

Banyule Urban Forest Strategy 2022

Community Engagement Information Pack



Prepared for Banyule City Council by Mosaic Insights
April 2022



Acknowledgements

Banyule City Council is proud to acknowledge the Wurundjeri Woiwurrung people as traditional custodians of the land and we pay respect to all Aboriginal and Torres Strait Elders, past, present and emerging, who have resided in the area and have been an integral part of the region's history.

Our community is made up of diverse cultures, beliefs, abilities, bodies, sexualities, ages and genders. Council is committed to access, equity, participation and rights for everyone; principles which empower, foster harmony and increase the wellbeing of an inclusive community.

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1 About this information pack

This information pack has been created to inform the community about some of the things we know about Banyule's urban forest and to assist people participate in the development of the new *Banyule Urban Forest Strategy*, which will be released in 2022.

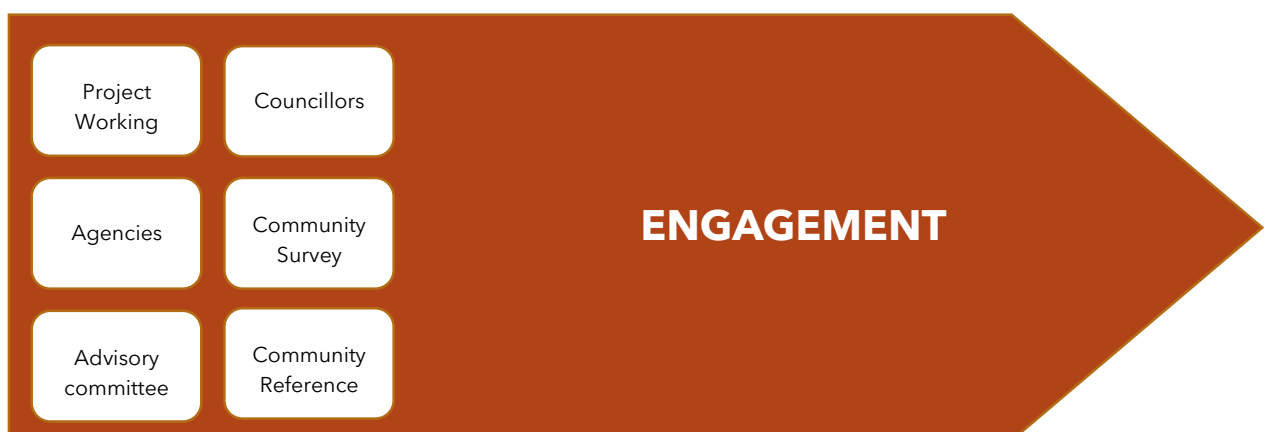
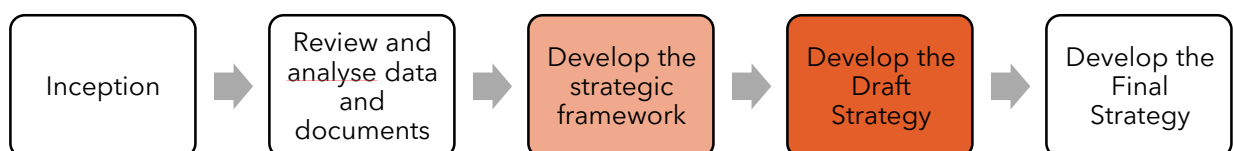
Banyule's current community has inherited an urban forest that has been shaped by many influences both natural and human. It has been shaped by generations of land use, urban development, design and public policy. This strategy intends to continue to shape the urban forest but in a way that enhances and protects it for future generations.

Banyule's community has clearly set the future direction by drafting a long-term vision that sets out the 50+ year plan for Banyule. With this new Urban Forest Strategy Council is focussing its efforts on the actions needed to be taken today and over the next ten years so that by 2032 Banyule is on its way to achieving the vision. The actions taken today will influence the state of the urban forest, and long-lived trees in particular, at the end of the century.

There are five key stages in the development of the strategy. We are currently at the end of stage 3 moving into stage 4.

This document provides context around:

- The adopted vision and principles for the urban forest in Banyule
- What makes a healthy urban forest
- What the available data tell us about the current state of Banyule's urban forest
- Where urban forest activities should be prioritised across Banyule





2 Glossary of terms used in this information pack

Term	What it means
Urban forest	Banyule's urban forest is the trees and green assets that exist in an urban area, that are strategically planned, designed, and managed as well as the ecosystems, soils and water that support them.
Vulnerability	The areas of Banyule where the urban forest is at risk or is not thriving or demonstrating resilience, for example in areas with low canopy, aging street trees or increased urban development
Useful life expectancy (ULE)	The estimated (safe) life expectancy of a tree
Resilience	The ability of the urban forest to adapt, survive and thrive in a changing climate
Water sensitive urban design	The approach to planning and designing urban areas and buildings to make use of the valuable resource of stormwater, make places cooler and reduce the harm it causes to waterways rivers and creeks.

3 Banyule's urban forest

The strategic framework for the Banyule Urban Forest Strategy provides a clear definition of the urban forest, a vision for its future, and principles to guide progress towards the vision.

These elements are crucial to achieving a common understanding of what is needed and wanted, how the urban forest should be delivered, and what it means for current and future communities and Council staff. The Urban Forest Definition, Vision and Principles were developed collectively by community, staff and Councillors.

What is the urban forest in Banyule?

Banyule's urban forest is the trees and greening assets that exist in an urban area, that are strategically planned, designed, and managed as well as the ecosystems, soils and water that support them.

The Urban Forest Definition, Vision and Principles were developed collectively by community, Council staff and Councillors.

A Vision for Banyule's urban forest

This is the community vision for Banyule's future urban forest. It helps Banyule map out the steps to get there over the next 10 years.

Banyule's urban forest is **resilient**. It is **thriving** and people are aware and value the role of the urban forest for health and wellbeing and in making Banyule a great place to live.

The urban forest is managed as an **essential asset** for Banyule and decisions about the urban forest are **fit for place and purpose** and space is provided to support greening and larger tree canopy.

People work with Council and are active in the protection, management and maintenance of the urban forest.

The four key themes are at the heart of the vision, and are used throughout this information pack.

Principles for the urban forest in Banyule

There are five Principles that provide the focus for Banyule's Urban Forest Strategy:

1. We believe the urban forest is an essential asset for Banyule, shared by all and crucial for the health and wellbeing of the community and natural environment.
2. We believe a healthy urban forest is the result of strong partnerships between Council and community.
3. We act today to respond to the changing climate and to leave a positive legacy for the future community, and we act responsibly, using evidence-based practice in our leadership and management of the urban forest.
4. We plan, design and deliver for the people, places and natural environments of Banyule including:
 - Climate change and reduction of the urban heat island effect
 - Liveability, amenity and neighbourhood character
 - Banyule's ecosystems and biodiversity
5. We protect and enhance the Banyule's natural environment to care for flora and fauna.

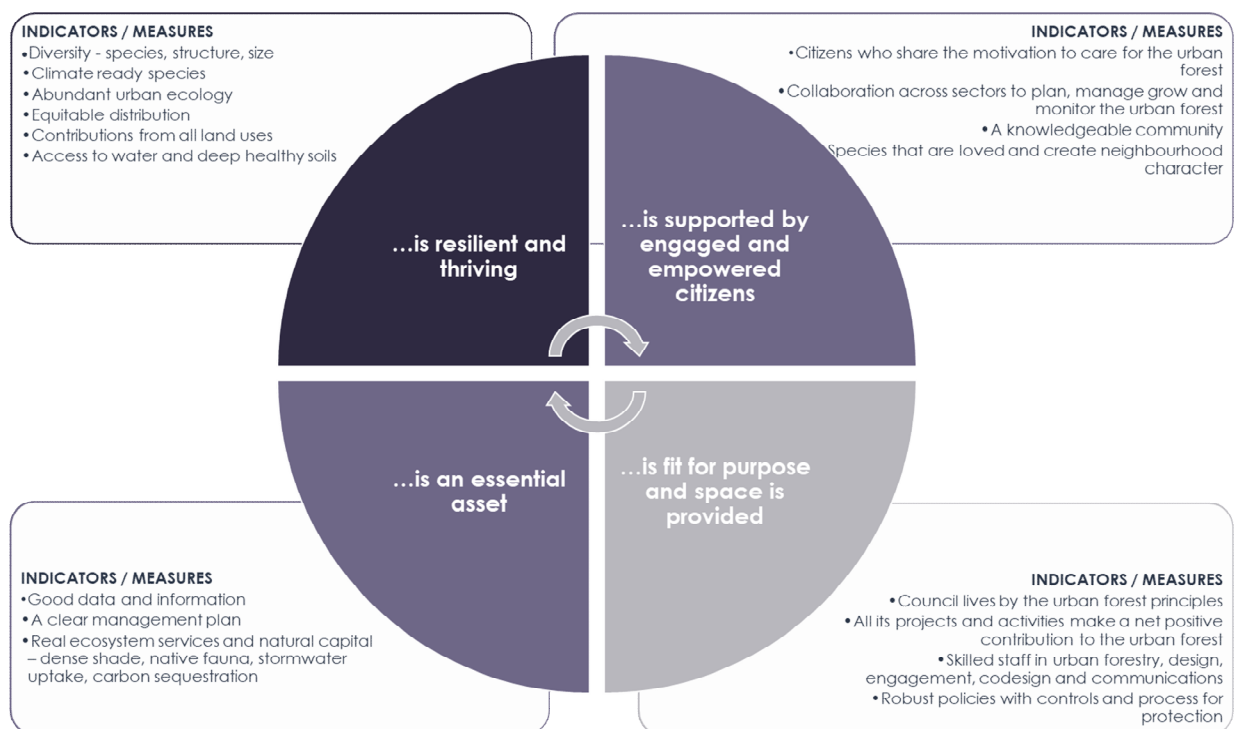


4 What the Banyule urban forest vision means

The four key themes in the new vision for the Banyule urban forest have guided the analysis of available data and now drive the strategies and actions to be taken over the next ten years.

How the vision informs the Urban Forest Strategy

The diagram below outlines the four key themes. Each of the themes is represented by indicators / measures that will be used to guide management actions and measure progress towards the vision for Banyule's urban forest.



How does the current urban forest measure up to the vision?

The table on this page shows how the urban forest in Banyule currently measures up to the key themes and indicators of its vision. Council staff have reflected on the current state and progress to inform this assessment. While there are some areas where Banyule is doing well, there is a need for consistent and concerted action across all areas to reach the Vision.

