

EARTH SCIENCE JOURNAL for

KIDS

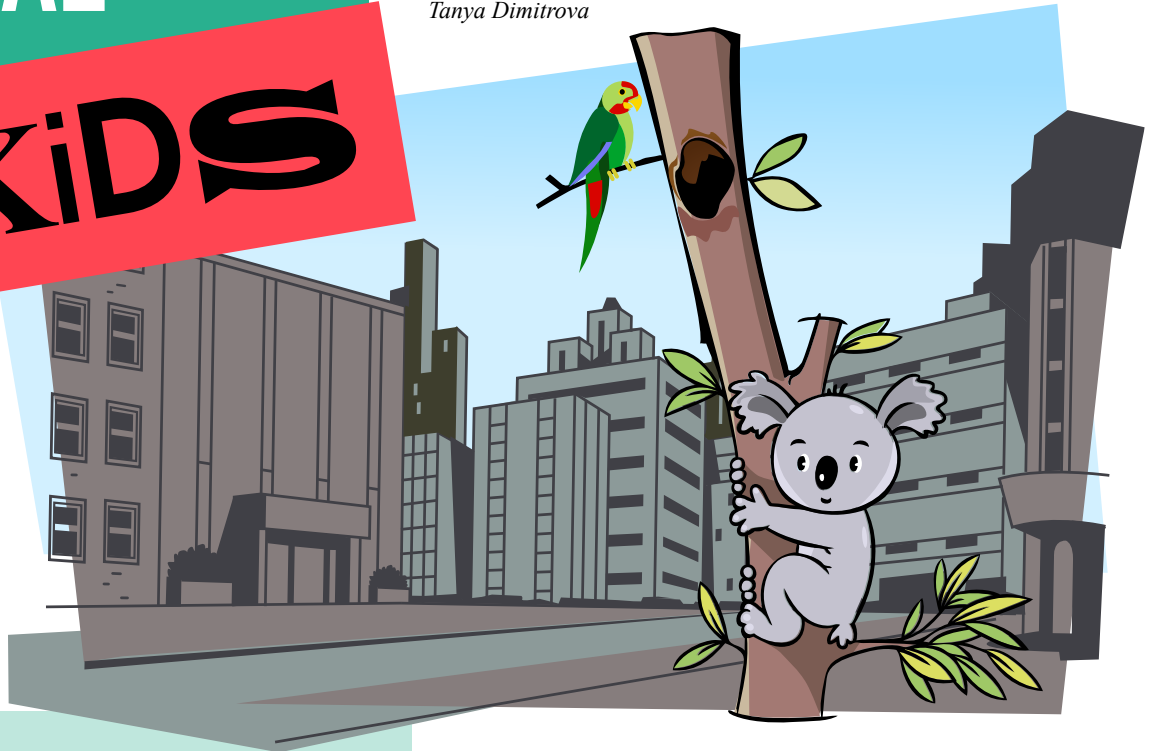
Where does Australia's wildlife hide?

Authors:

Pia Lentini, Christopher Ives, Caragh Threlfall, Karen Ikin, Danielle Shanahan, Georgia Garrard, Sarah Bekessy, Richard Fuller, Laura Mumaw, Laura Rayner, Ross Rowe, Leonie Valentine and Dave Kendal

Associate editor:

Tanya Dimitrova



Abstract

People often think that endangered plants and animals are tucked away in a protected park somewhere in the wilderness. Yet, we know that many species, threatened with extinction, live much closer to us – in our own neighborhoods. We began our research to find out exactly how much threatened wildlife lives in Australian cities. We overlapped maps of species habitats with maps of urban areas and discovered that half of the threatened animals and a quarter of the threatened plants live in cities! If we care about giving them a chance to survive, we need to learn to share our space with them.

Introduction

The continent Australia is home to many animals and plants found nowhere else in the world. We, scientists, call them endemic species. Many of them are threatened with extinction because they have lost their natural homes or have to deal with pollution and foreign hostile species.

Here in Australia, we have been working hard to protect these

threatened animals and plants. Many people think that they hide away in wild natural parks. But it turns out that many of them might be much closer than we expect – right under our noses in the cities where we live. We began this scientific research to find out exactly how many threatened species live in our cities.



*The Grey-headed flying fox (**Pteropus poliocephalus**) is a large fruit-eating bat threatened by conflict with humans, who do not like the noise and smell bats create when they “camp” and the fact that they eat their orchard fruits. Flying foxes like cities because of the trees we plant and the lakes we build. (Image: Kate Hofmeister)*



Growling grass frogs (*Litoria raniformis*) are from southern Australia and are known to eat other frogs when they have the opportunity! Even though they're pretty tough, populations of "growlers" have declined quickly because of deadly chytrid fungus, and because the ponds they live in are no longer connected to each other with natural habitat. Growlers survive in swamps around Melbourne that are warm and slightly salty, where chytrid fungus struggles to grow. (Image: Geoffrey Heard)

Methods

Threatened species

First, we had to figure out which species are under threat. The Australian government has designated over 1200 plants and 400 animals as "threatened". Over the years, many different scientists and nature explorers have collected data about these species' distribution (i.e. where they live) and created distribution maps.

