

Finding new ways to stave off koalas' demise

March 10 2014, by Jonathan Rhodes

(Phys.org) —Scientists are using genetics to save endangered koala populations from the perils of urbanisation.

Researchers at the National Environmental Research Program (NERP) Environmental Decisions Hub (NERP ED) have analysed genetic patterns in Queensland [koalas](#) and found how striking the right balance between [tree cover](#) and roads can help save animals threatened by urban growth, says Dr Jonathan Rhodes of NERP ED and The University of Queensland.

"Koala numbers have dropped massively over the past 15 years in southeast Queensland, and further urbanisation will affect them even more," says Dr Rhodes. "We need smarter and more cost-effective ways to keep our koalas while our cities continue to grow."

Dr Rhodes explains that while koalas spend most of their time in trees, they move between trees on the ground. "When they move across landscapes to mate, they transfer their genes across the landscape too. The mixing of their genes across different areas is how they maintain genetic diversity, which is crucial for their health and survival.

"By identifying koalas' genetic connectivity – how their genes are distributed across landscapes – scientists can establish how viable a population is. We can also identify the main landscape features that influence this gene flow."

In the study, the NERP ED researchers examined koala samples

collected across eight local government areas in southeast Queensland and explored how the amount of tree cover and roads affected the koalas' gene flow.

The team found that genetic connectivity drops rapidly once the percentage of [forest cover](#) falls below 30 per cent. Areas with little or no forest cover had rates of gene flow three times lower than areas where foliage cover was 100 per cent.

"We also found that the presence of highways reduces gene flow dramatically compared to areas without roads," Dr Rhodes says. "If you throw in a major highway, genetic dispersal is greatly impeded regardless of how much forest cover is present."

The findings imply that koalas have a good chance of dispersing through an area if there is sufficient forest cover, Dr Rhodes says. "If you want to keep, create or maintain connections between [koala populations](#), at least 30 per cent forest cover should be planned for.

"Also, as highways impede gene flow, habitat bridges and underpasses beneath highways need to be implemented as they can play an important role particularly where highways are adjacent to koala habitats."

Maintaining genetic diversity holds the key to the koalas' long-term survival – and the only way for them to achieve this is to keep them moving, Dr Rhodes adds. "So it's crucial to help them shift across highways and to preserve or restore eucalypt foliage cover.

"Understanding the genetic connectivity of koalas can be used as a cost-effective and informative tool for conservation planning," Dr Rhodes says. "Sustaining gene flow is a major challenge when you are trying to minimise the impact of fragmentation on native wildlife, so it's important to know what the factors are that influence [gene flow](#) when we

design new urban areas."

More information: "Using multilevel models to identify drivers of landscape-genetic structure among management areas." Dudaniec RY, Rhodes JR, Worthington Wilmer J, Lyons M, Lee KE, McAlpine CA, Carrick FN. *Mol Ecol.* 2013 Jul;22(14):3752-65. [DOI: 10.1111/mec.12359](https://doi.org/10.1111/mec.12359). Epub 2013 Jun 4.

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