

# City bats need trees!

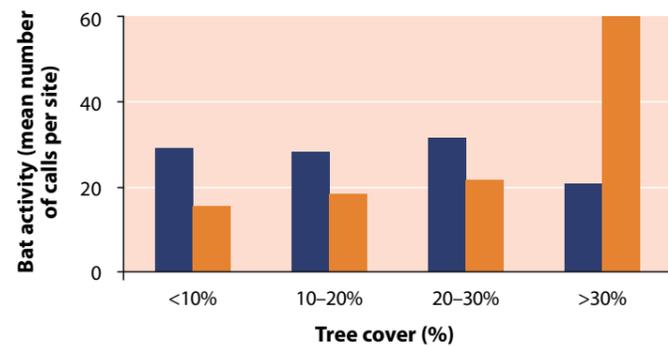
## Bats at the landscape scale (cont'd)

### 3. Some bat species thrive where there are lots of trees.

The same pattern occurred when we looked at how the tree cover of each landscape influenced bat activity.

**Urban-tolerant species** (blue columns) had similar levels of activity regardless of the amount of tree cover across the landscape.

**Urban sensitive species** (orange columns) were most abundant in landscapes with >30% tree cover. The effect of tree cover and building density within landscapes also interact, so sensitive species may still be present in landscapes with greater development so long as there is a large amount of tree cover.



### Fun Fact!

Despite some species of microbats weighing less than a 10 cent coin, they can fly up to 10 km in a single night!



## How to conserve bats at different spatial scales

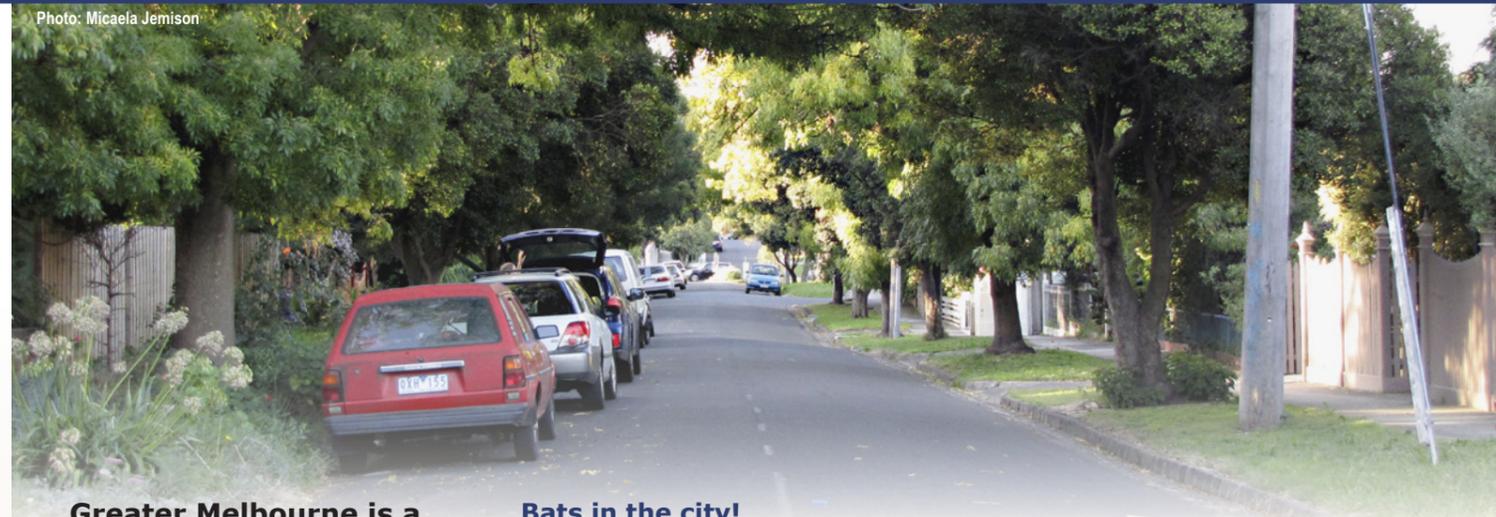
### Patch:

1. Big trees = more bat species.
2. More trees = more bat species.
3. A few big trees are better than lots of little trees.
4. Backyards can be just as good habitat for foraging bats as urban parklands.
5. In residential areas, we can really help to increase the number of bat species, by allowing trees to grow bigger, and by maintaining / increasing tree cover throughout the suburbs.