The future urban forest in Banyule...	...if the urban forest in Banyule has...	How is Banyule doing now?
...is resilient and thriving	<ul style="list-style-type: none"> Diversity - species, structure, size Climate ready species Abundant urban ecology Equitable distribution with contributions from all Access to water and deep healthy soils 	<ul style="list-style-type: none"> Some diversity but not enough Not all species are resilient to climate Not all areas have equal access to the urban forest Not all land areas or land use types contribute to the urban forest Ecology, water and soils are not well integrated into planning design and management of the urban forest
...is supported by engaged and empowered citizens	<ul style="list-style-type: none"> Citizens who share the motivation to care for the urban forest Collaboration across sectors to plan, manage grow and monitor the urban forest A knowledgeable community Species that are loved and create neighbourhood character 	<ul style="list-style-type: none"> The community are VERY supportive of the urban forest The vision and principles were adopted by Council 28 Feb There are many partnerships but none specifically focussing on the urban forest There is little shared knowledge about the urban forest There is no current program of empowerment for urban forest management There is an active community committee for environment and climate change There is little data about community knowledge of or value for the urban forest The urban forest provides strong neighbourhood character only in some places
...is fit for purpose and space is provided	<ul style="list-style-type: none"> Council lives by the urban forest principles All its projects and activities make a net positive contribution to the urban forest Skilled staff in urban forestry, design, engagement, codesign and communications Robust policies with controls and process for protection 	<ul style="list-style-type: none"> The principles were adopted by Council on 28 February 2022 There is currently limited integration of urban forest needs in many parts of Council There are staff in some teams that are skilled in UF knowledge Policies need updating to reflect the vision and principles As of 2018, Banyule had experienced a NET LOSS of canopy. Most losses were across the private domain.
...is an essential asset	<ul style="list-style-type: none"> Robust data and information A clear management plan and budget Real ecosystem services and natural capital – dense shade, native fauna, stormwater uptake, carbon sequestration 	<ul style="list-style-type: none"> There is some data about public trees, but it is not consistent There is no overall framework for data and information about the urban forest The Urban Forest Strategy is under development now There are some operational management plans in place, with capital and recurrent funding There is good species selection and inclusion of WSUD and greening outcomes in some projects in place for some projects but not all

5 What do the data tell us about the Banyule urban forest?

There are many ways to describe and measure trees, ranging from measurements of the circumference of a single tree trunk to analysis of the proportion of a whole city shaded by trees using satellite imagery.

In 2019 RMIT University released a report on their analysis of changes in urban forest canopy between 2014 and 2018¹, which combined Australian Bureau of Statistics (ABS) data with CSIRO urban monitor data² to assess change in canopy cover and the relationship between any observed change and land-use categories. The RMIT analysis shows that Banyule had a net loss of canopy between 2014 and 2018. Most of the loss occurred across private land (Figure 1), and 97% of the private canopy loss was on residential land.

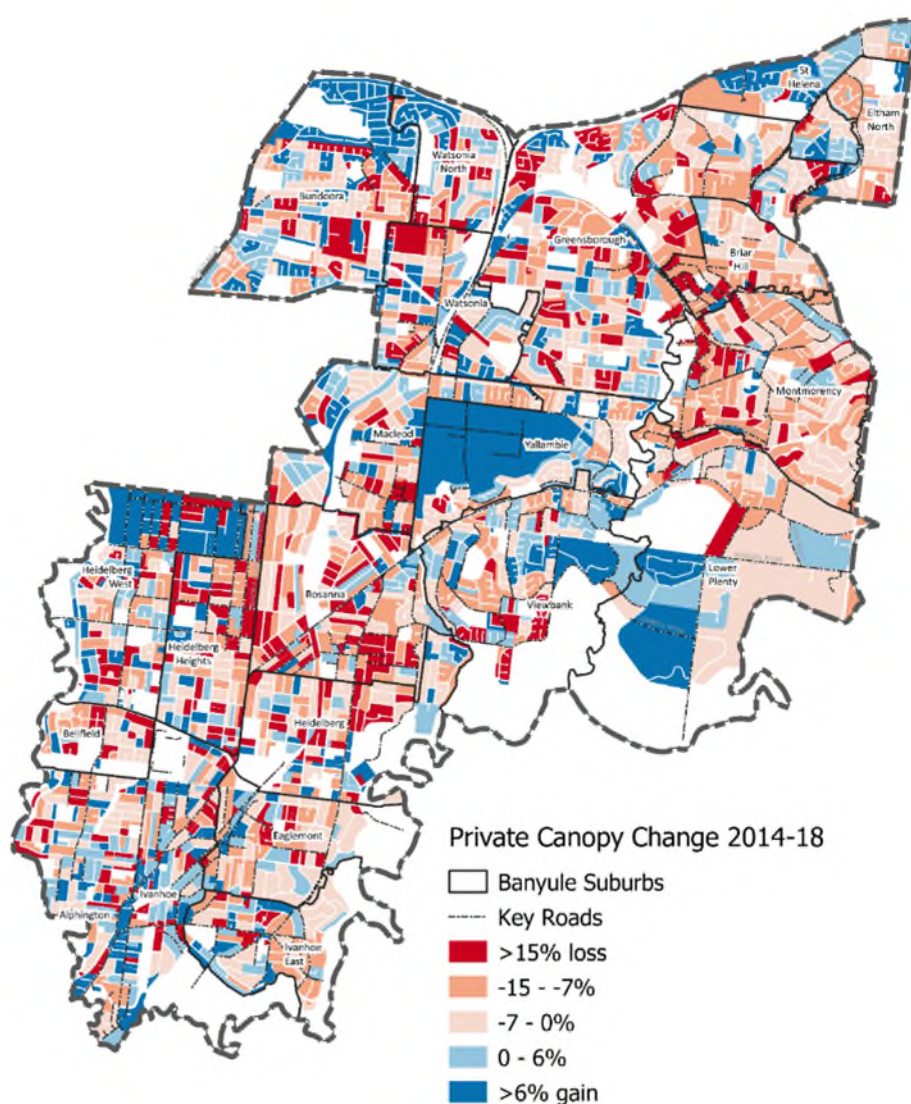


Figure 1. The change in canopy cover between 2014-2018 on private land in Banyule

¹ <https://nespurban.edu.au/wp-content/uploads/2019/07/urban-vegetation-cover-change.pdf>

² <https://www.csiro.au/en/research/technology-space/data/urban-monitor>

There was a net gain in public canopy over this time (Figure 1) but not enough balance the canopy losses on private property.

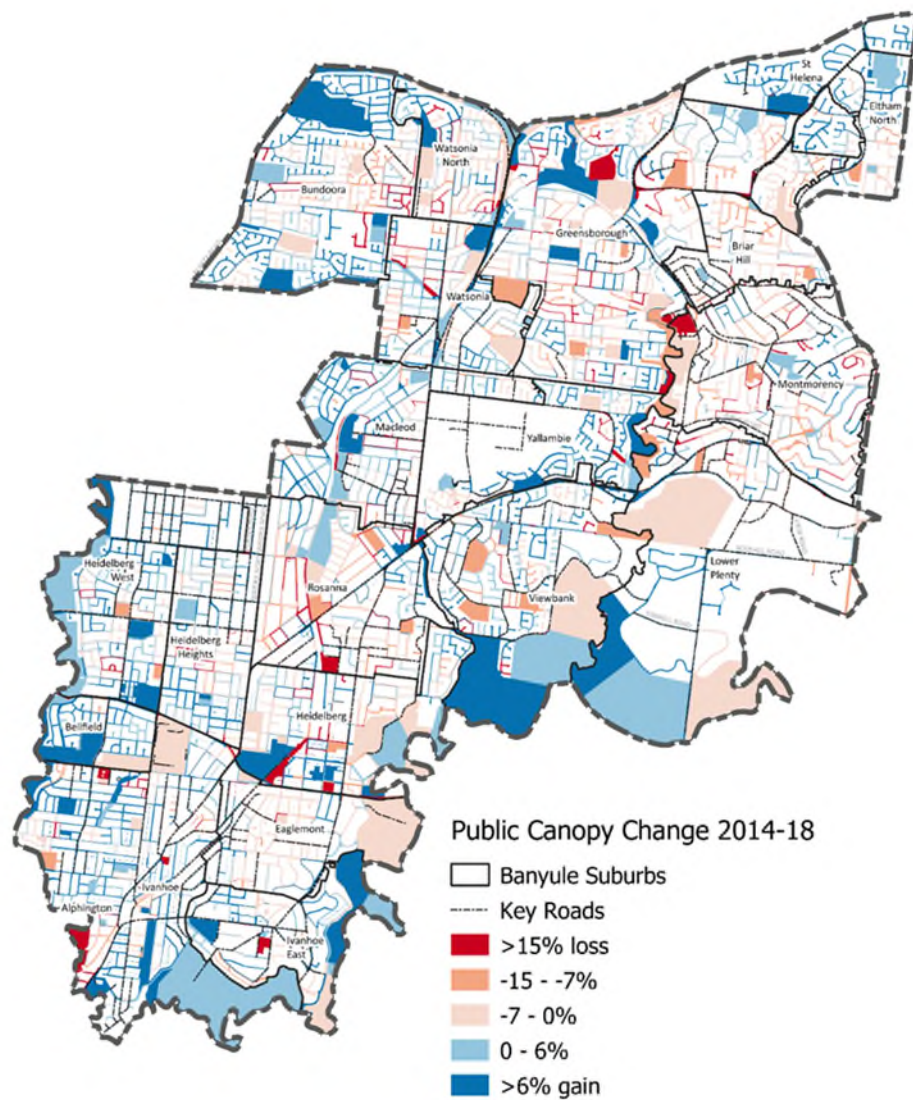


Figure 2. The change in canopy cover between 2014-2018 on public land in Banyule³

³ The data used in the RMIT research were a combination of modified ABS data and DELWP/CSIRO tree canopy data, and the analysis was undertaken at the Greater Melbourne spatial scale.



Banyule's places - a framework for analysing the urban forest

The diverse character of the urban forest and Banyule's neighbourhoods mean it is important to take a place-based approach to urban forest management. To support this approach we have considered the LGA as a whole, as well as its specific places, as shown below (Figure 3).