Cities

The government also has maps with data about where people live. Using these data, we identified 99 cities in Australia (aka urban areas). Sometimes it may be hard to tell the difference between types of urban areas, so we used a very strict definition for a city:

1. Home to at least 100 people per squared kilometer (or 10 people per area the size of a football field);
2. Home to at least 10,000 people.

We found that Australian cities cover a relatively small area: less than a quarter of 1% of the continental territory.

Overlap

So we had a map showing where animals live and another map showing where the cities are. Our next step was to overlap them using a special computer program.

We also created a threatened species list for each city.



Every year Swift parrots (*Lathamus discolor*) migrate from their winter grounds on the mainland of Australia to the island of Tasmania where they breed in tree hollows. Swift parrots are threatened because trees have been cleared, and they are eaten in their nests by sugar gliders, a small possum not native to Tasmania. Swift parrots can be seen in urban parks feeding on Eucalyptus blossoms during their migration. (Image: Simon Bennett)

Control

But how can we be certain that the overlap between plants and animals' homes and our human cities is not just a coincidence?

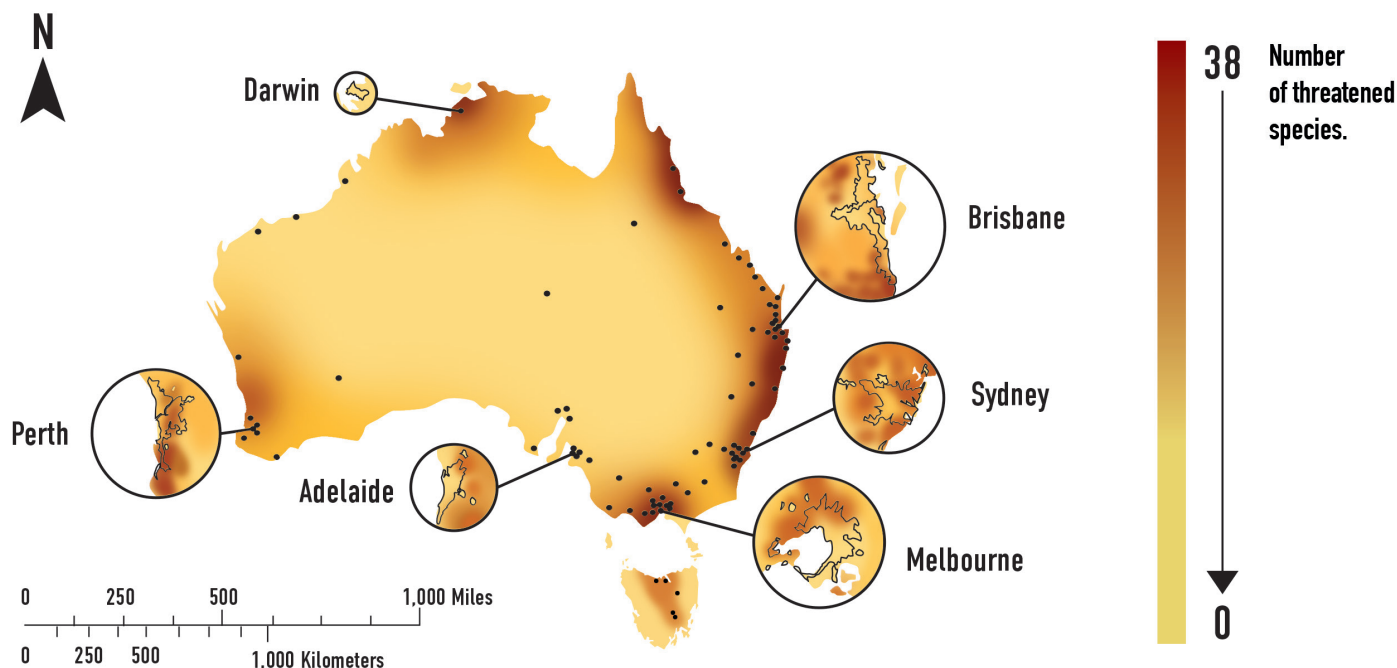
To help us be sure, we made the computer program create a control group of cities – made-up, "dummy" cities at random locations around the continent.

We then compared the real cities and the dummy cities. The results surprised us!



The Canberra spider orchid (*Arachnorchis actensis*) is endemic to the area around Australia's capital city. The grassy woodlands they existed in were cleared to make way for houses, and the 250 plants left exist only on natural areas and hills nested in the city. The flowers are pollinated by a tiny wasp, and plant itself is only visible for a few months of the year - the rest of the time it exists as a tuber underground which needs special fungus to survive. (Image: Mark Clements)

Results



Map of Australia: the areas with highest number of threatened species (darkest shade) are usually around the big cities.