### Landscape:

1. Some bat species are tolerant of urbanisation while others are extremely sensitive.
2. The same 2 or 3 tolerant species of bat are found at almost every site in Melbourne.
3. The most sensitive species are disappearing from the inner suburbs.
4. Urban planning needs to account for the most sensitive species if we want to protect them.
5. Sensitive species are found infrequently in landscapes where housing density is greater than 2 houses/ha but they can still occur in landscapes where tree cover exceeds 30-40%.

Photo: Micaela Jemison



**Greater Melbourne is a natural home to many species of microbats (small, insect-eating bats). However, they are starting to disappear from some areas – keeping bats in the city means ensuring there are enough large trees for them, and enough tree cover in our neighbourhoods and suburbs.**

### Bats in the city!

- There are 17 species of microbats in the Greater Melbourne area – almost all of the kinds of bats that live in Victoria can be found in the city or suburbs!
- Their ability to fly makes them more resilient to the ever-increasing urban development than other groups of native mammals that are now absent from cities.
- However, surveys show that some microbat species that once occurred within Melbourne's inner suburbs are no longer present. If this pattern continues, these species may also disappear from the outer suburbs.
- The disappearance of bats and other small mammals from cities is a global problem, occurring in many cities around the world.
- Bats are important for the role they play in reducing insect populations, including pest insects.

### A note about scale!

Spatial scale refers to the distance over which ecological processes operate. Species respond to their environment at a range of spatial scales, so we need to examine differences in patterns at more than one spatial scale. For example, we can study where animals spend their time and what kinds of habitats they use most often, ranging from small to large-scale, and from local to distant.

### Patch scale

Small area, covering in the range of tens to hundreds of square metres.

The characteristics (types of trees, etc) of the patch are reasonably uniform over the whole patch.

Examples of patches: backyards, urban reserves and parklands.

Patch features that are important to bats include the number of trees, types of trees, amount of insect prey available, etc.

Patch features influence aspects of a bat species' behaviour, such as where they forage, where they roost, or how likely they are to be captured by a predator.

### Landscape scale

Large areas that might cover tens to hundreds (and maybe thousands) of square km.

Landscapes are like land mosaics – they are made up of many different types of environments and habitats.

Examples of landscapes: a suburb, valley, or large tract of bushland.

Features that are important at landscape scales include the number of patches within the landscape, how close patches are to each other, number of parks in a suburb, etc.

Landscape-level features influence bat species' distribution, such as where in Greater Melbourne a particular species occurs.

## Looking for more information about bats?

Please see our fact sheets on a range of issues, available for download from: [www.ausbats.org.au](http://www.ausbats.org.au)

## Bats at a patch scale

Researchers from the University of Melbourne studied the presence of bats in both residential backyards and small urban bushlands around Melbourne. In each patch, they recorded the number of bat species and measured habitat features such as tree size, tree and shrub density, and types of trees present.

### 1. Bigger trees = more bat species

**Urban bushlands** (green line on graph): there were always at least 5 species of bats present regardless of the size of the trees in the bushland.

**Residential backyards** (red line): yards with bigger trees had more species of bats.

*WHY? Bigger trees tend to be older, and so are more likely to have hollows where bats can roost. Bigger trees also typically support a more diverse and abundant insect population – which bats enjoy! A few big trees in a garden is much better for bats than many small trees.*

### 2. More tree cover = more bat species

**Urban bushlands** (green line): the more tree cover, the more bat species were present.

**Residential backyards** (red line): the more tree cover, the more bat species were present. Also, backyards in areas with high tree cover had more than double the number of bat species than backyards in areas with little tree cover.