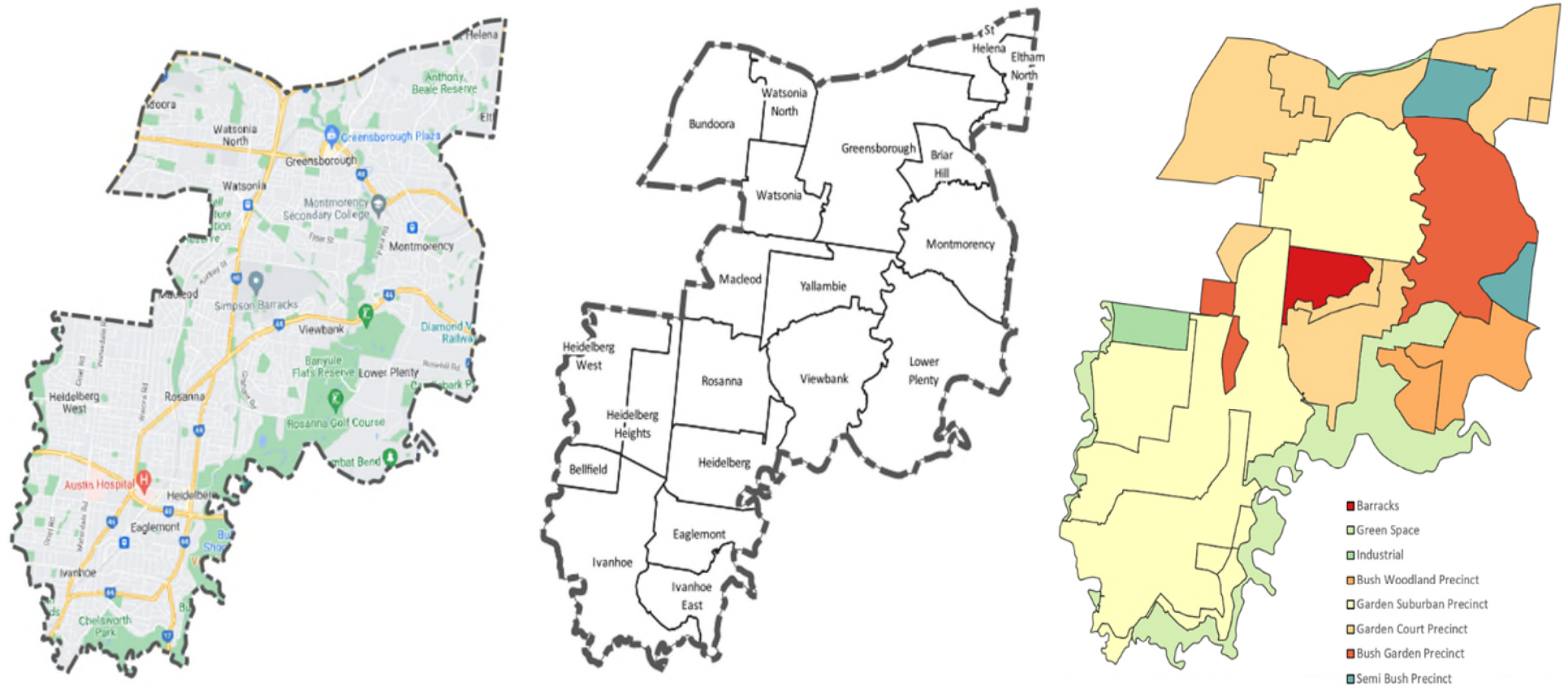
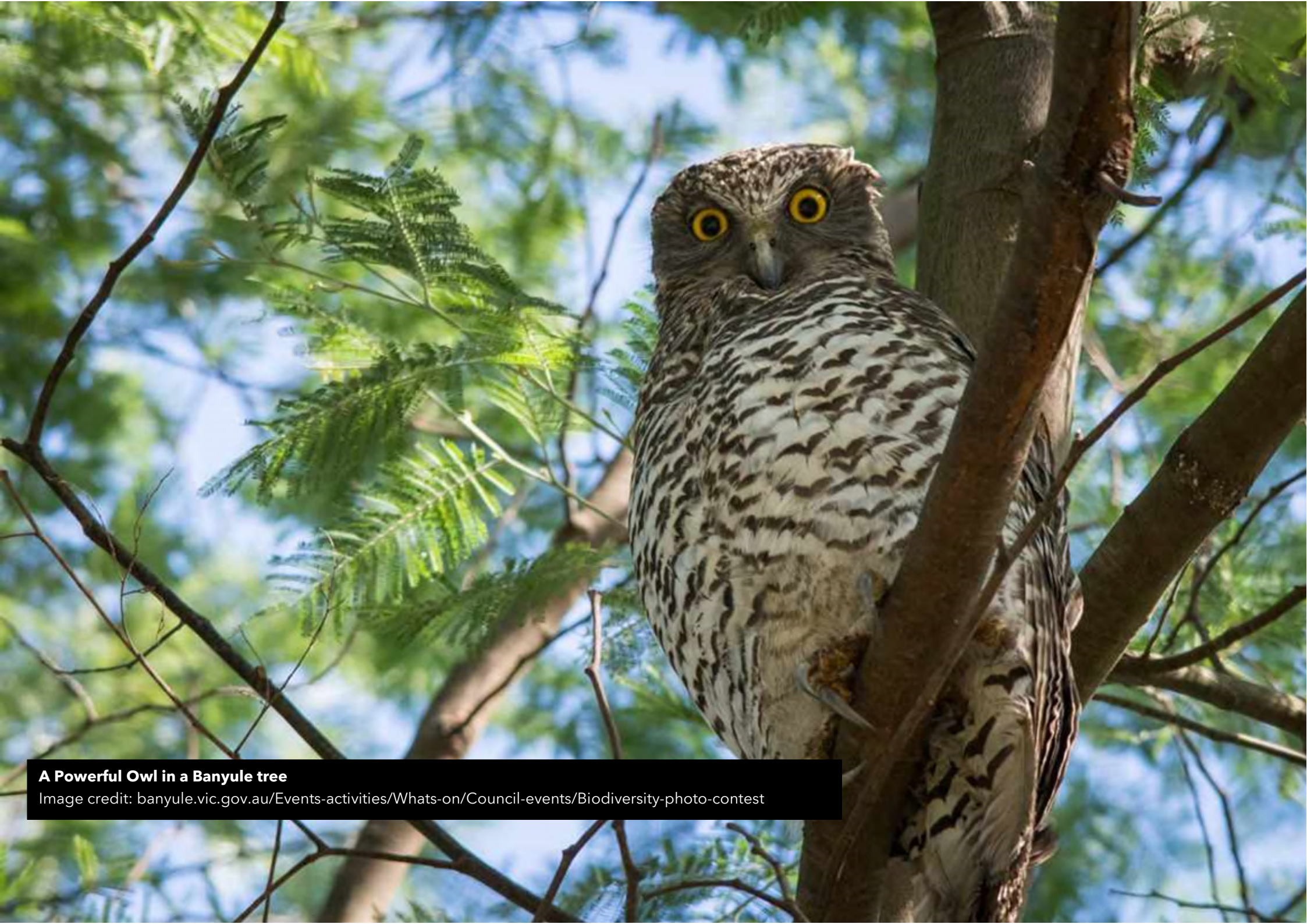


Figure 3. Banyule LGA and its places. From left: Banyule LGA, Banyule's suburbs and Banyule's Neighbourhood Character areas (<https://www.banyule.vic.gov.au/Planning-building/More-in-planning-building/Planning-controls-policies/Neighbourhood-character>)



A Powerful Owl in a Banyule tree

Image credit: banyule.vic.gov.au/Events-activities/Whats-on/Council-events/Biodiversity-photo-contest

Is the urban forest in Banyule resilient to shocks and stresses?

A resilient urban forest can withstand the pressure of climate change, pests, and disease. It is able to accommodate the natural, finite, lifecycle of every tree. To do this, a resilient urban forest has:

1. A diversity of trees (in terms of species, structure, size and age)
2. Climate-ready species – in other words, species of tree that are likely to survive, and ideally thrive, in the future climate that Banyule will experience in their lifetime.
3. Contributions from all land uses
4. Access to water and deep healthy soils



Diversity in Banyule's urban forest

The diversity of trees in an urban forest is important in protecting the forest from impacts that affect a particular group of trees. A common target for tree diversity within public urban forests is the **10:20:30** target where:

- no more than 10% of the overall population is one species
- no more than 20% is one genus
- no more than 30% is one family.

Analysis of the diversity of Banyule's urban forest indicates that:

- Overall Banyule's species-level diversity is healthy, with no single species contributing more than 6.8% of the public tree inventory.
- Banyule's top 30 trees make up just over 50% of Banyule's recorded public tree inventory.
- The Garden Suburban Precinct, and the Garden Court Precinct have the healthiest diversity of the Banyule Neighbourhood Character areas where no one species contributes higher than 7.1% of the overall population.
- However, over 25% of each of the Semi-Bush and Bush Woodland precincts is made up of just one Eucalyptus species – *Eucalyptus melliodora* for the Semi-bush Precinct (26%) and *Eucalyptus camaldulensis* for the Bush Woodland Precinct (28%)
- Approximately a third of planted public trees are locally native to Banyule/ Melbourne Ecological Vegetation Classes.
- The most common street trees within Banyule are locally native Eucalyptus species, including *E. melliodora* (6.8%), *E. camaldulensis* (6.2%) and *E. leucoxylon* (2.9%).
- The three most common non locally native species in Banyule are Australian native species.
- The next most common is the Jacaranda (2%).
- Street trees are 19% indigenous, 45% native and 37% exotic.

More than two thirds of the street trees in Banyule are not locally native, though a certain percentage of these will be Victorian or Australian native species.

A breakdown of the tree species present Banyule (based on analysis of Council's tree inventory) is provided in Figure 4 below.

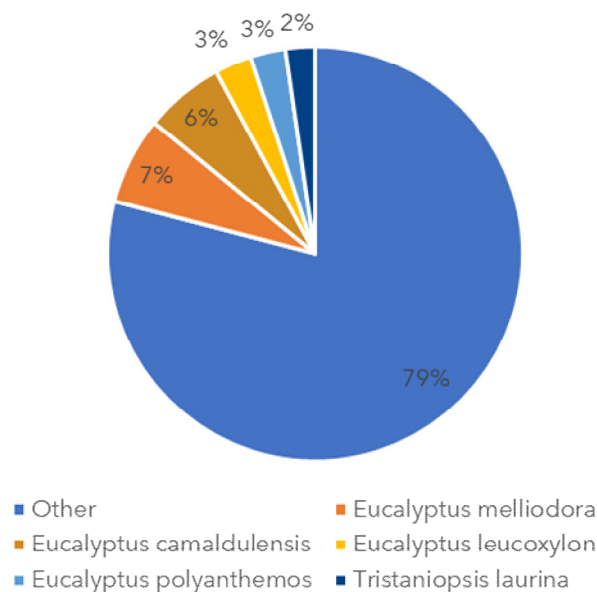


Figure 4. Breakdown of tree species in Banyule

If Banyule aspires to meet the 10:20:30 target for diversity for its neighbourhood character areas, the Bush Woodland, Semi-Bush Precincts need to diversify plantings beyond the dominant tree species. This might be through use of other locally native species, other Australian native species, or species from elsewhere though all need to be resilient to climate change and urban heat.

Banyule might strengthen the resilience and diversity of its plantings by defining the features that it wants to see within the urban forest, and selecting a diversity of plants for these features. For example, if the Jacaranda is popular for aesthetics and sprawling canopy, Banyule might diversify its plantings by finding species that are similar to the Jacaranda in these ways. Or if an area is identified as flood-prone, Banyule might select a range of species for their capacity to withstand inundation. Features of plants that might inform diversity choice could include height, canopy form, flowering, deciduousness, heat tolerance, flooding tolerance, root structure and many others. This sort of data would build the next level of sophistication into Banyule's plant selection for diversity, based on the specific and targeted needs of Banyule's urban environment.

Biodiversity isn't just public trees and their species. A healthy diversity should be seen not only in the breadth of species selected, but in the complexity of urban forest structure – including trees, shrubs, ground-cover – as well as function – availability of a diverse set of urban forest features which support urban ecosystems. Biodiverse, complex and connected plant communities can support biodiverse faunal communities and may be far better at supporting humans in Banyule, too.

