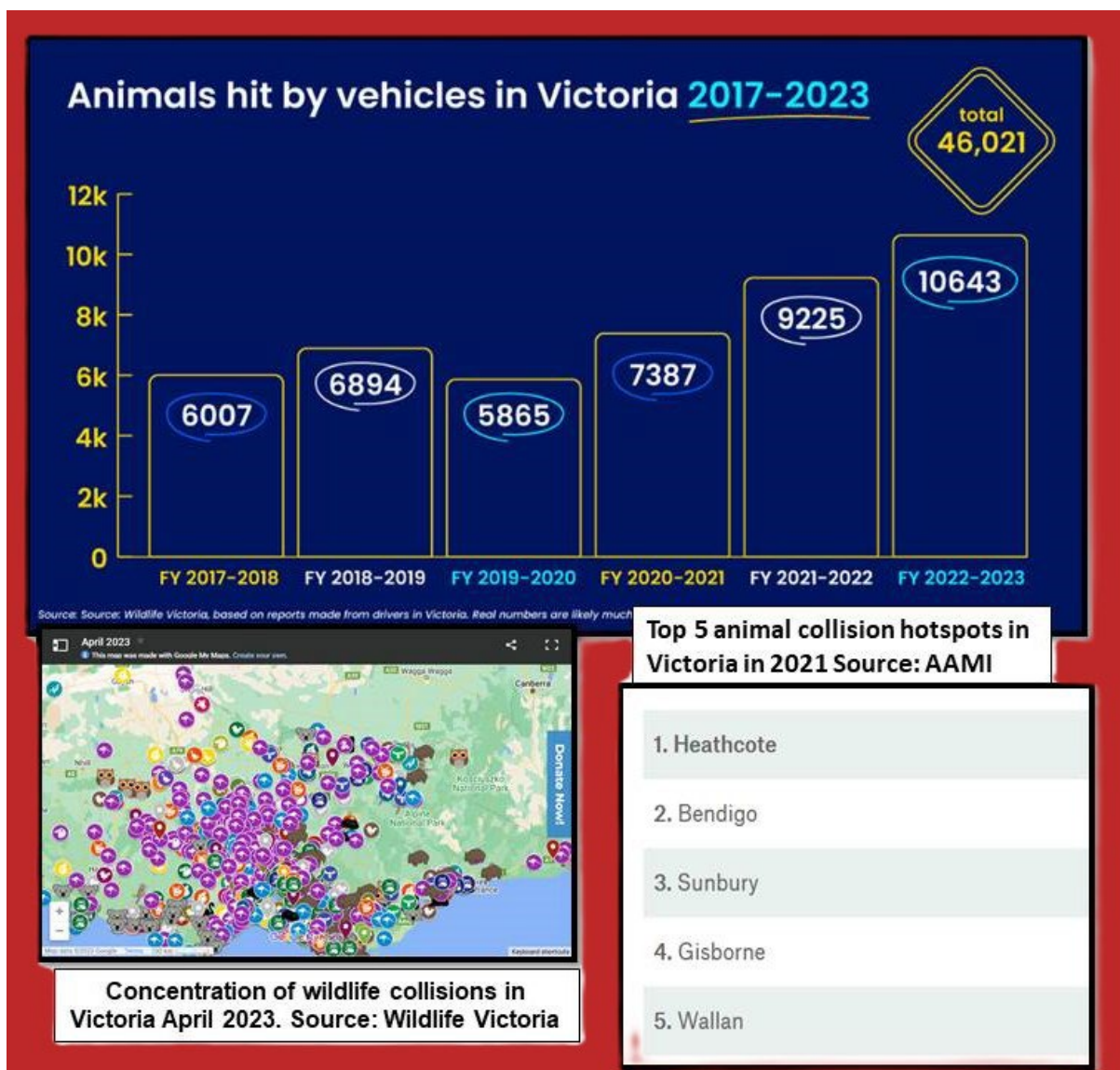


Figure 2A: Wildlife vehicle collisions are increasing in Victoria as evidenced by insurance company claims and Wildlife Victoria data but go unrecognised in road safety data provided by Transport Victoria. Sources: Wildlife Victoria and AAMI.

