



THE UNIVERSITY OF
MELBOURNE

School of Ecosystem and Forest
Sciences



Removal of urban trees: Implications for human connection with nature, wellbeing and biodiversity

Background

Many Australian cities have ambitious targets to increase tree numbers and canopy cover but they also remove many urban trees every year. This is because many large, old trees pose a hazard to human safety and hinder construction activities, and hence are often removed. However, the benefits that trees provide are more significant as trees age and increase in size. This means that places where trees are removed often experience rapid loss, absence, and slow recovery in tree canopy cover.

While the negative effects of tree removal on environmental benefits, such as shade, are known, there is no clear understanding of the combined ecological and social effects of tree removal. Social benefits are derived from the type, frequency and duration of contact with treed spaces, which can influence health and wellbeing by stimulating physical activity and positive psychological states. The removal of trees from parks and streets may have important effects on the social and ecological benefits trees

provide, but we do not know the extent to which the absence of specific trees influences changes in, for example, bird density, predatory behaviour, walkability, perception of derived benefits, and positive psychological states.

Research questions

How does absence or presence of specific trees influence bird and tree-hollow dependent animal density and behaviour, and levels of leaf herbivory and insect predation?

How does absence or presence of specific trees influence the attitudes people have towards trees, the importance they attach to them, and the levels of subjective well-being and nature relatedness?

Approach

Previous research on the social benefits of urban trees has been based on the relationship between tree abundance, such as abundance of canopy, and health and psychological indicators, such as self-reported physical activity, at the scale of the whole city and at one

point in time. Many of these studies assume that contact with trees occurs, that this contact is the same for everybody, and are often based on correlative associations that are too coarse to know exactly how the presence or absence of specific trees relate to changes in social behaviour or psychological states. These research gaps are difficult to fill by studying the effects of tree plantings given that trees take years to establish and decades to provide significant benefits.

This research will:

- Test new techniques to measure biodiversity and social benefits in treed spaces;
- Determine how these benefits are impacted by tree removal; and
- Give municipalities tools for quantifying the benefits lost due to tree removal.

We are partnering with the cities of Melbourne, Ballarat, and Moreland (Victoria, Australia) to identify sites where trees are being removed. We are using a before-after-control-impact experimental design, which means

collecting data before and after trees are removed, and in comparable control sites where there is no tree removal, accounting for spatial and temporal effects, such as the different scales (i.e., landscape- or tree-level), types of sites (i.e., parks, streets), and time of year (i.e., summer, winter). Biological and social data is being collected at each site.

Biodiversity field surveys

- Bird species richness & behaviour
- Possum density and behaviour
- Levels of leaf herbivory and insect predation.

Social and psychological metrics (on-site questionnaires)

- Importance of trees, wildlife, and the green space (sites)
- Subjective wellbeing
- Nature relatedness.

Research impact

This project will help generate knowledge that will be useful for people working in city councils who deal with the management of urban trees, non-government community organizations interested in disseminating knowledge about the social and biodiversity benefits of trees and academic researchers. The knowledge can be used immediately to develop stronger methods to calculate the current and future value of urban trees - information that can later be used to advocate for tree protection or compensate for the costs associated with the loss of benefits due to tree removal. In the long term, this information will be used to update strategic policy documents, management toolkits, and technical instruments that serve as references to account, increase awareness, or advocate for the biodiversity and social benefits of urban trees.

This project will also have an impact on several disciplines (e.g., urban ecology, environmental geography and psychology) that study the effects of urban nature on people and wildlife. It will also enable stronger coordinated actions by city councils and other stakeholders to create knowledge exchange networks and become global knowledge brokers on the effects of urban trees on people and wildlife. This will help improve the cities we live in by enhancing the social and biodiversity benefits that trees provide.

Research team

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Removal of large trees has been undertaken at University Square, Melbourne, as part of site restoration and redesign. This project is investigating the biodiversity, social and human psychological impacts of tree removal.



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