Is Banyule's urban forest ready for the future climate?

Climate change is increasing the frequency, severity and duration of heatwaves, droughts and storm events. These changes are likely to have a significant effect on the trees in Banyule's urban forest. Some species that have thrived in Banyule in the past may not be able to continue to do so in the decades ahead, and others may perform better.

Research undertaken by the School of Ecosystem and Forest Science at the University of Melbourne in 2016⁴ found that 48% of the species present in the City of Melbourne, and more than a third of currently planted trees, were moderately or extremely vulnerable to increasing temperatures under a moderate climate change scenario.

Storm events have significantly damaged trees in Banyule. Trees that are planted for stability are in the best position to withstand the force of high winds and storms. The features of trees, like size, root structure and branching structure all affect how a tree will respond to drag from wind.

Providing adequate space for trees in the urban environment, in a way that anticipates needs of root and branch growth of an adult tree can aid in building tree stability.

Maintenance for stability can be species-specific, and a one size fits all approach is not enough. Additionally, urban design for storm resilience can build tree planting into storm resilience strategy. For example, planting stands of large trees in areas with lots of space for trees to grow above and below-ground, like parks, can create windbreaks for surrounding areas.



⁴ Kendal and Baumann, 2016, *The City of Melbourne's future urban forest: identifying vulnerability to future temperatures, Report to the City of Melbourne*

Climate change can alter dynamics of tree pests and pathogens and affect the capacity of forest systems to resist and tolerate attacks. Three of the main threats to Banyule's urban forest are lerps, heat stress, and Myrtle Rust.

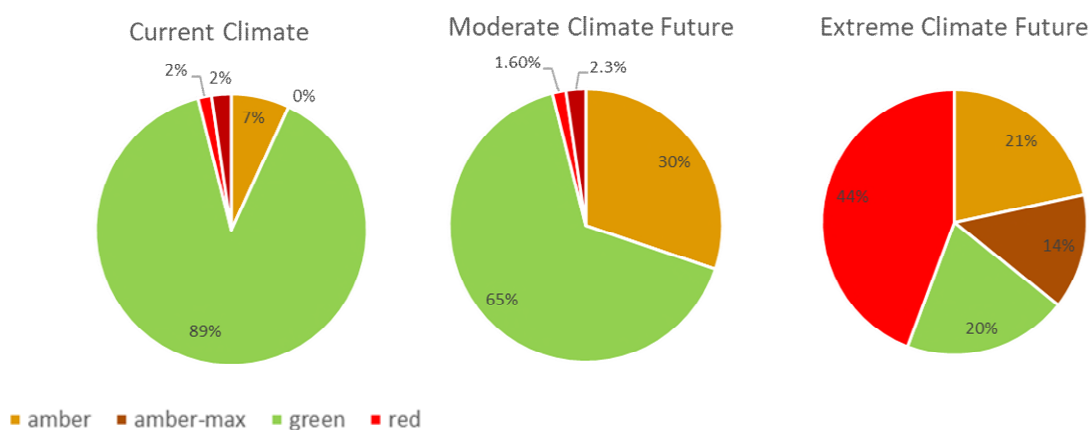
Lerps	Heat stress	Myrtle Rust
<p>The bell miner bird, and its interaction with a tree sap eating insect, a 'lerp' is causing the spread of the deadly tree disease dieback in East Coast Australia.</p> <p>Lerps are protected and 'farmed' by the bell miner as a food source. An abundance of lerps on eucalypt species (like flooded gums, blue gums, ironbark, red gum and grey gums) can kill a tree.</p> <p>This process is known as Bell Miner Associated Dieback (BMAD) and it is an increasingly prevalent landscape management problem across Victoria.</p> <p>For more information, see http://www.bmadproject.info/</p>	<p>Some much-loved tree species, widely planted across our cities, do not handle heat well. They may fair especially poorly as temperatures within cities climb, with climate change.</p> <p>Trees cool down by losing water from their leaves. However, when exposed to heat and drought, a tree might suffer modest to extensive dieback (loss of foliage and other outer parts). This loss can depend greatly on tree species.</p> <p>Well-watered trees can tolerate extreme temperatures, while those that are drought-stressed can struggle to survive.</p> <p>For more info, see https://theconversation.com/without-urgent-action-these-are-the-street-trees-unlikely-to-survive-climate-change-172758</p>	<p>...is a plant fungal disease. Its presence in Victoria is mainly within commercial nurseries in and around metropolitan Melbourne.</p> <p>When it appears on a plant, it looks like bright yellow egg-yolk, and is found on the leaf surface.</p> <p>Myrtle rust threatens trees and shrubs in the Myrtaceae family, which includes Eucalyptus, Angophora and Corymbia species, among many others). It can deform tree leaves, cause leaf loss, reduce fertility, stunt plant growth, and result in plant death.</p> <p>For more info, see https://www.awe.gov.au/biosecurity-trade/invasive-species/diseases-fungi-and-parasites/myrtle-rust</p>

Analysis of Banyule's urban forest indicates that:

- 17% of trees with a life expectancy of > 10 ten years have a moderate to high vulnerability to a 2040 climate change scenario. In other words, nearly a fifth of the larger, mature trees in Banyule may not survive or thrive in coming decades. This is based on testing for the 30 most common park and street tree species. Any vulnerability, moderate or extreme, means that the temperature in a tree's environment can result in tree stress. Stress can leave a tree open to damage, disease and even death, which is costly both to manage, and in terms of the loss of the tree's value to Banyule and the time it took to grow.

The impact of climate change on the vulnerability of trees in Banyule is illustrated in the charts below. The colours in the charts represent different levels of vulnerability to increased temperatures under different climate scenarios.

- Green - species in this group are not considered vulnerable in each climate scenario. The proportion of species in Banyule in this group declines from 89% to 20% in the extreme climate future.
- Amber and amber-max - species in this group are moderately vulnerable in each temperature scenario. The proportion of species in this group increases from 9% in the current climate to 35% to 32% in the moderate climate future.
- Red - species in this group are very vulnerable in each temperature scenario. 44% of the 30 most common species in Banyule would be very vulnerable to climate change, and 35% would be moderately vulnerable.



The analysis shows that under an extreme climate change scenario, common trees that are well suited to the present climate will become very vulnerable e.g. *Eucalyptus melliodora*, *Eucalyptus leucoxylon* and *Eucalyptus nicholii*. The first two of these species are native and common in Banyule.

Conservatively, this would mean that 40% or more of the public tree population would have moderate to high vulnerability to projected climate change. Under a more moderate climate scenario 20% of the most common tree individuals may show increased vulnerability to climate change.

As high proportion of the current public tree population is considered vulnerable to the impacts of climate change, an important next step for street trees is assessing all planted tree resilience to climate change and urban heat, and this is especially important for those species that are more commonly planted.

Ignoring these vulnerabilities will mean potential losses of street trees to disease and heat stress, loss of shade and amenity, increased maintenance and watering costs. Action on species resilience ties directly into Banyule's 2019 declaration of a climate emergency.



Is Banyule's urban forest equitably distributed?

The distribution of the urban forest canopy is not even across Banyule. Using data provided by the Victorian Government, we analysed the spatial distribution of tree canopy across the city, as shown below in Figure 5. The analysis shows that the residential areas with lowest canopy cover are in the north-west of Banyule, in particular Bundoora. The Heidelberg West Business Park has very low canopy cover, typical of industrial estates across Melbourne. The southern area of Lower Plenty encompasses the floodplain of the Yarra River, which is still used for grazing and is the location of a golf courses. Both these land uses have low levels of canopy cover. Typical streetscape images of these are provided below (Figure 6).

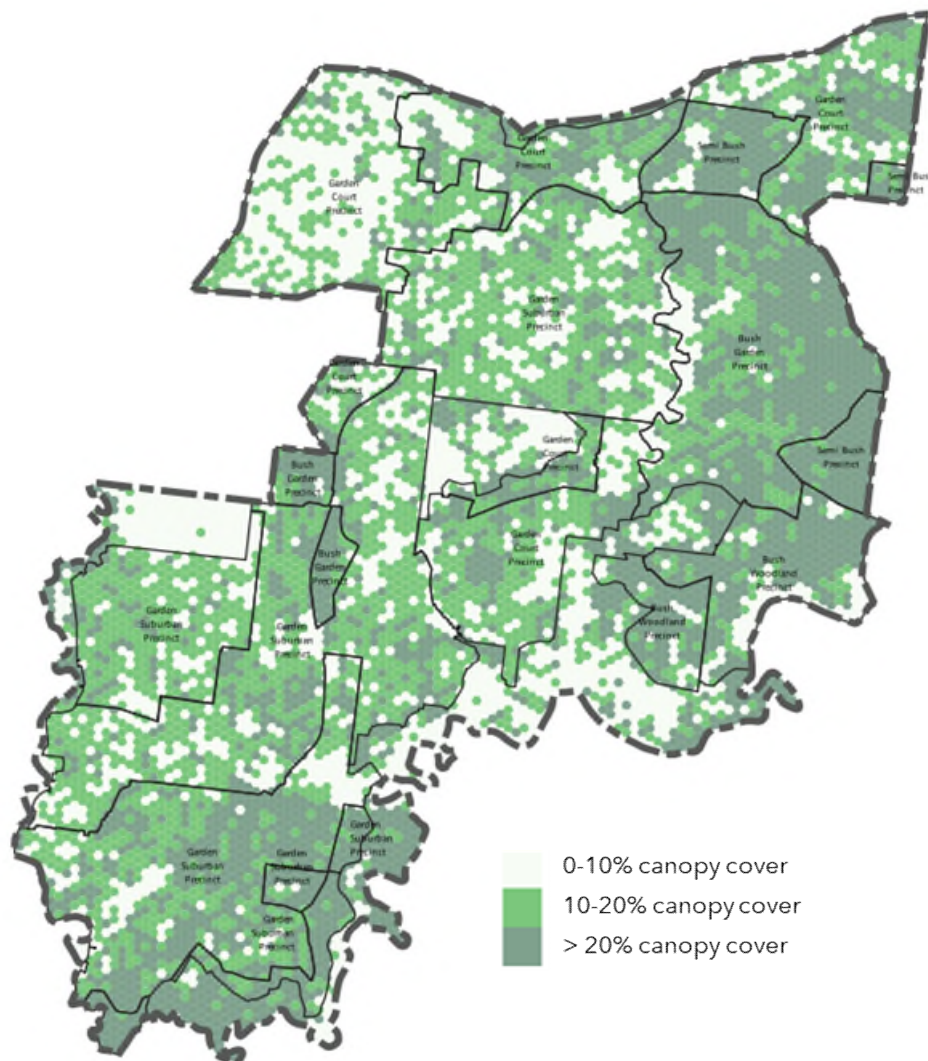


Figure 5. Tree canopy cover across Banyule. Cover is averaged to hexagonal mesh with 100 m long sides. Neighbourhood Character Zone boundaries are represented by thin black lines. Data collected, quality assured and supplied by the Victorian Government as part of the Vicmap data set released in 2021⁵

⁵ Vicmap Vegetation Tree Urban was constructed from high resolution aerial photography which was used as the source information and a machine learning technique was utilised to extract the location of individual trees. A canopy height model derived from LiDAR which covered the tree Urban extent was used to assign height to each of the mapped trees.