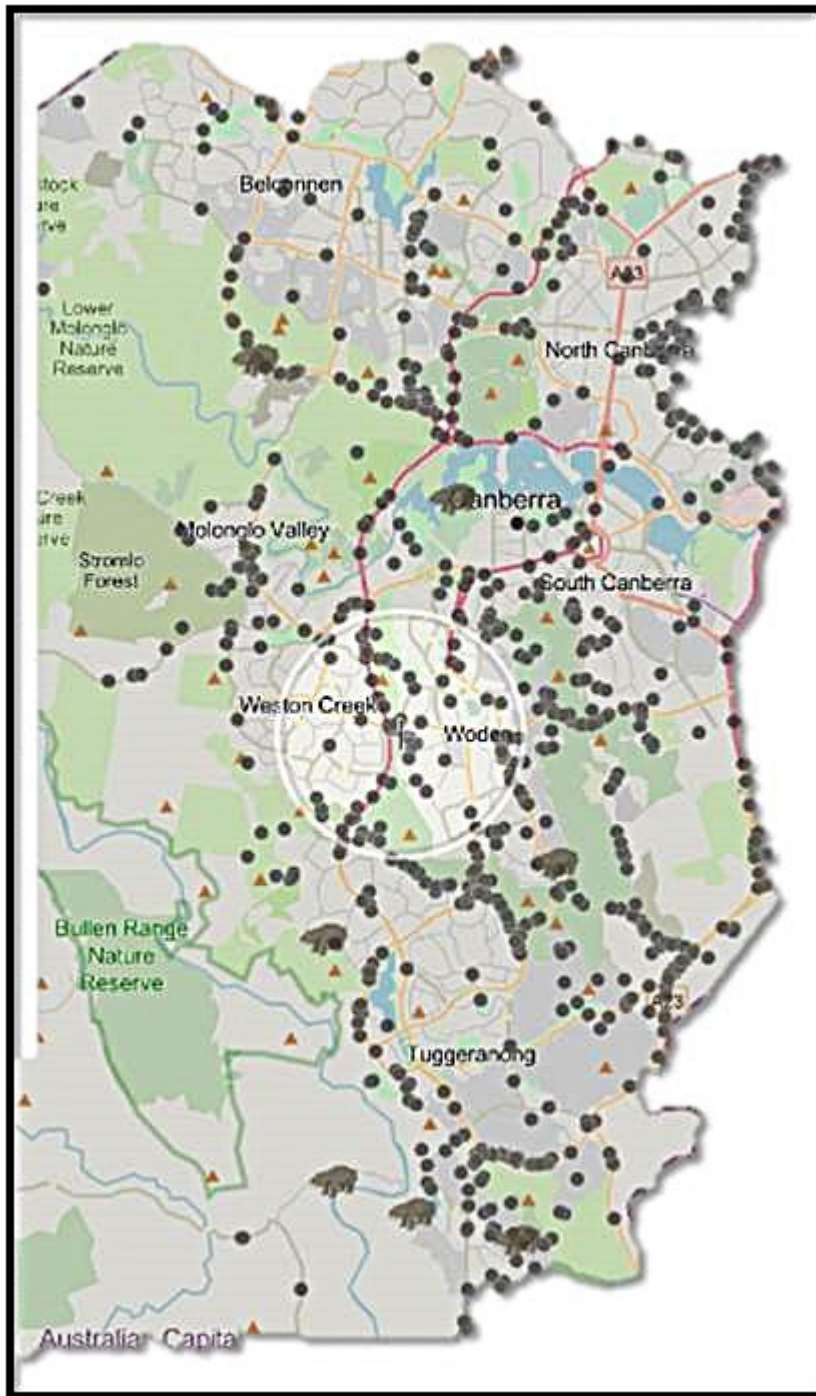


Figure 2B: *There is some irony in the results of this ANU research which show 3346 kangaroo vehicle collisions in a 15 month period in and around Canberra, the work place of Office of Road Safety bureaucrats who use the Safe System Model to underpin the National Road Safety Strategy 2021 – 2030 which ignores wildlife as a contributor to vehicle collisions and safety of occupants. Source: Dunne, B. and Doran, B. (2021), Spatio-temporal analysis of kangaroo-vehicle collisions in Canberra, Australia.*

One of Australia's most experienced wildlife vehicle collision researchers (road ecologist) Professor Emeritus Darryl Jones, Griffith University Queensland highlights

the multiple impacts of wildlife vehicle collisions in his book 'A Clouded Leopard in the Middle of the Road': *"Roads can be deadly, not only for wildlife but also for people. A shocking number of humans are killed daily throughout the world because of collisions with animals, although a much larger number are injured or remain deeply affected by the event. Even if a person is left unscathed emotionally, their vehicle may be damaged or even written off. In the case of the animals involved, however, the vast majority will die, either at the time of the collision or sometime later. One estimate is that less than 2 percent of all animals involved in any sort of vehicle strike will survive"*.

AAMI's motor claims manager Leah James wrote "To avoid a collision with wildlife, slow down when you see warning signs". But how effective is slowing down to "avoid a collision" and by how many km/h should a driver slow? James has no suggestions as to what slowing means for drivers while Australia's state Transport departments and local councils provide no meaningful advice around slowing down.

For example Transport for NSW web site has an "Animals on country roads tips for staying safe" document. One of the five tips is to "follow animal warning signs ...if you see these signs, slow down, stay alert and be prepared to stop if required". The previous version of this advice (2021) made no reference to animal warning signs and provided another tip under the heading Never Swerve "It is safer to hit the animal than swerve".

Transport Victoria state's on its web site "If you can't drive around the animal safely, you may have to hit it, to avoid injuring yourself or others " .

The same advice is given by Silvia Morris, Senior Instructor for RACV Drive School who states in a company web article " Avoid trying to swerve around (the animal) you could also endanger yourself and other road users. But if you can't safely avoid the animal, you may have to hit it to avoid injuring yourself and others."

Seemingly sound advice given vehicle occupant road fatality and injury statistics on 100km/h regional roads shows the highest proportion of fatal and serious injuries occur in single vehicle run-off road crashes with roadside hardware such as trees figure 3. The 2024 Transport for NSW Never Swerve advice no longer mentions hit the animal but suggests "Take great care if you manoeuvre to avoid an animal. You may lose control of your vehicle if you swerve too harshly."