*WHY? Tree cover is important for bats. In areas with lots of tree cover, bats are more protected from predators and from extreme daytime temperatures, as well as support more insects. This shows it's important to maintain or increase tree cover in residential areas.*

### 3. More urban development = less bat species

**Urban bushlands** (green line): in high-density neighbourhoods, bats were more likely to be found in urban parks than in amongst the houses.

**Residential backyards** (red line): the higher the density of housing, the fewer bat species were found. Backyards in highly urbanised suburbs are typically very small with few trees.

*WHY? Most bat species can't tolerate the disturbance (noise, artificial light, lack of natural habitat) that occurs in highly urbanised neighbourhoods. In these areas, bats tend to retreat into bushland and parks where there are more trees. However, at every site sampled there were at least two bat species that were able to live in the most busy human environments.*

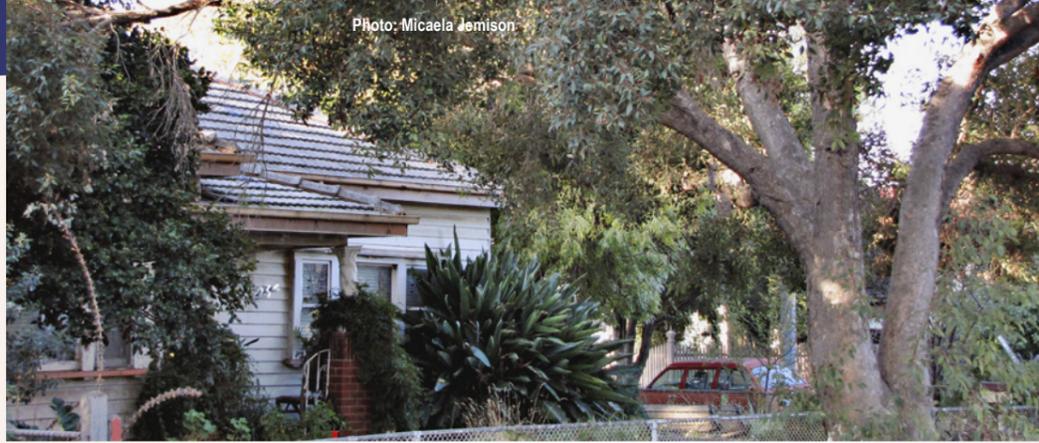
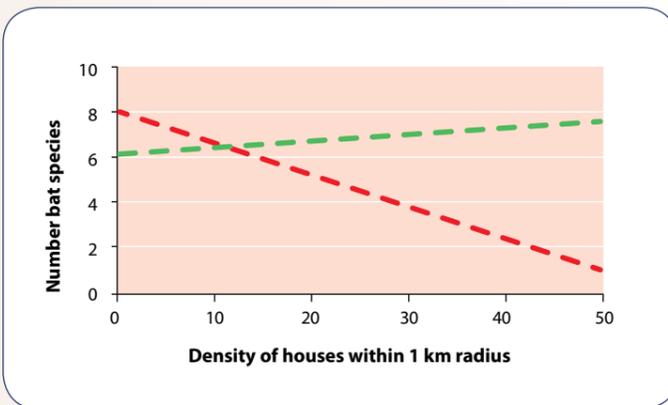
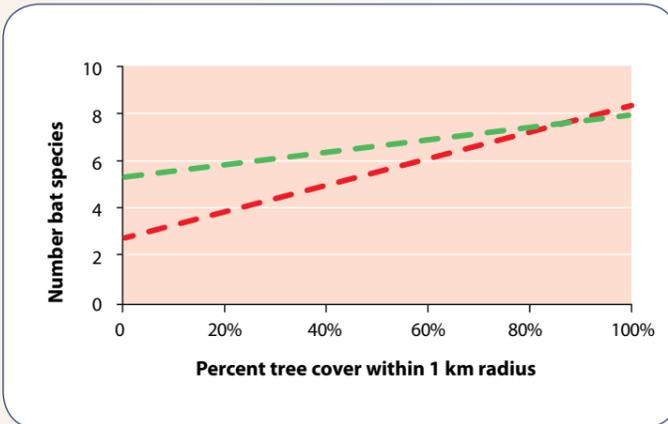
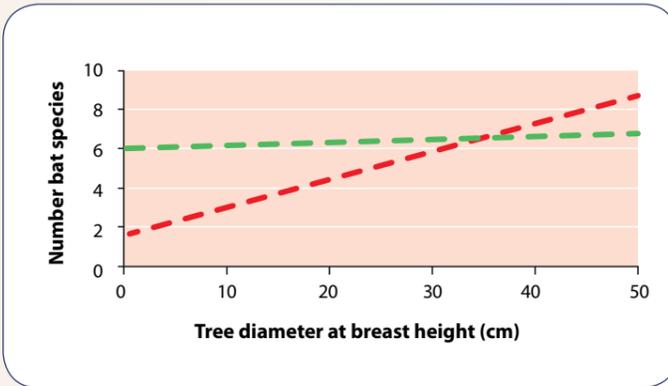