Figure 6. Images from areas of Banyule with low canopy cover (all taken from Google Maps). Taunton Drive in Bundoora (top), Orthia Avenue in Heidelberg West (middle) and looking east across agricultural land on the Yarra River floodplain from Bonds Road in Lower Plenty (bottom)

The analysis shows that the canopy cover is uneven distributed across different land-use zones in Banyule (Figure 7). Public Use Zones are defined as providing for public utility and community services and facilities and have the highest average % canopy cover of land use zones in Banyule, Residential cover is on average close to half of the Public Use Zone cover, at 16%, and Industrial and Commercial areas have, on average, less than 10% canopy cover.

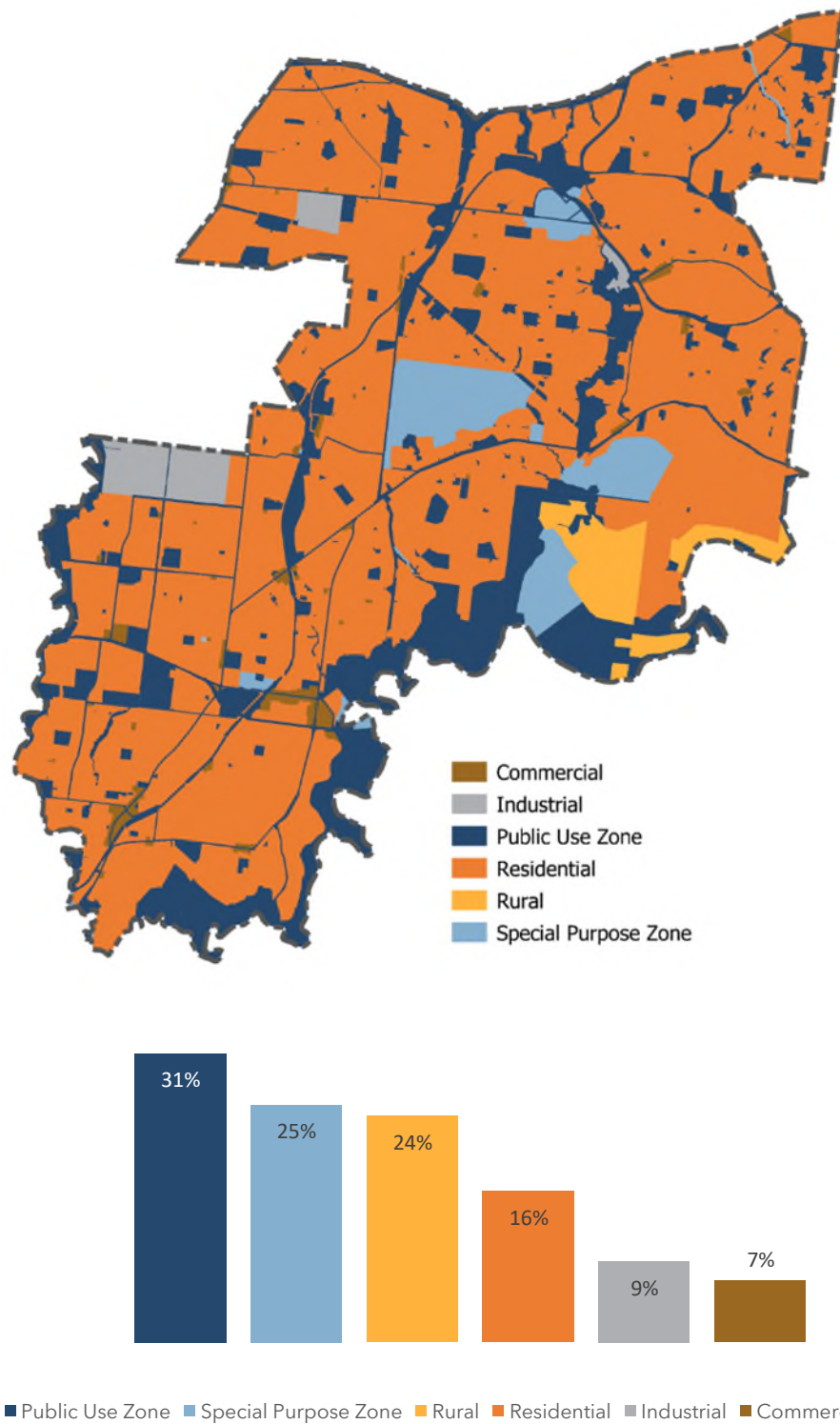


Figure 7. Map of different land use zones in Banyule (top) and percentage canopy cover on each zone (bottom).

The uneven distribution of canopy means the benefits of the urban forest are not felt equally across the population. We analysed the distribution of social advantage and disadvantage across Banyule using SEIFA (the Socio-Economic Indexes for Areas - see text box below for more information).

SEIFA or the Socio-Economic Indexes for Areas -is a product developed by the Australian Bureau of Statistics that ranks areas in Australia according to relative socio-economic advantage and disadvantage. The indexes are based on information from the five-yearly Census. Relative socio-economic advantage and disadvantage has to do with people's access to material and social resources, and their ability to participate in society

The spatial distribution of SEIFA in Banyule (Figure 8) shows that areas of disadvantage are concentrated in the western areas of Banyule, in particular Bundoora, Watsonia, Heidelberg West, Heidelberg Heights and Bellfield. Greensborough has a mixed of advantage and disadvantage, and most of the eastern area of Banyule show relative social advantage with respect to Victoria as a whole.

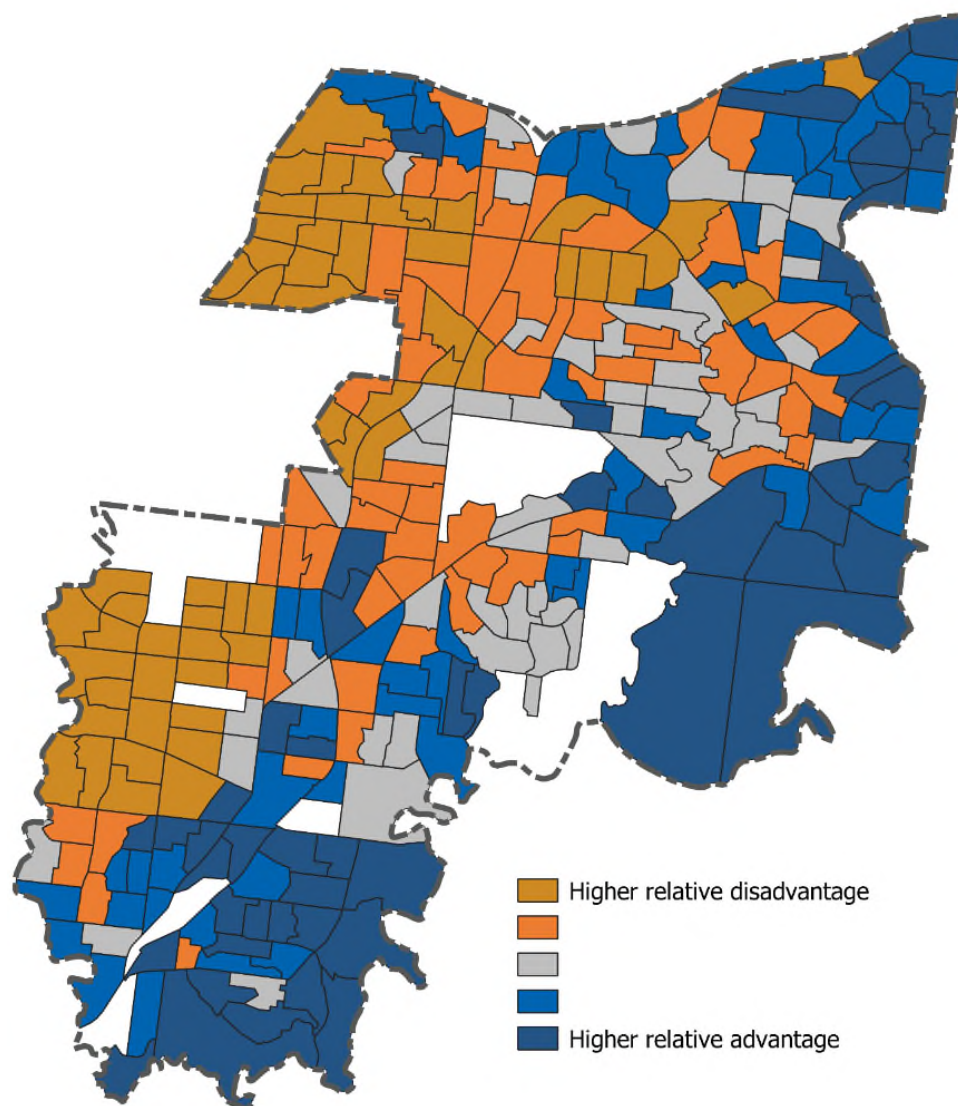


Figure 8. Map of SEIFA in Banyule. The red and orange areas have a higher social disadvantage relative to other parts of Banyule and Victoria. The green and blue parts of this map are areas of relative social advantage

When the results from the canopy cover and SEIFA analyses are combined, we can see the relationship between social disadvantage and tree canopy cover. The results show that the most advantaged communities have the highest level of canopy cover, with a general trend towards lower canopy with less advantage. Interestingly, the most disadvantaged communities (in terms of SEIFA) have a relatively high level of canopy cover (Figure 9). It is likely that some of the most disadvantaged areas have a lower level of Public Use Zoned land, which as described above has a very high level of canopy cover.

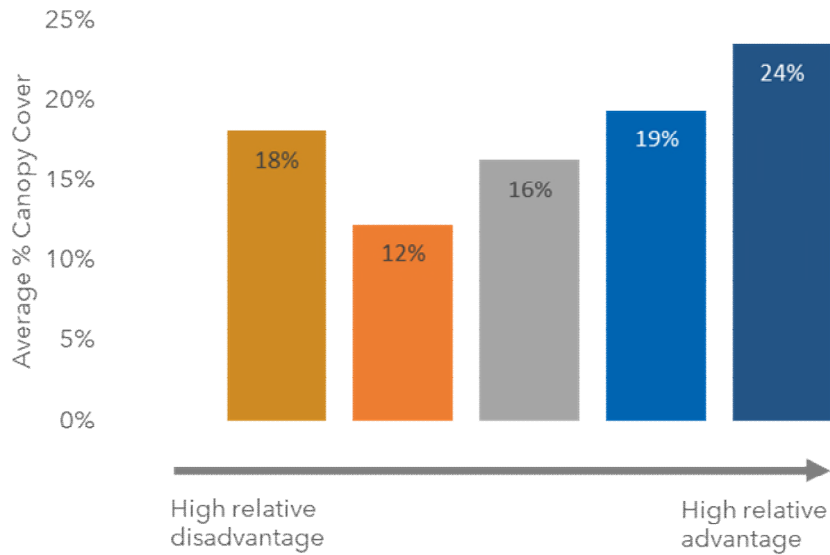


Figure 9. Percentage tree canopy cover by SEIFA group across Banyule.