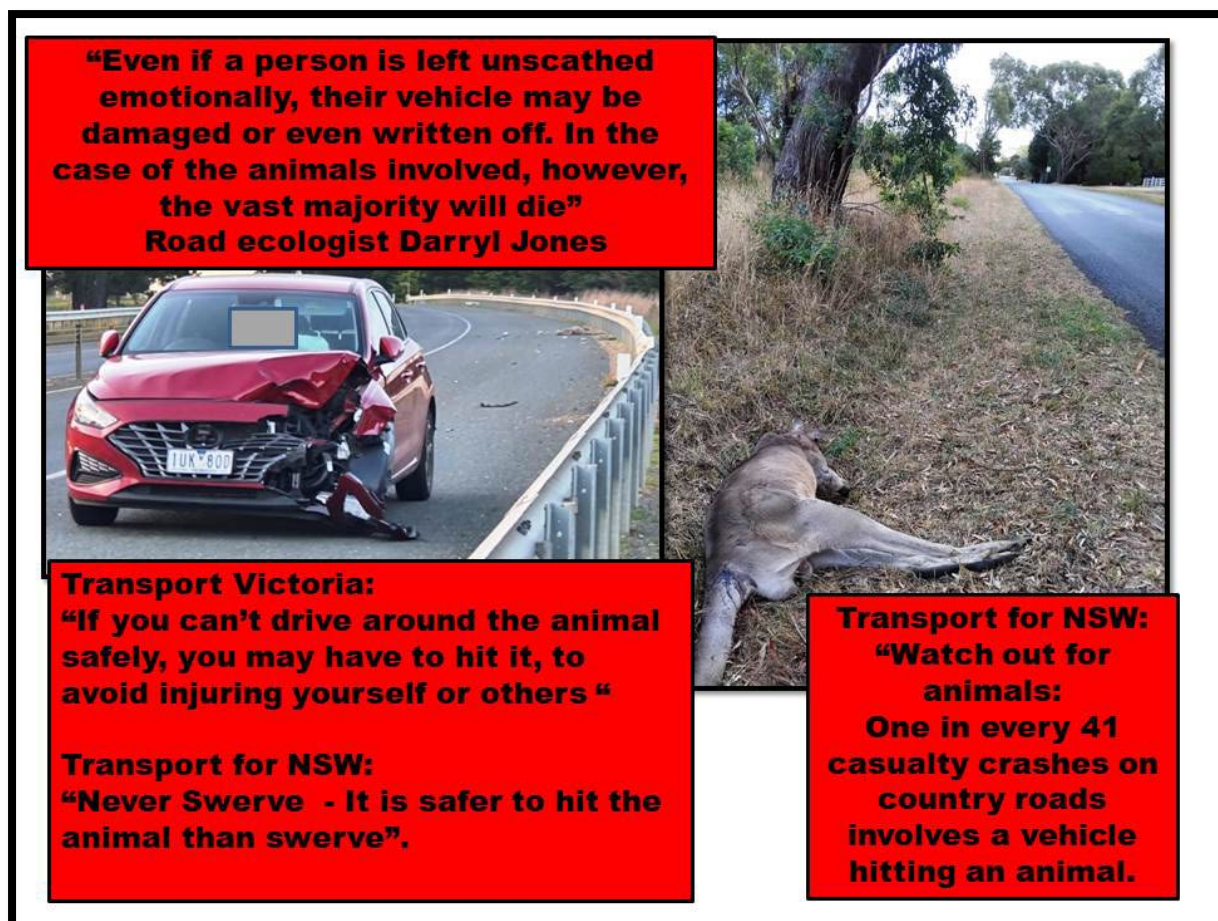


Figure 3: Despite most drivers on rural and regional roads stating they will swerve to avoid colliding with a large animal and single vehicle run-off road collisions with trees is the major cause of occupant fatalities, the National and State Road Safety Strategies 2021 – 2030 ignore wildlife as a component of road safety and Vision Zero 2050. Photo: Patrick Francis

The problem with this never swerve advice is the majority of drivers are likely to ignore it. AAMI's 2023 survey found 60% will swerve rather than hit an animal. But there's a group of drivers who are prepared to hit large wildlife, they are the ones equipping their vehicles with Standards Australia Motor Vehicle Frontal Protection Systems (usually called roo bars or bull bars). When passing the yellow wildlife warning signs they can maintain the posted or default 100km/h speed without needing to slow down reasonably secure in the knowledge that in a collision with large wildlife their vehicles won't be damaged.

The enormous gap in the statistics associated with insurance company wildlife vehicle collisions claims plus police rural road accident casualty reports and the estimated four million kangaroos/wallabies killed each year suggest roo/bull bars on passenger vehicles, utes, trucks, buses are effective in preventing damage. Not one insurance company or state road transport department asked would provide an opinion as to how they see the role of roo/bulls bars in contributing to the Safe System principles underpinning each state's Road Safety Strategy 2021 – 2030. (Article 2 includes more details about Transport Departments' views for the use of Vehicle Frontal Protection Systems).

Table 1.1: Severity of run-off road crashes, 2016-2020

All crashes	Proportion	Run-off road crashes	Proportion
Fatal	2%	Fatal	4%
Injury - hospitalised	33%	Injury - hospitalised	45%
Injury - not hospitalised	65%	Injury - not hospitalised	51%
Total	100%		100%

Note: Jurisdiction definitions of a hospitalised injury include confirmed admitted to hospital (Victoria and New South Wales); taken to hospital (Queensland and Australian Capital Territory), admitted to hospital overnight stay (Western Australia) and admitted to hospital for 24 hours or more (Tasmania).

Source: BITRE NCD (unpublished).

Table 2.2: Fatal run-off road crashes, 2016-2020

Year	Fatalities	Vehicles	RoR crashes (C)	Single Vehicle RoR crashes (SV)	Proportion, SV/C
2016	506	485	472	454	96%
2017	452	431	417	400	96%
2018	435	421	412	394	96%
2019	477	457	445	429	96%
2020	422	405	400	386	97%
Total	2,292	2,199	2,146	2,063	96%

Source: BITRE NCD (unpublished).

Table 1: This unpublished BITRE data highlights that run off road crashes cause the most fatalities and serious injuries and 96% are single vehicle crashes supports the AAMI research that 60% of drivers will swerve rather than hit an animal. More recent data has not been published. Source: BITRE - Bureau of Infrastructure and Transport Research Economics

The “slow down” wording is symptomatic of the “safety wash” around what drivers facing wildlife road signs should do or be required to do. Currently wildlife road sign technical and use guidelines in 100km/h speed zones are managed under a “wild west” approach. It can be summarised along the lines – drive how you think is responsible on a regional or remote roads but we (state transport departments and council engineers) won’t advise what speed reduction is safe and if you think it is safer to hit the animal do so but the departments/councils take no legal responsibility if you or other vehicle occupants are injured or killed in a wildlife collision!

But the Safe System Model which forms the basis of the Federal and State Road Safety Strategies and Towards Zero 2050 road fatalities does have speed setting guidelines for rural and regional roads that have poor or no run-off road safety infrastructure and/or used by pedestrians and cyclists, Table 1 ((explained in detail in article three). These Table 1 guidelines are based on the Safe System’s principle that “*humans are physically vulnerable and are only able to absorb limited kinetic energy during a crash before serious injury or death occurs*”. (There is no reference to wildlife’ ability to absorb kinetic energy in a collision and its consequences but there is no reason why it is any different.)

Table 2, is published in Austroads “Model National Guidelines for Setting Speed-limits at High Risk Locations 2014”. These are the Safe System speeds determined by research so must be considered appropriate for Australia’s rural, regional and remote roads which do not have the necessary infrastructure safety investment of higher volume roads “...needed to maintain higher speeds in line with the expected mobility function”. These rural roads lacking necessary safety infrastructure are the ones where tens of thousands of yellow wildlife warning signs are installed. They are also usually roads with posted or default 100km/h maximum speed limit. Many of them are minor roads outside towns boundaries which are used by pedestrians and cyclists, Infographic 1.

Biomechanical tolerances to impact* or Safe System speeds	
Crash type	Impact speed
Car/pedestrian/cyclist	20–30 km/h
Car/motorcyclist	20–30 km/h
Car/tree or pole	30–40 km/h
Car/car (side impact)	50 km/h
Car/car (head-on)	70 km/h

Source: Austroads (2005).

* The chance of a fatal outcome is less than 10% at these speeds, and increases sharply above them.

Table 2: Biomechanical tolerances of humans for different crash types. Austroads contends “These human tolerances need to be considered in the management of speed to ensure that in the event of a crash, no road users are killed or seriously injured.” Source: Austroads “Model National Guidelines for Setting Speed-limits at High Risk Locations 2014.