Half of the threatened animals and a quarter of the threatened plants live in cities! The data also showed the following:

- All Australian cities harbor rare plants and animals.
- Threatened species tend to live closer to the coast and in the edges of cities.
- Half of all studied species - 258 - were found in only one city on the entire continent.
- More endangered species live in urban areas than in non-urban areas: on average, there are 10 threatened species per square kilometer in cities compared to only 3 in non-cities.
- Sydney was the most popular home for threatened species: 124 live there!

Three times fewer endangered plants and animals live in the areas we used as dummy cities compared to real cities. Therefore, these trends are not a coincidence: wildlife seems to like something about urban living! But what?

Researchers have come up with a few possible explanations:

- The areas where we built our cities had high biodiversity (i.e. rich wildlife) to begin with. (Although areas outside of cities might have high biodiversity too, just not as many threatened species.)
- Many cities (especially in Australia and the U.S.) were established fairly recently - within last 100 years – so wildlife are still hanging on there.
- Cities feature a lot of different landscapes: suburban residential areas, dense urban development (such as roads, stores etc) and parks plenty of different habitats for every taste!
- For many animals, it might be easier to find food and water in urban areas than in the “wilderness”.
- More people live in cities. So it is possible that we find more threatened species because more eyes are on the lookout for them. They might just be going undetected in the countryside.

Discussion

Interestingly, Australian threatened species are not the only ones who chose to live in urban areas. A recent scientific study from the U.S. found that 22% of endangered plants grow in the 40 largest American cities (which represent only 8% of the country’s territory). Similarly, in the United Kingdom, the Song thrush (*Turdus philomelos*) is three times more likely found in cities than in the areas around them.

Conclusion

Our study showed that cities are not wildlife dead-zones. On the contrary – they are biodiversity hotspots and very important for conservation. If we want to protect endangered plants and animals from extinction, we should allow space for them in our cities!

People around the world are already working on urban conservation. There are many ways to make our cities wildlife-friendly:

- Allow development (building stores, roads, houses) only in certain parts of the cities.
- Have green corridors of trees and plants between parks so that animals can travel to find food.
- Protect big old trees with hollows, plant more trees and have green roofs covered with plants to provide more wildlife habitats.
- For cities on the coast, lead dogs on a leash on beaches so that they do not disturb migratory birds.

See some more ways we can design our neighborhoods to be more plant and animal-friendly.



A vision of a more wildlife-friendly city.

(Image: Georgia Garrard, Sarah Bekessy, Simon van Wijnen, Mauro Baracco, Jonathan Ware, Catherine Horwill)

Glossary of Key Terms

- **Development** = building human constructions like houses, roads, shops. *E.g. Development from growing cities caused much of the rainforest loss.*
- **Control group** = one of the tested groups in a scientific experiment, which is NOT exposed

to any experimental treatment but is tested under the same conditions as all other groups. This helps the scientists confirm that the experimental treatment actually makes a difference. Every good scientific study must have a control group if it wants to reach valid results. *E.g. The scientists programmed the computer to create and test random dummy cities as a control group. These cities did NOT have as much biodiversity as the real cities. That is how the scientists confirmed that their finding was not just a coincidence.*

- **Biodiversity** = short way of saying “biological diversity”, or the “diversity of living things”. It is all the plants, animals and other living organisms in an area and the differences between them because of the way they have evolved. *E.g. Australia is a continent with high biodiversity.*
- **Conservation** = people’s effort to protect nature. *E.g. A lot of students participate in wildlife conservation programs in their communities.*
- **Hotspot** = an area with exceptionally high biodiversity. *E.g. Scientists discovered that Sydney is a hotspot for biodiversity – more than 120 threatened species live there.*
- **Species distribution** = the area where an animal or

a plant species can be found. *E.g. Some plants have a very small distribution – they only grow in one isolated region.*

- **Urban** = related to cities. *E.g. Some neighborhoods have started urban farms to grow fruits and veggies for their communities.*

References

Ives, C. D., Lentini, P. E., Threlfall, C. G., Ikin, K., Shanahan, D. F., Garrard, G. E., Bekessy, S. A., Fuller, R. A., Mumaw, L., Rayner, L., Rowe, R., Valentine, L. E. and Kendal, D. (2016), Cities are hotspots for threatened species. *Global Ecology and Biogeography*,

25: 117–126.

<http://onlinelibrary.wiley.com/doi/10.1111/geb.12404/full>

Schwartz, M.W., Jurjavcic, N.L. & Brien, J.M.O. (2002) Conservation’s disenfranchised urban poor. *Bioscience*, 52, 601–606.

<http://bioscience.oxfordjournals.org/content/52/7/601.full>

Chicago Wildlife Watch: help scientists identify wildlife caught on camera: www.chicagowildlifewatch.org/