Is Banyule's urban forest supported by an active and aware community?

The public trees and other vegetation in Banyule belong to the community, and is managed on their behalf by Council. Much of the urban forest is on private residential land, which has seen significant canopy losses in recent years (see following section). A thriving urban forest requires the mutual care of many parties, including Council, homeowners, businesses, developers, institutions (e.g. schools) and state agencies.

A well-supported urban forest has:

- People (community, government and business) who work together to plan, manage and monitor the urban forest
- A knowledgeable and enthusiastic community
- Species that are loved and create neighbourhood character

The community is engaged in the development of the Urban Forest Strategy through a Community Reference Group made up of nine Banyule residents that provides strong and regular engagement with the Council to input into the strategy, endorse directions and seek input from the wider community. There are Friends Groups and citizens science programs running across Banyule. In addition there is regular engagement with the Banyule Environment and Climate Action Advisory Committee (BECAAC), which has 11 members.

To understand the degree of support from the wider community a survey was carried out on Shaping Banyule, and 57 people responded. Key outcomes from the survey are presented below.

- 53% of respondents highly value the urban forest for corridors and connections for fauna
- 42% recognise the importance of locally native species on both public and private land
- 92% strongly agreed that Banyule needs more urban forest
- Half of the respondents believe the urban forest is well managed / maintained (Figure 10)
- Highlighted the themes of nature, locally important habitat and urban ecology (Figure 11).
- Ranked provision of urban forest corridors and habitat for fauna as the top priority (Figure 12)

More engagement in the topic of urban forestry as well as planning and design of the urban forest elements will need to be done to deliver the vision.

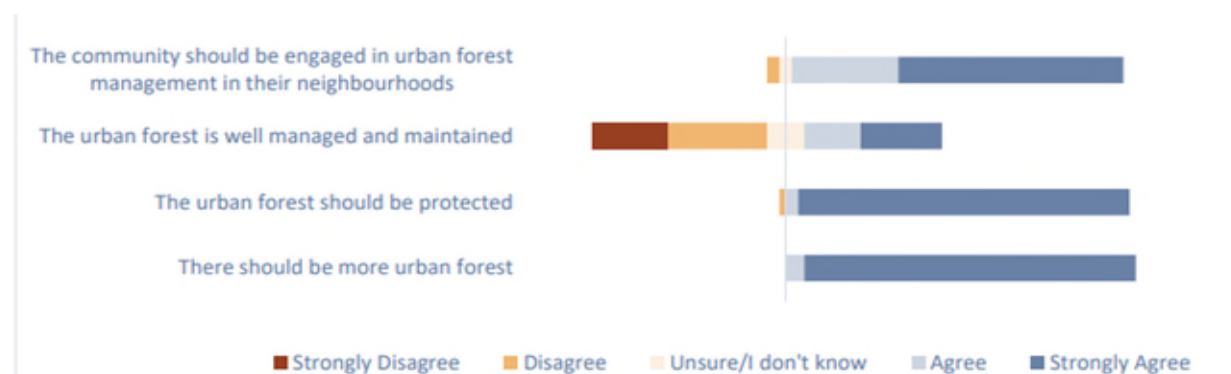


Figure 10. Degree of (dis)agreement with urban forests statements in the Shaping Banyule urban forest survey

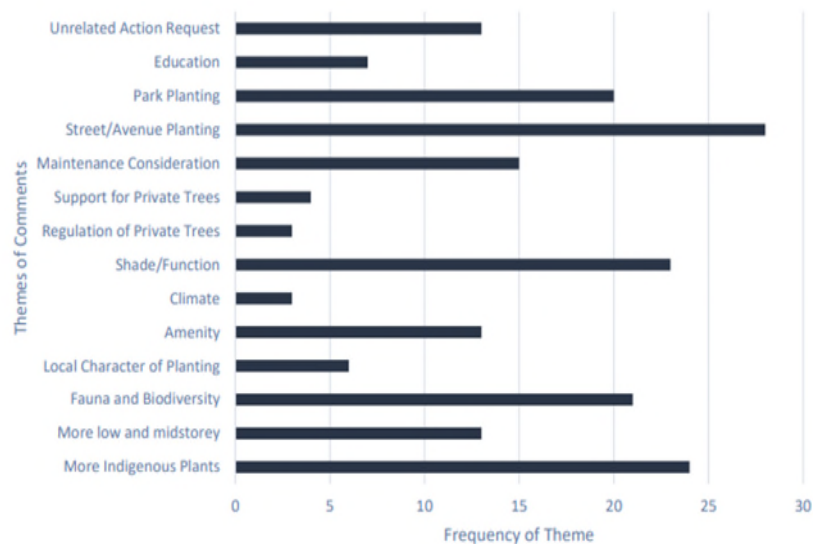


Figure 11. Summary of social map responses from Shaping Banyule urban forest survey

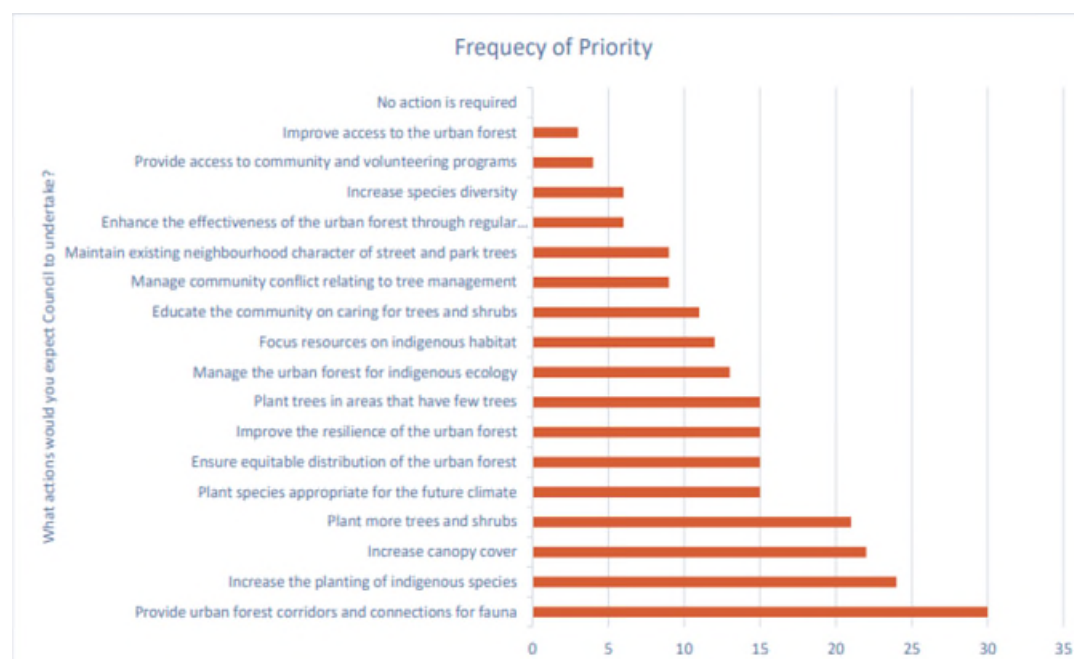


Figure 12. Frequency of priority of response in the Shaping Banyule urban forest survey

The engagement resulted in:

- Support for the principles and vision - 70% strongly agreed with them. When asked what the urban forest meant to them people gave a range of answer including trees, native, green, habitat cooling (**Error! Reference source not found.**)
- A 5th principle being added '*We protect and enhance Banyule's natural environment to care for flora and fauna*', (**Error! Reference source not found.**)
- Confirmation of the importance of managing the urban forest for a changing climate and mitigating climate change damage through planting strategies and species choices



Is Banyule's urban forest managed as an essential asset?

Local governments invest significantly in asset management systems that allow them to plan, deliver, maintain and manage assets of all types. Asset management systems have been developed around what is known as *grey infrastructure*: roads, footpaths, drainage pipes and pits etc. The systems allow the level of service provided by each asset to be ascertained, the financial value to be estimated and an asset management plan to be developed. Green infrastructure – parks, trees, wetlands etc – has traditionally not been included in these systems, which has placed more natural systems and assets at a disadvantage in terms of capital and operational expenditure.

More recently, local governments have started to implement systems that capture data on their urban forests that provides them with similar insights. Banyule is one of those councils, and captures a range of tree-related data including:

Banyule has a tree inventory of data for many of its public trees in streets, the inventory is less complete for trees in parks and bushland areas. The public tree inventory includes data and information on:

- Height
- Species name
- Life expectancy
- Age
- Inspection frequency
- Frequency of pruning and by whom

Analysis of the Banyule tree data inventory was undertaken to understanding the age profile (i.e. how many trees are young, middle-aged or old) (Figure 13).

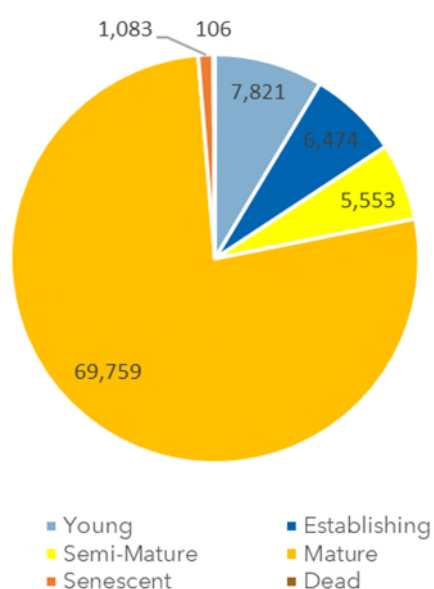


Figure 13. The number of public trees in each age class across Banyule.

We were able to analysis the useful life expectancy of Banyule's public trees (Figure 14) and the spatial distribution (at the scale of the Neighbourhood Character Zones) of trees that are coming towards the end of their life and are likely to need removal and replacing during the period covered by the Urban Forest Strategy (Figure 15).

Useful Life Expectancy (ULE) is the length of time that a tree is expected to remain healthy and provide ecosystem services within its environment, before it begins to decline. This length of time can vary between trees and between species, as it depends on tree health, condition, safety and location.

A tree that has been subject to damage, lots of pruning or other modification may have a shorter useful life expectancy than an unaltered tree of the same species.