Infographic 1: Safe System Speeds case study of pedestrian and vehicles use on one local rural road, central Victoria shire. The Safe System Model and Vision Zero road deaths by 2050 is adopted by all state and territory Transport Departments, but its Safe System Speeds are ignored on many rural and regional council managed roads not required for mobility function outside town boundaries where it is more convenient to implement a standard 100km/h default speed limit and risk the lives of pedestrians and cyclists. Local council engineers will not lobby to change the 100km/h speed limit to Safe System speeds often requested by residents as they have no jurisdiction to take speed reduction initiatives under Transport Victoria's Speed Zoning Policy and Guidelines. They are restricted to ineffective actions to reduce wildlife road kills such as installing more yellow wildlife road signs that are ignored by most drivers. Sources: Victorian Road Safety Strategy 2021 - 2030; photos Patrick Francis.

The Table 2 speeds are also referred to by Australia's national body of engineering, Engineering Australia, the voice of 130,000 plus members many of whom are responsible for road safety infrastructure and speed limits determinations as employees of state transport departments and local councils. Despite the rhetoric around community consultation for setting speed limits engineers are the arbiters of road speed limits around Australia and as subsequent articles in this series demonstrate they have no jurisdiction to embrace wildlife safety directly and the consequences for vehicle occupant safety in vehicle wildlife collisions.

In its December 2024 document “Towards safer and more liveable urban streets” it states Engineers Australia *“back today’s problem-solvers, so they can shape a better tomorrow”*.

But this sentiment has a long-way to go when EA admits *“Traditional transport engineering which focuses on efficiency or lowest overall cost, does not properly take all sustainability issues into account. ...due to reliance on quantified micro-economic analysis such as benefit to cost ratio estimates that do not account for intangible effects”* such as pedestrians and wildlife on rural roads outside town boundaries.

Even the EA document doesn’t recognise pedestrians and cyclists use roads outside town boundaries but highlights the dangers they face in street planning and design principles which operate within town boundaries:

- * Reduce street speeds to ‘safe speeds’ in accordance with the Safe System approach (table 2), and*
- * Apply a street user hierarchy that is based on meeting the safety needs of the most vulnerable” which must be pedestrians, cyclists and wildlife.*

Under the heading ‘Reducing speed reduces crashes, injuries and deaths’ EA repeats what is known about why speed has such a big impact on serious injuries and deaths but is universally ignored by state transport authorities when they impose default 100km/h and 80km/h speed limits on minor council managed roads outside town boundaries regularly used by pedestrians. The two reasons EA cites are:

- “Firstly, the severity of an injury is highly dependent on the impact speed at a collision. For example, the probability of death for a pedestrian hit by a vehicle at an impact speed below 30kph is fairly low but increases rapidly to 85% at an impact speed of 50kph*
- “Secondly, crashes occur when mistakes are made and are inevitable given the number of interactions that happen in traffic, but drivers travelling at lower speeds can stop quicker and either avoid crashing altogether or reduce the severity of the crash. The mechanics of stopping a vehicle includes a reaction time before the brakes are applied, followed by the braking itself.*

“Also, the cone of a driver’s vision narrows as speed increases, reducing the peripheral vision of the driver. This means that a slower driver would see a pedestrian moving into a potential conflict zone earlier, than would a faster driver.”

The amnesia around people and wildlife safety on minor council managed rural roads outside town boundaries is almost universal amongst NGOs like it is within government transport departments. The most recent example is Infrastructure Victoria’s March 2025 “Victoria’s draft 30-year infrastructure strategy”. It has a chapter titled Victorians are healthy and safe (from harm) and *suggests “reducing speed limits to 30km/h on local streets”*. The potential harm from vehicles to pedestrians, bike riders and wildlife using roads outside town boundaries with 100km/h default speeds is not mentioned despite what these people are doing, interacting with nature and exercising, are activities recommended for better health.

In fact Infrastructure Victoria mentions that Victorians want a thriving natural environment and states *“people benefit when they can visit and explore natural areas”* but it does not connect the dots between reducing speed limits for safer pedestrians and safer wildlife with reduced road kills on low traffic volume rural roads, Infographic 1. It also fails to understand and give consideration to the fact that many peri-urban town residents are attracted to visiting wildlife and bushland on farms adjacent to nearby roads hence their desire to walk and ride along them.

Queensland's Department of Transport and Main Roads (TMR) does not recognise vehicle wildlife collision as a crash despite data as in figures 2A/B and 3. In its Guide of coding crashes it defines a crash as *“A crash is an incident involving a vehicle, or vehicles, in which a person is killed or injured, property is damaged, or an animal in someone's charge is killed or injured.”* Using that definition wildlife are in no-body's charge so are not monitored as a contributor to crashes.

Transport for NSW has a wider definition for crash *“Any ...event reported to police and resulting in death, injury or property damage attributable to the movement of a road vehicle on a road”*. This definition allows for counting wildlife vehicle collisions reported to police and recorded in 'Road Traffic casualty crashes in New South Wales 2022' but ignores thousands of other wildlife vehicle collisions even the ones causing insurance claims.

No transport departments refer to wildlife in definitions associated with crashes and its unclear where reference is made to an animal whether or not it includes wildlife or is limited to livestock under control on a stock route and or horses being ridden or driven on roads.

It seems wildlife warning signs have no legal requirements, no speed reduction requirement, and usually no ecological and adjacent land uses considerations associated with where they are installed. Under its comprehensive technical guidelines for road signs Transport for NSW simply states for its Kangaroos and Wildlife signs *“this sign is not a prescribed traffic control device. This sign may be installed by council on the network they manage without seeking traffic committee or written approval from Transport NSW”*.

Even when wildlife (or curve) warning signs have a suggested speed limit such as in figure 1 (lower right) the speed is advisory only and according to Transport for NSW *“Although the sign provides a warning to approaching drivers, it is not legally enforceable.”* *

The advisory signs guidelines could be described as “weasel” words and phrases which basically leave speed outcomes up to drivers perception of risk. Transport for NSW states *“Advisory speed signs are used where the appropriate speed on a section of the roadway may be less than the posted speed limit.”* * In NSW advisory speed signs do not accompany wildlife symbol or word signs, just curve signs.



