

How smart roads can help koalas beat traffic

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Australian cities can keep their precious koalas from ending up as road kill – if they plan their roads properly, environmental scientists say.

A new study at the ARC Centre of Excellence for Environmental Decisions (CEED) reveals that expanding existing highways, instead of building new [roads](#), is the best way to minimise the impact of increasing traffic and growing cities on koalas.

The team also developed a world-first mathematical model that helps determine the most cost-effective way to shield [wildlife populations](#) that live near roads – such as where to build fences, and over- or underpasses, to give these animals the best protection on limited conservation funds.

"The impact of roads on wildlife is growing rapidly as we continue to expand our cities," says Dr Jonathan Rhodes from CEED and The University of Queensland (UQ). "Animals worldwide, including mammals, birds, reptiles and frogs, are increasingly threatened by high traffic volumes."

Dr Rhodes explains that the effects include the loss of habitat, disturbances from human activities, and traffic accidents as the animals cross the road. "Take koalas for example – more than 3800 of them have been hit by cars between 1997 and 2008 in Queensland, and 85 per cent of these victims die.

"While koalas spend most of their time up trees, they also need to travel along the ground to find food and mates. The key to minimise the number that get killed on roads as we expand our cities is more careful design of our road networks."

The scientists studied whether koalas fare better when they have to cross a few large roads with more traffic, or many smaller roads with less traffic. They found that in most cases, having a large number of small roads results in significantly higher koala death rates than does having fewer larger roads.

They also found that male koalas are more susceptible to getting hit by cars than females, as males have larger home ranges and move greater distances, especially during the breeding season, Dr Rhodes says.

"The more roads they have to cross, the greater their chances of being hit by cars," he says. "If we want to accommodate higher traffic volumes and still have a chance of keeping our koalas, it's better to expand existing roads instead of building new ones."

In another study, led by Ms Tal Polak of CEED and UQ, the researchers

developed a mathematical formula to minimise the impact of existing roads on nearby wildlife populations.

"Since we can't rebuild or change existing roads, various ways are used to protect animals that live close by," says Ms Polak. "This includes building fences to keep them off the road, and under- or overpasses that allow them to cross the road safely.

"But up until now we didn't have a way to work out the most cost-effective way to do this. So we developed a mathematical model to work out how to ensure that the animals gain the most benefit per dollar spent."

The model combines information such as the size of the wildlife population, the size and traffic volume of nearby roads, and the chances of the animal crossing the road safely. It then shows the cost-effectiveness of building a fence, a fence with a wildlife passage or leaving the road as is with no mitigation – as well as the best places to do so.

Using a threatened koala population as a case study, the researchers found that simply building more overpasses isn't the best solution, Ms Polak says. "For example, if it's a small population, it's better to build a fence instead of an overpass. In these cases, it's more important to keep what we have instead of letting them risk their lives on the road."

The researchers say motorists must also play their part in protecting wildlife. "Speeding is a major killer of [koalas](#), especially at dawn and dusk, when they're the most active," says Dr Rhodes. "We should all stick to speed limits and be on the lookout for wildlife that is out on the roads at twilight or at night."

More information: "A Few Large Roads or Many Small Ones? How

to Accommodate Growth in Vehicle Numbers to Minimise Impacts on Wildlife." *PLoS ONE* 9(3): e91093. [DOI: 10.1371/journal.pone.0091093](https://doi.org/10.1371/journal.pone.0091093)

"Optimal planning for mitigating the impacts of roads on wildlife."
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