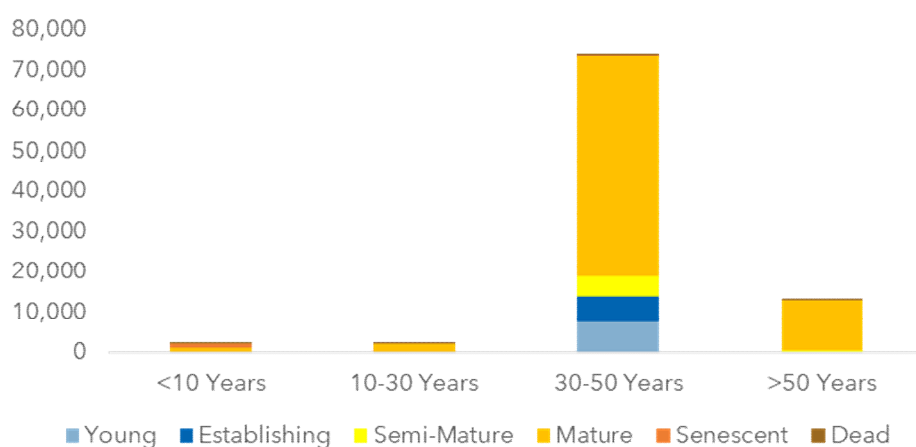


Figure 14. Breakdown of the life expectancy of Banyule's public trees, and the age of these trees

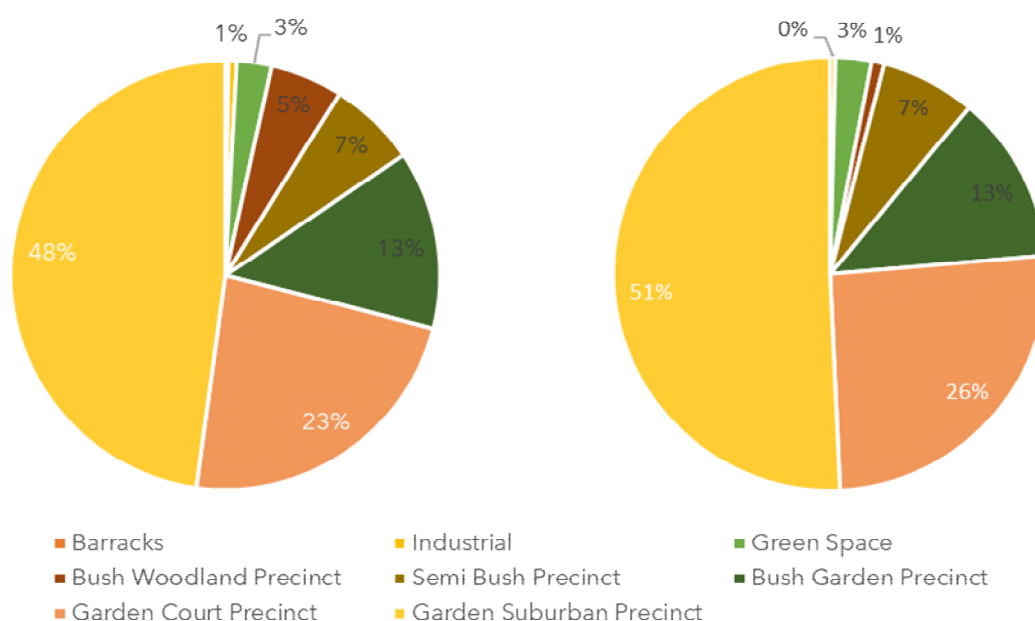


Figure 15. Useful life expectancy analysis results by Neighbourhood Character Zone. Trees with a ULE less than 10 years on the left and older trees with a ULE of 10-30 years on the right.

The analysis shows that:

- Most trees that are planted in Banyule are expected to live between 30 and 50 years. Currently majority of these trees are mature.

- Only a small percentage of the trees in Banyule's inventory are senescent or dead, and these mostly only have a lifespan on 10 years or less.

Detailed data on individual trees and the urban forest as a whole can be expensive. In addition, for assets like trees, which are very long-lived, data needs to be retained over multiple decades and throughout all the environmental, social and governance changes that occur over this time – an ambitious task.

Challenges around collecting and maintaining the right data mean that even the best data can have holes. For Banyule the key issues relating to data and effective asset management are:

- The data within the inventory is largely focused on street trees (over ¾ of the trees are street trees), with the remainder covering park and 'facility' trees. Several parks and reserves within Banyule (e.g. Darebin Creek corridor) have large areas that are not included in the inventory, mostly those areas that are natural/reserve open space type.
- The available data is adequate to form some good baseline information about the urban forest however there are a number of gaps – most prominently health – which make evidence-based decisions and sharing data and information more difficult.
- Council does not have an approximate date of tree planting for many trees, which means it is hard to estimate when trees might be most likely to fail due to age. The trees that are mature in each of these age brackets may have many useful years left, or they may be close to passing their useful age – we just don't know.
- After the senescent trees, the age bracket to watch most closely in the next 10 years are the mature trees – first those with a shorter lifespan and mature trees currently in poor health, then the longer-lived trees in the 'mature' category as the decade progresses.
- Most trees that will likely need to be replaced within the lifetime of this strategy fall within the Garden Suburban Precincts and Garden Court Precincts.
- There is no robust data on the urban forest across different land uses (its structure, diversity, ecological values).
- Information about more complex measures, like the contribution of the urban forest to ecosystem services (air filtration, carbon capture, biodiversity value) is not captured.
- Most tree management is reactive and responsive to resident requests, emergencies and maintenance.
- Succession planning is largely absent, and Banyule's measured tree population is overwhelmingly mature or growing old.

Integration of the planning design and management of the urban forest is not yet fully embedded throughout the whole organisation e.g. active management of urban forest and integration of the forest with other parts of council e.g. cycling, recreation, arts trails, development, training, maintenance

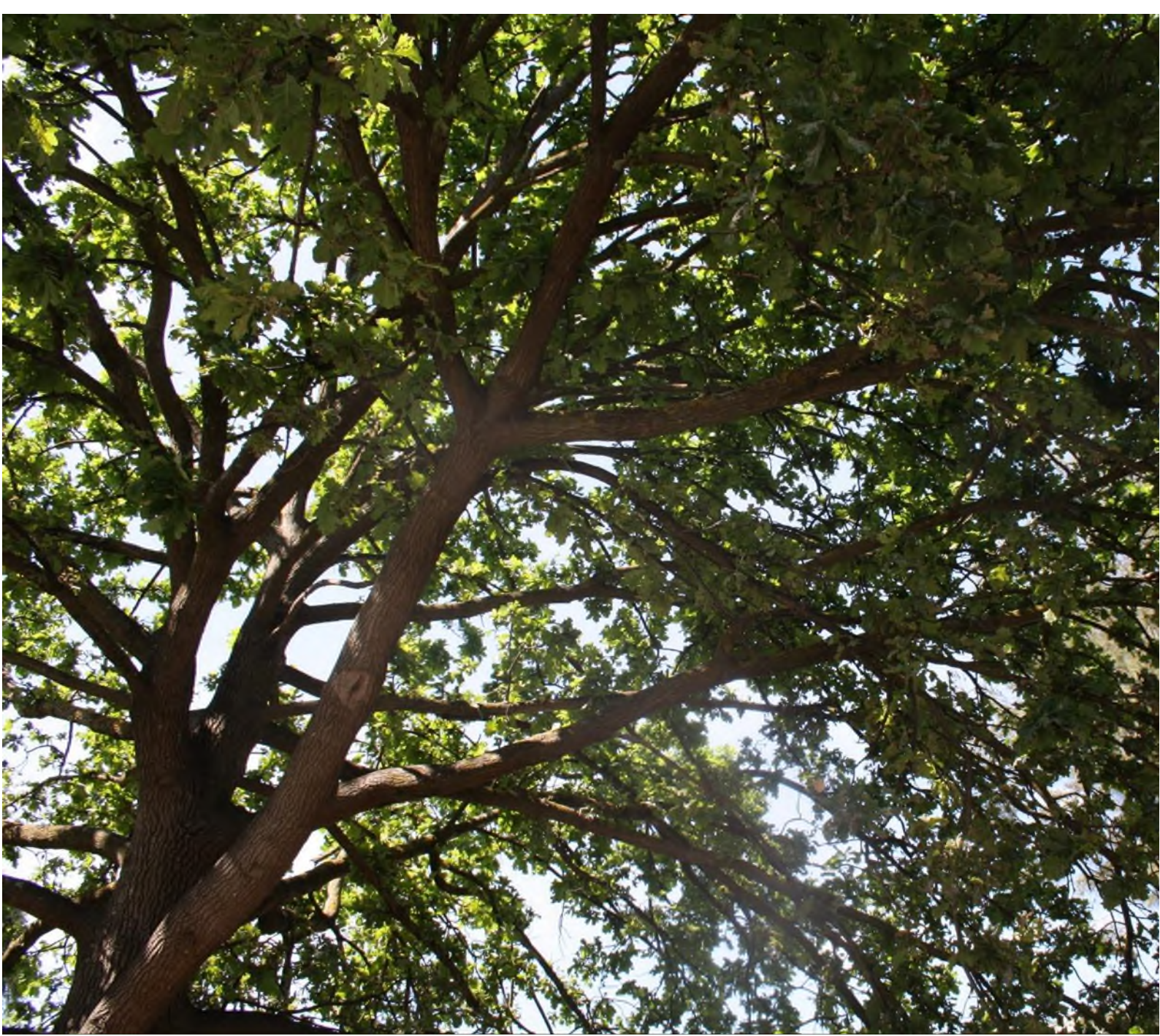
There is no asset management approach as yet and value-driven decisions about the urban forest are difficult to make. However, Council is proactive in developing the new Urban Forest Strategy and is building momentum around a strong vision and principles.

Related strategies and plans

Council has more than ten current strategies and plans that are important for supporting a healthy urban forest.

- Cycling
- Aboriginal Heritage
- Biodiversity
- Climate Action
- Rights of way
- Safe travel
- Water
- Emissions reduction
- Environmental Stewardship
- Integrated Transport
- Neighbourhood Character
- Regional trails
- Walking
- Weed management

There is currently some integration of tree management and urban forest approaches across Council, but there is no real evidence of current capital works including or making way for the urban forest as an essential asset. There are staff in some teams that are skilled in urban forest knowledge, and a number of strategies and plans that will support the implementation of this Urban Forest Strategy (see above). Council policies and plans will need to be updated to reflect the vision and principles for the urban forest, and the wider vision of the Victorian Government to green and cool the city.



There are several Victorian Government and local government policies and plans that relate to the urban forest

Planning Level	Key details
State-metro-level policy objectives	<ul style="list-style-type: none"> • Living Melbourne Strategy - a metropolitan strategy galvanising support for a unified vision across local government, state government, water authorities, statutory agencies, academics and more. The Living Melbourne vision is for a more liveable Melbourne - where our thriving communities are resilient, connected through nature • 20 Minute city (Plan Melbourne) - which aims to create more accessible walkable communities • Yarra River protection - To maintain and enhance the natural landscape character of the Yarra River corridor • Walking - To facilitate an efficient and safe walking network and increase the proportion of trips made by walking
Banyule Planning Scheme	<ul style="list-style-type: none"> • High-quality vegetation and landscape - The municipality includes several sites of State, regional and local botanical, zoological and habitat significance. A number of significant trees have been identified throughout the municipality • Cultural heritage • Key issues in the built environment: <ul style="list-style-type: none"> ○ Some new development fails to consider the broader role of significant trees, substantial trees and other vegetation as a contributor to: biodiversity, greenhouse gas absorption, water sensitive design and the shading of buildings and spaces. ○ The impact of the urban heat island effect • Banyule Character and Identity: <ul style="list-style-type: none"> ○ Encourage residents to care for street trees in consultation with Council, support the retention of significant trees and the planting of trees and other vegetation, encourage tree protection.
Local Policy	<ul style="list-style-type: none"> • Environmentally sustainable residential and non-residential development • Residential Neighbourhood Character - ensure that development complements and respects the preferred future character of the area. • Ensure that any future development, or changes will not have a detrimental impact upon the integrity and condition of the tree/s and vegetation. • Where significant or contributory trees need to be removed, encourage 'like for like' replacement.