Figure 4: An example of state Transport department safety wash associated with wildlife warning signs. How is a driver expected to interpret this wildlife warning sign, slow down to some undefined speed or increase speed back to 100km/h after the road works 60km/h speed limit?. Photo: Patrick Francis

The same applies to guidelines for the 100km/h default speed limit on most NSW rural roads where no posted legal speed limit are in place. Despite imposing a default speed Transport for NSW states “The default speed limit is often inappropriate for unsealed roads in rural environments” and suggests ‘A Reduce Speed to Conditions’ (G9-318-1) sign should be installed on the entry to a road where the default speed limit applies for the length of road, but not recommended to be signposted at 100 km/h..... The Reduce Speed To Conditions sign should be used to remind drivers to drive to prevailing conditions on unsealed roads”.*

The combined effects of reaction and braking times on STOPPING DISTANCE in both wet and dry conditions.
Source: Transport NSW Towards Zero October 2022

Speed	Reaction distance (dry road)	Braking distance (dry road)	Stopping distance (dry road)	Reaction distance (wet road)	Braking distance (wet road)	Stopping distance (wet road)
40	17m+	15m	32m	17m+	15m	32m
50	23m+	16m	39m	23m+	16m	39m
60	30m+	17m	47m	30m+	17m	47m
70	38m+	20m	58m	38m+	20m	58m
80	47m+	24m	71m	47m+	24m	71m
90	56m+	29m	85m	56m+	29m	85m
100	65m+	35m	100m	65m+	35m	100m

Watch out for animals
One in every 41 casualty crashes on country roads involves a vehicle hitting an animal. Transport for NSW

Never swerve
You may lose control of your vehicle if you swerve to avoid an animal. It's safer to hit the animal than swerve. Transport for NSW

Figure 5A: NSW Wild West of wildlife road signs. NSW default 100km/h speed limit roads are not sign posted but may have a “reduce speed to conditions” sign which is open to driver interpretation and risk profile. Transport for NSW has no wildlife warning signs with any indication of safe speed to travel, its only advice is hit the animal if you cannot stop in time which take 133 m in dry conditions if travelling at 100km/h. The states’ road safety strategy to 2030 is based on the Safe System Model which does not recognise wildlife vehicle collisions. More regional owners are equipping vehicles with roo bars to avoid damage in a kangaroo collision. Sources: Transport for NSW, Queensland TMR, photo Patrick Francis.

Transport for NSW provides no guidance as to how much lower than the maximum speed limit drivers should reduce their speed given the prevailing conditions. A spokesperson stated “*Signage advising motorists to slow down for wildlife are advisory only. Which means that it is up to the motorist to use their own judgement when adjusting their speed below the legal limit to allow greater reaction time when responding to an unexpected wildlife. It is not possible to provide advice on every potential issue affecting an individual’s circumstances and there are currently no plans to attach advisory speeds to these signs*”.

In Victoria Transport Victoria’s “Vicroads Fauna Sensitive Road Design Guidelines 2012” gives contradictory information about the usefulness or otherwise of yellow wildlife symbol signs for slowing drivers speed.

Firstly the Department contends that yellow wildlife signs are “*suitable for all animals where traffic volumes and speed contribute to high levels of roadkill. In Victoria, warning signage is the most common method used to reduce fauna mortality on roads ...but do not eliminate risks of roadkill*”. It qualifies this by stating signs are “*Not likely to be practical on highest speed roads or roads with high traffic volumes*”. In other words on most regional Transport Victoria managed roads outside town boundaries the speed limit is 100km/h and on freeways 110km/h and are where the vast majority of wildlife vehicle collisions happen, the signs are not effective. So why are the signs installed?

Furthermore Transport Victoria also sets a default 100km/h maximum speed limit for Council managed connecting and local roads. On these roads it states “*Success of permanent signage in reducing roadkill and public awareness diminishes over time, particularly with local residents familiar with the signs.*” So why are the signs installed?



Figure 5B: Victoria's Wild West wildlife roads signs. Most of Victoria's rural roads have a posted or default 100km/h speed limit with a plethora of differently worded wildlife warning signs, all of which are advisory only with no legal speed reduction requirements. The state's road safety strategy to 2030 is based on the Safe System Model and has objectives to reduce road fatalities and injuries which so far are not being met. Regional owners are equipping vehicles with roo bars with the intention of avoiding damage when they hit kangaroos. Photos: Patrick Francis.

The lack of speed enforceability for wildlife signs sets them apart from other prescribed speed limit signs for meeting the Net Zero road fatality by 2050 objective contained in the Safe System based National Road Safety Strategy 2021 – 2030 and its state equivalents. Tens of thousands of wildlife vehicle collision are happening each year across Australia which are putting people in hospital, causing fatalities, costing millions of dollars in medical fees and millions of dollars for vehicle repairs and insurance but all these go unrecognised by Federal and state road safety authorities, for them wildlife exist but collisions with them are not considered a safety hazard which warrants addressing with the Safe System speeds (Table 2) through hot spots on rural and regional roads.

The closest the National Road Safety Strategy 2021 – 2030 and the Vision Zero 2050 Objective comes to referencing wildlife contributing to vehicle collisions can be found in a wildlife warning signs photograph on page 1 in the first and so far only

“National Road Safety Strategy Annual Progress Report 2023” published by the Australian government Department of Infrastructure, Transport, and Regional Development, Figure 6. Apart from the photo there are two references to wildlife as a vehicle occupant safety issue. On page 7 the Report states *“Crashes on regional roads are more likely to be fatality-causing accidents than urban areas for one main reason: they have higher average speed limits. This is why crashes resulting in death are over represented in regional areas. Furthermore, regional roads are more likely to have ... wildlife and poorer road quality”*.

On page 12 the Report states *“Road safety research indicates that there is a significantly higher risk of death or injury due to crashes on rural or remote roads.”* In the list of key risk factors involved in crashes on rural or remote roads is *“animals on the road”*.



Figure 6: This wildlife warning signs image in the National Road Safety Annual Progress Report 2023 is accompanied by two statements that wildlife can be associated with vehicle occupant fatalities on high speed regional and remote roads but there are no mechanisms within the Safe System model which underpins the Federal and State Road Safety Strategies for including wildlife collisions as a risk factor. Source: Australian Government Department of Infrastructure, Transport, Regional Development.

Researchers at the Monash University Accident Research Centre have highlighted an issue with wildlife advisory signs which are open to speed risk interpretation by each driver. They found". *"the evidence does point to a relationship between speed variability and crash risk. ...Factors that increase speed differentials between vehicles may therefore have as much or more effect on crash risks as factors that increase speeds chosen by all drivers"*. The driver's sense of security provided by bull bars against vehicle damage in a wildlife collision provides an extreme example of why speed differentials between vehicles happen on regional roads. The unintended consequence of wildlife warning signs might be that drivers who take any notice of them will drive slower than other drivers who adopt risky behaviours such as nose to tail driving, dangerous overtaking and cutting off on 100km/h roads. Ironically the Federal Government's 2024/25 TV Road Safety Campaign is highlighting this behaviour by motorists.