Photo: Micaela Jemison



## Bats at the landscape scale

Researchers from the University of Melbourne then studied the distribution of bat species across very large spatial scales. They surveyed numerous large landscapes across Greater Melbourne. In each landscape they looked for bats in all types of habitats, and measured tree size, tree cover and urban density.

### 1. Bats are all over!

In most places across the urban landscape, there were lots of bat species! There were between 2 to 15 species of microbat within each landscape.

The number of bat species in a particular landscape was generally affected by the amount of tree cover and the intensity of urban development.

There were fewer bat species in the inner suburbs (where urban density is highest).

All of the landscapes in the outer suburbs had at least 9 species of bats, except for one in the NW that only had 5 species.



### 2. Some bats are more sensitive to urbanisation.

Some bat species are 'urban tolerant' and some are 'urban sensitive.'

**Tolerant species** (blue columns) had similar levels of activity in landscapes with both high and low housing density – in other words, building density did not seem to affect the behaviour of these species. Examples of these species are Gould's Wattlebat (*Chalinolobus gouldii*) and White-striped Freetail Bat (*Tadarida australis*), that are found in the most urban of settings.

**Urban-sensitive species** (orange columns) were rare in areas of high human density, but common in less developed areas.

*WHY? Because of their particular abilities, body size and wing shape, some bats are better at tolerating increased urbanisation or reduced tree cover than others. These bats tend to be able to fly further and higher than those species that are more sensitive to urbanisation.*

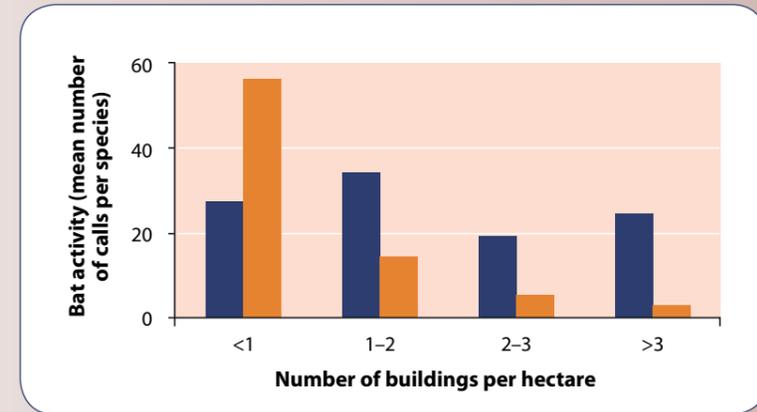


Photo: Micaela Jemison

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White-striped Freetail Bat (*Tadarida australis*). Photo: Lindy Lumsden