6 Where is action needed?

A central tenet of the Urban Forest Strategy is that activities should target areas of greatest need. To determine where these places are, we looked at the available data to assess the areas of highest need or vulnerability.

There are many ways to define the need or vulnerability. The following six elements were considered important for Banyule:

- Existing canopy cover - areas where existing canopy cover is low
- Socio-economic disadvantage - focus on areas of greater disadvantage
- Biodiversity - address gaps in habitat corridors and
- Urban heat - areas of higher heat vulnerability
- Walking routes - high pedestrian intensity
- Flooding hot spots - opportunities to reduce flooding

The analysis of data using this prioritisation matrix shows that the high priority areas for intervention and UF improvements are Bundoora, Greensborough, Watsonia, Heidelberg West and Heidelberg. These areas are followed in terms of priority by Eltham North, Belfield, Viewbank and Ivanhoe. Maps of each of these factors and the overall prioritisation are shown below (Figure 16).

Building up the layers to arrive at high priority sites for urban forest intervention involved combining data for canopy cover with socio-economic factors (SEIFA), urban heat vulnerability, mapped walking routes and flooding hot spots. Further data on biodiversity is yet to be added.

Other factors that should be investigated to be included in the prioritisation matrix in the future include:

- Areas with capacity for storm buffer/ wind break
- Areas that can accommodate large trees
- Relative diversity of tree species
- Aging/successional priority
- Areas with upcoming maintenance activities or capital works planned

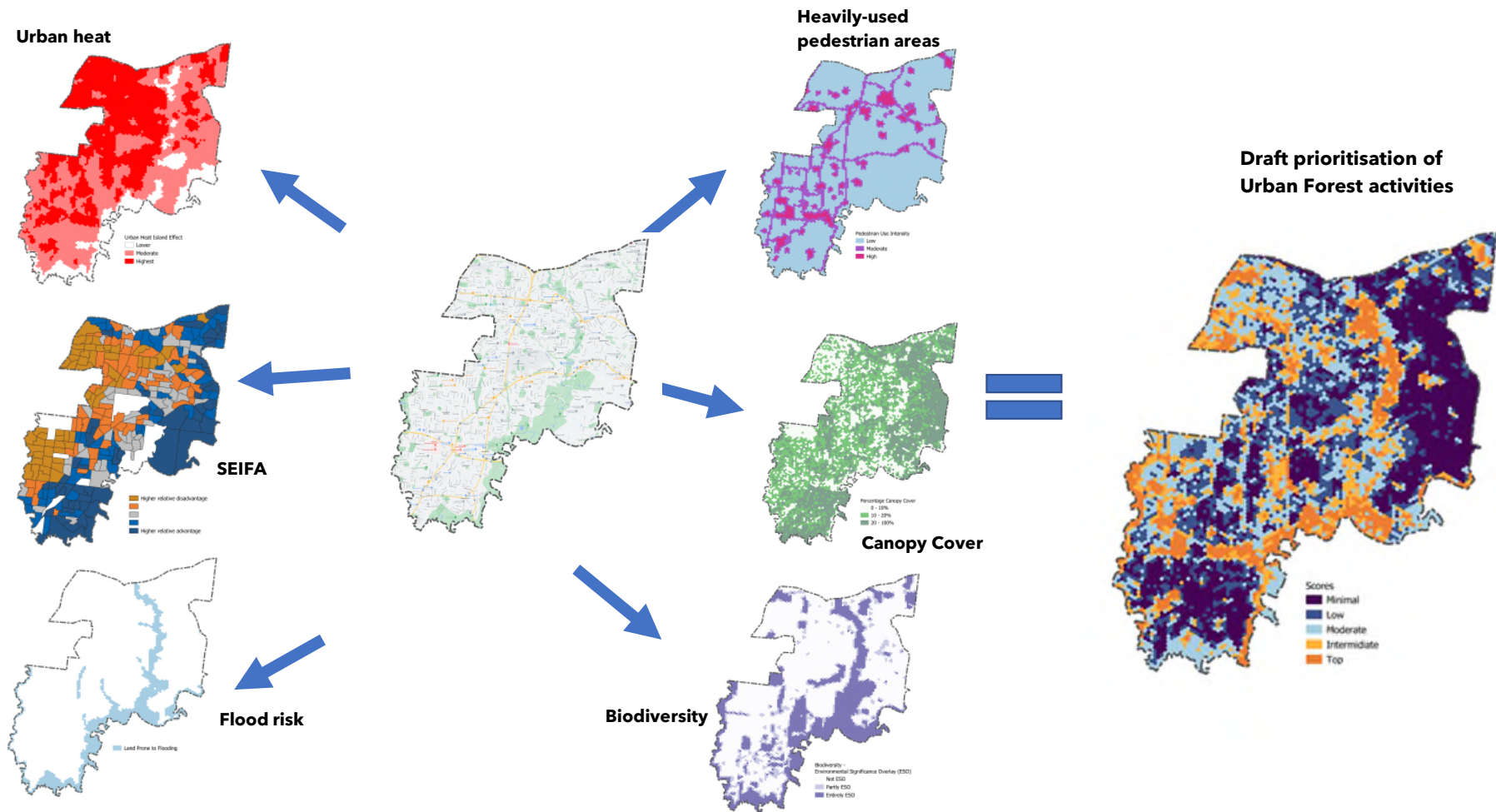


Figure 16. Draft spatial prioritisation of urban forest actions in Banyule

7 Emerging strategic priorities and action ideas

With the vision for the Urban Forest from Banyule Community Vision 2041 and principles from the urban forest strategy engagement to date there are six areas emerging as **important for strategic focus** needed for Banyule over the next ten years.

The draft strategy areas are:

- | | |
|-------------|---|
| Strategy 1. | Prioritise urban forest improvements in the most vulnerable suburbs and places across Banyule |
| Strategy 2. | Improve planting to complement trees |
| Strategy 3. | Manage the urban forest across public and private land for resilience to climate change |
| Strategy 4. | Take a long-term approach to Urban Forest management |
| Strategy 5. | Build community partnership with council to protect and enhance the urban forest |
| Strategy 6. | Integrate the urban forest principles into all parts of Council services |

The draft framework of Vision, Definition, Principles, Strategic Areas and Example Actions is shown in the following figure.

A more detailed view of actions that go with them is provided through the Shaping Banyule Survey. Feedback gathered from the survey will inform the changes and prioritisation of actions in the final strategy.

Strategic areas

Example actions

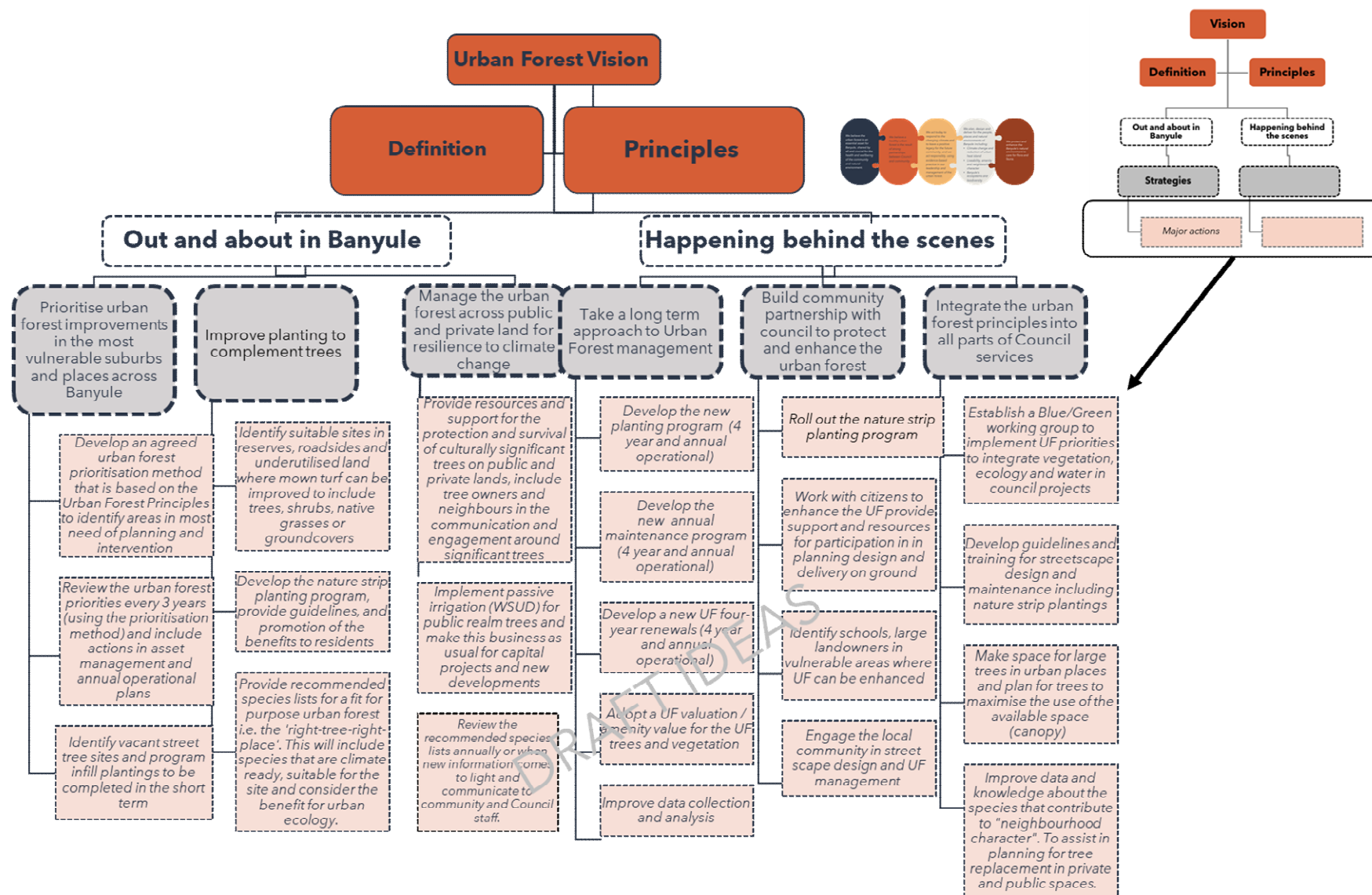


Figure 17. Draft Framework of Vision, Definition, Principles, Strategic Areas and Example Actions