The lack of recognition of vehicle wildlife collisions as a vehicle occupant safety threat may stem from Austroads the peak organisation of Australasian road transport and traffic agencies. It's stated task is to *"undertake leading-edge road and transport research which underpins our input to policy development and published guidance on the design, construction and management of the road network and its associated infrastructure"*. It provides agencies with the

- * Infrastructure Risk Rating (IRR) Manual for Australian Roads which is a methodology for risk assessing roads based on measured road and roadside features,

- * AusRAP a program for all road authorities to maximise the road safety trauma reduction. AusRAP is behind star rating roads with the goal of 80% of roads are 3 star or better by 2030.

- * Model National Guidelines for Setting Speed Limits at High-risk Locations.

- * Safe System Assessment Framework.

There are no mentions in all these Austroads documents of animals (or wildlife) on or crossing roads as vehicle collision risks or when wildlife warning signs should be erected, on what roads, and what speed drivers of different classes of vehicles should slow to if at all.

Engineers Australia points out another issue about Austroads approach *"For many decades the planning and design of urban streets has been guided by Austroads design manuals that are based on the movement of cars and trucks."* If this is the case for urban streets the safety threat is even greater for pedestrians and cyclists on minor rural roads outside town boundaries which have no footpaths, no crossing points, and no fixed object (trees, poles) safety barriers. Safety for pedestrians, cyclists and wildlife on these roads is currently ignored as the design manuals used by state transport authorities ignore them



Figure 7: When providing road management engineers with risk rating and star ratings for any road in Australia the presence of wildlife is ignored despite roads dotted with tens of thousands of wildlife warning signs and insurance companies data showing thousands of vehicles collide with wildlife. Sources: Austroads, AAMI, photos Patrick Francis.

In contrast to Austroads neglect of wildlife as a contributor to vehicle collisions and occupant safety, Queensland's Transport and Main Roads (TMR) has a comprehensive analysis of their role in its "Fauna Sensitive Transport Infrastructure Delivery" manual October 2024. This is amongst the most complete manuals available for evidence based guidance for reducing wildlife vehicle collisions (WVC) written by any state road safety department . It has individual chapters for road design considerations for all fauna species with extensive literature references.

In Chapter 6 the Manual includes a comprehensive review of wildlife vehicle collision mitigation measures. In section 19 it introduces the concept of traffic calming and states "*Traffic calming is the process of managing the speed, timing, and/or volume of traffic on a road to reduce the rate and/or severity of WVC. However, motorists typically drive at the design speed of the road and forcing drivers to drive more*

slowly without changing the design of the road is very difficult. Nevertheless, even minor improvements in the rate of WVC may be significant and WVC hot-spot data can be considered by an engineer undertaking speed limit reviews”.

When it comes to using the yellow wildlife symbol signs for traffic calming TMR is forthright stating they are commonly used around the world but have little to no effect on vehicle speed. *“most drivers do not modify their behaviour in response to standard signs because they rarely see fauna and therefore do not trust or believe the sign. In addition, the widespread deployment of standard signs in areas with few fauna reinforces this perception, thereby minimising effectiveness everywhere, including in high-risk areas. Transport and Main Roads does not recommend standard signage alone as an effective, long-term solution to WVC”.*

Despite this recommendation TMR installs a bewildering number of yellow wildlife signs in four categories, Figure 8:

- * Standard warning signs – where wildlife frequently encroaches onto the road in localised areas when there is significant traffic volume, and where drivers are unlikely to expect wildlife.
- * Temporary warning signs – where there have been recent sightings of endangered wildlife eg koalas
- * High-impact warning signs – where there is a wildlife hotspot or area with significant conservation value.
- * Wildlife Conservation Area signs – where a ‘conservation’ status is related to wildlife such as protected areas, state forests, dedicated area for environmental purposes.



Figure 8: Queensland TMR uses a range of yellow warning signs in four categories and describes them all as ineffective for preventing wildlife vehicle collisions and inadequate for wildlife preservation. From top left: Standard; High Impact; Wildlife Conservation Area; Temporary. Source: Queensland Manual of Uniform Traffic Control Devices Part 2: Traffic control devices for general use , November 2023

Insurer AAMI contends that it's latest driver survey shows more than 40 per cent of drivers admit to ignoring wildlife warning signs. So despite the inconvenience associated with potential vehicle damage repairs, potential vehicle occupant injuries, even fatalities it is not surprising to AAMI that vehicle animal collisions have increased by 22 per cent year-on-year.

Researchers agree signs useless

Research by road ecologists agree that the yellow symbol signs are useless for changing drivers speeding behaviour. Griffith University scientist Darryl Jones who has studied wildlife warning sign effectiveness for 20 years was clear about them in an ABC science article in September 2023. According to Jones *"Councils put them up because it's a way of doing something. But the evidence is unequivocal. They make absolutely no difference to anything"*.

Jones explained why these yellow signs don't work in his book *A Clouded Leopard in the Middle of the Road*: *"What we do know about the response of drivers to this signage can be nicely summarized in one word: "habitation." Most of the time, drivers just don't notice these signs—or, if they do, they don't react in any discernible way. And crucially, they don't slow down. The use of standard wildlife warning signs offers a textbook example of the elements that lead to habituation. The images are overly familiar and not particularly attention grabbing, and there is no apparent reason for drivers to react. Once these signs are installed, they stay in place more or less forever. Old, faded, rusty signs—often bearing signs of wear, bullet holes, and graffiti—look more like historic relics than vital alerts warning that something potentially hazardous might be about to happen. Road authorities and local councils love to erect these signs as an indication that they are "Doing Something" about road safety or because they want to demonstrate that they really do care about a particular species of interest. And while these may be worthy political aims, the fact remains that static warning signs are, at best, pointless and at worst, misleading"*

Does changing sign design work?

Road ecologists have undertaken research into how different types of signs and messages on signs might affect driver behaviour to slow down. Research by Amy Bond and Jones in 2013 surveyed urban and peri-urban drivers for their responses to eight different sign designs, figure 9A. They found three designs elicited positive responses for possible increased driver alertness and possible reduced speed, Figure 9B. As no speed data was actually recorded interpretation of these responses provides nothing more than possible driver intentions.

While not part of the project design researchers uncovered a particularly useful response from many of the participants. They said if a sign is interactive and has a separate panel that displays updated numbers of wildlife killed on the stretch of road they would take more notice. Such feedback to drivers *"would provide them with evidence that wildlife vehicle collisions do occur regularly"*. The researchers said

such feedback in conjunction with carcasses left on roadside gives drivers clear reminders that wildlife vehicle collisions are highly likely and slowing is the safe option. It also suggests that councils removing carcasses may not be helpful as drivers have no feedback to the collision reality on a stretch of road.

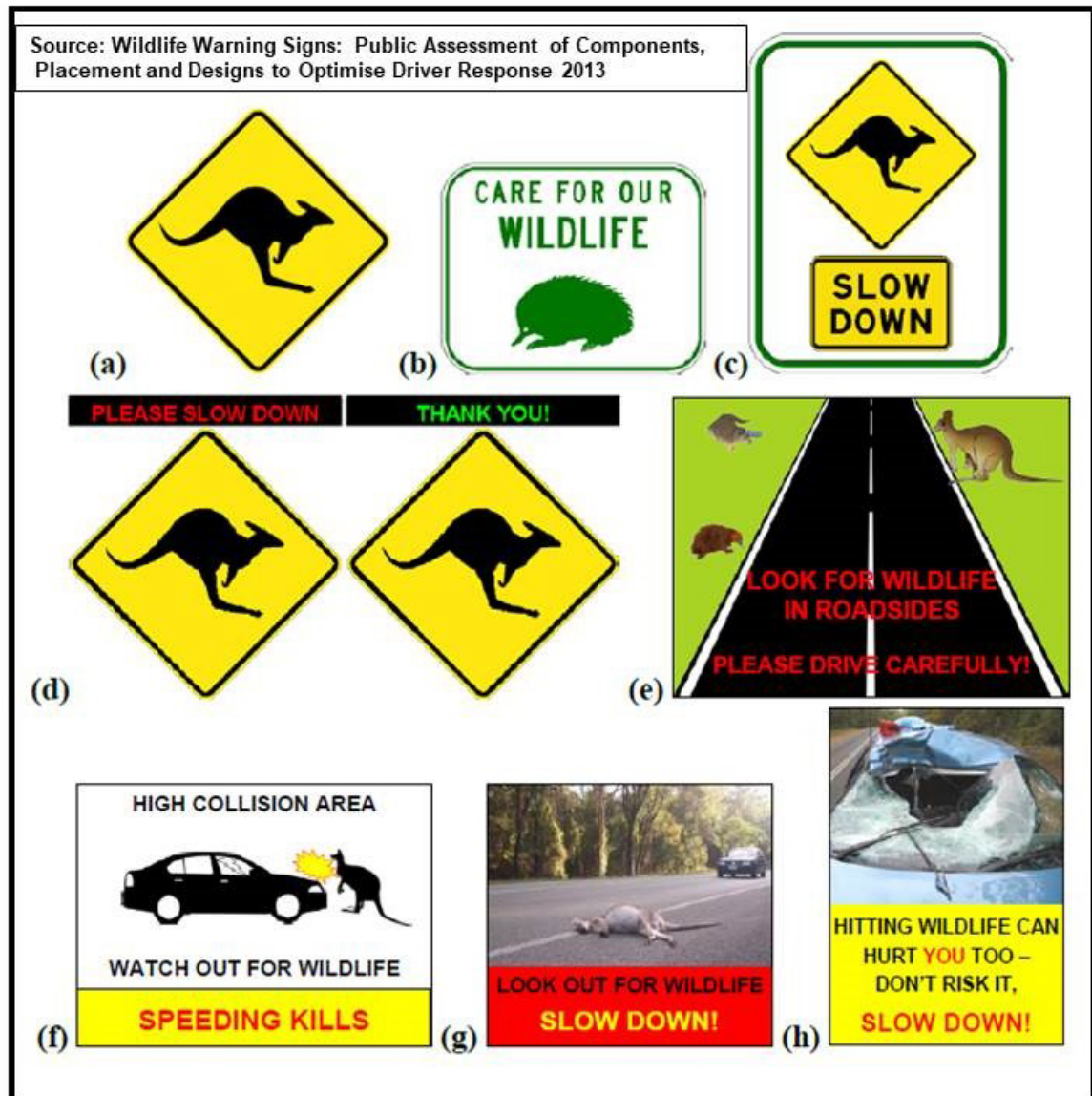
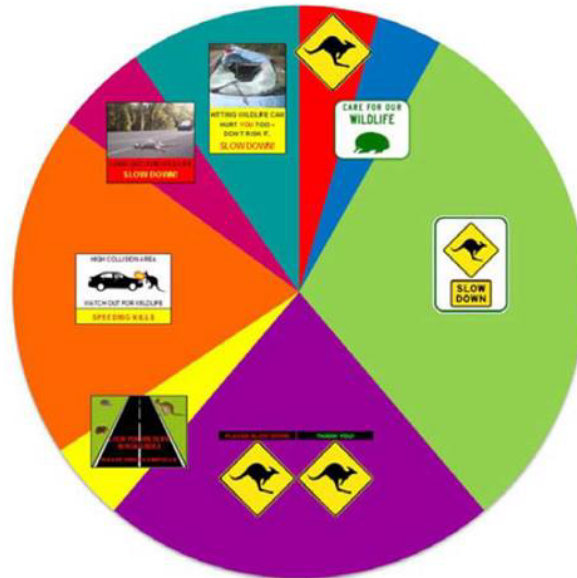


Figure 9A: The eight versions of wildlife warning signs Griffith University researchers presented to drivers.

The proportion of participants that preferenced the signs as the most likely to produce the response of increased alertness and reduced driving speed. N = 134.

■ #1 ■ #2 ■ #3 ■ #4 ■ #5 ■ #6 ■ #7 ■ #8



Source: Wildlife Warning Signs: Public Assessment of Components, Placement and Designs to Optimise Driver Response 2013

Figure 9B: Signs 3, 4, and 6 were drivers preferences for increasing alertness and slowing down.

Interactive and enhanced signs

Research into driver interactive wildlife signs has been underway in south east Queensland and Tasmania for over a decade. These signs are orientated to preserving iconic wildlife species rather than warning drivers of possible vehicle occupant deaths and injuries. They are also conducted in urban and peri-urban areas where road speed limit is generally 60km/h.

In south east Queensland one trial of 16 vehicle activated koala slow down warning signs with flashing lights produced an average vehicle speed reduction of 1.6km/h.

A 2018/19 trial by Redlands City Council in south east Queensland and reported by Griffith University's Applied Road Ecology Group used two versions of koala images and both reduced vehicle speed marginally.



Figure 10: In the Redlands City Council trial using two interactive signs which displayed vehicle speed, a small reduction in driver behaviour was achieved with the koala crossing being more effective than the smiling koala. Source: Amy Blacker Griffith University.

According to Queensland TMR . Enhanced signage , such as those that (i) only operate at high-risk times of the day, (ii) detect vehicle speed and alert drivers if they are speeding, and (iii) report in near-real time the number of WVC may slightly increase sign effectiveness.” Nevertheless, even enhanced signs may become ineffective over time if motorists perceive them as advisory only, and an over-

saturation of any type of sign will lose effectiveness as people become accustomed to them”.

In 2023 – 2024 TMR conducted a trial with a new interactive sign in a 60km/h koala zone. The big difference with this sign was a legal speed limit reduction from 60km/h to 50km/h between 6pm and 6am. The results over a six month period was a 6% reduction in overall speeds, and a 20% reduction in speeds above 60km/h. This trial was a first to provide drivers with an actual legal requirement to reduce their speed and was so successful TMR has extended the trial for another 18 months. If further data collected is positive TMR will consider modifying wildlife signage across the state.



Figure 11: TMR koala zone wildlife signage has introduced a legal 50km/h maximum speed limit from dusk to dawn and successfully reduced driver speed. Source: Queensland TMR.

The NSW government has included a Smarter Highway Activated Vehicle and Environmental Systems (SHAVES) trial within its January 2025 launched five million dollars Smarter Highways program. This is described as “self-adaptive electronic signage with machine learning capability which is able to predict events and provide motorists with advance warning of hazards such as ...wildlife.” It will be interesting to find out if the electronic signage will include reduced legal speed limits or be advisory only like the existing yellow wildlife signs?

Local and state government road managers have another safety wash strategy apart from the yellow warning signs, it's the driver education advice to “drive to the conditions” without any suggestions around what speeds on what roads are appropriate for the conditions such as the possibility of wildlife on or crossing a road. It could be expected that the Table 2 Safe System speeds would be considered appropriate for informing drivers to “drive to the conditions” on rural roads which do not have the necessary infrastructure to prevent fatalities and serious injuries in the circumstances listed.

The driver education infographic produced by Transport for NSW is an example of driving to the conditions safety wash, Figure 12. Its 2021 version emphasises “*One in every 41 casualty crashes on (NSW) country roads involves a vehicle hitting an animal*” then amongst advice as to what the driver should do states “*slow down when you see animal warning signs*”. But there is no advice provided about by how much speed should be reduced.

Curiously the 2024 version of this infographic has removed the reference to the number of casualty crashes involving vehicles hitting an animal, but has added in a Towards Zero logo, a reference to the Safe Systems principles underpinning the National and State Road Safety Strategies objective of zero road fatalities by 2050.

The number of casualty crashes on NSW roads in 2022 was 11,963. In these 281 persons were killed and 14,560 injured. Country roads accounted for 40% of all casualty crashes but 67% of fatal crashes. On this basis 188 people died on country roads, how many of those fatalities involved animals is not reported. But the data does record that 153 casualty crashes involved swerving to avoid an animal. Transport for NSW has estimated the cost to the community of the 2022 road casualties at \$8.6 billion.

Another classic example of the driver education safety wash can be found in NRMA's November 2022 report 'Wildlife Road Safety - Overview of wildlife road safety and what can be done to improve road safety outcomes for our wildlife and all Australians'. Its cover depicts the yellow wildlife signs. The Report highlights 2015 - 2020 Centre for Road Safety Wildlife Collision Data showing hundreds of casualty crashes are happening each year on NSW roads.

As for a solution it states “*driver education is the single biggest contributor to motor vehicle accidents.*” It suggests driver education campaigns can deliver risk mitigation techniques on roads frequented by wildlife, but makes no mention of reducing speed

such as the Safe System Speeds in table 2. Instead of speed guidance the Report provides the *advice* “If a large animal comes onto the road, it is more likely that a better outcome is hitting the animal rather than trying to swerve where the outcomes may roll the vehicle or result in an impact with a roadside tree, causing severe or fatal injuries.”



Figure 12: Driving to conditions education material usually provides advice around slowing down when passing an animal warning signs but gives no suggestions by how much speed should be reduced. And advice has become more vague as evidenced by this Transport NSW document. Its 2021 version under “Never swerve” states it is safer to hit the animal than swerve. Its 2024 version advises “Take great care if you manoeuvre to avoid an animal. You may lose control of your vehicle if you swerve too harshly.” Source: Road safety Transport for NSW.

Take home message

State transport department and local councils install wildlife signs along rural and regional roads where the posted or default speed limit is usually 100km/h as safety wash despite overwhelming evidence that most drivers ignore the signs and know road safety data shows most fatalities and injuries occur on 100km/h speed limit roads many as a result of wildlife vehicle collision or attempt by drivers swerving to

avoid hitting an animal and colliding with an on-coming vehicle or roadside obstacle such as a tree or pole.

Drivers are left to interpret the wildlife warning signs for themselves as possibly meaning slow down by an unknown amount and often for an unknown distance or for a tourist they could simply mean look out you might see a kangaroo, koala, wombat on or close to the road?

The reality around wildlife vehicle collisions is clear. Wildlife rescue organisations and vehicle insurance companies are reporting wildlife vehicle collisions are increasing and most collisions involve kangaroos or swerving to avoid an animal and colliding with a roadside tree or other hardware. Most state transport departments have no wildlife vehicle collision monitoring systems in place to evaluate wildlife's role in causing casualties on roads. The exception is Transport for NSW which states 1 in 41 casualty crashes on country roads involves a vehicle hitting an animal.

Research published in Emergency Medicine Australasia 2019 suggests that in Victoria more vehicle occupants are being injured and killed each year in wildlife vehicle collisions. State and Federal Road Safety Strategies 2021 - 2030 ignore enforceable solutions to reduce wildlife vehicle collisions in their quest for meeting the Strategies 2030 objectives for road fatalities and casualties despite the fact that these objectives are not being achieved.

Finally, safe speeds on remote, rural and regional roads without the necessary Safe System Model infrastructure provided on highways are known and published (table 2) but are ignored by all state transport departments and local councils in favour of a one size fits all solution of posted and default 100km/h and 80km/h maximum speed limits and installing yellow wildlife warning signs.

Article 2: Driver behaviour dictates politicians attitudes to vehicle wildlife collisions - the inconvenient truth around wildlife road kills

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