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Final Report

Where will all the trees be? An assessment of urban forest cover and management for Australian cities

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RMIT University; The Republic of Everyone; Urban Forest Consulting; Clean Air and Urban Landscapes Hub

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Contents

Summary

This project's aim was to provide an assessment of current urban forest cover across Australian cities and associated urban forest management practices in order to reveal areas of challenge for the future of urban forest cover in Australian cities.

The project team delivered on this aim by:

- Conducting an assessment of land cover across 131 LGAs in Australia, covering all significant urban centres and using the i-Tree Canopy sampling methodology. This 2020 assessment built on similar assessments done in 2013 and 2016, allowing cover trends to be established across the three timepoints.
- Conducting a survey of local government professionals working in urban forest management seeking information on the enablers and barriers to better urban forest management. The survey was sent to contacts in all 131 LGAs in the study, with 169 completed responses returned covering 118 of the LGAs in the study.
- Reviewing of state statutory planning policy looking at likely influences on the presence of trees through their retention, removal, management and establishment.

The following outputs were generated:

- An interactive website allowing users to enter their local area and view an online green cover summary report for their LGA, including comparison between comparator LGAs and assessment of future challenges
- Public and industry facing report covering all 131 LGAs in the study titled "Where Will All the Trees Be? The 2020 update of green cover benchmarking in our cities and suburbs"
- 131 individual LGA green cover summary reports including trendlines, comparison between comparator LGAs and assessment of future challenges
- This research report, including presentation of methods, key findings and research data.
- Data workbook containing all assembled assessment data

These outputs amount to a comprehensive national assessment of urban forest cover and urban forest management practices, highlighting areas of challenge for the future of urban forest cover in Australian cities. The 2020 assessment of urban land cover shows that at a national level we are seeing a slight decline in urban forest cover when we hope to see growth. At the LGA level, since 2013 the majority (69%) of LGAs are going backwards, losing green cover. However, an encouraging trend is present in the more recent study period between 2016 and 2020, with the majority of local government areas (62%) gaining green cover – in most cases not enough to make up for losses, but the trend is in the right direction.

The survey of local government professionals indicates that the majority of LGAs are well progressed in developing and maintain a strong management framework to address urban forest cover on public land, and that they have strong organisational and community support to do this work. However, most reported that that there is limited and ineffective effort to influence cover on private land, with lower organisational and community support to do this work. Despite challenges on private land, most recognise this is a critical area for improvement, but feel that state policy frameworks around land management do not support urban forest protection/enhancement on private land.

As cities grow, we need to also grow our green cover. This is possible and results show that this is happening in many places across the country that we can learn from. The outlook for most LGAs, while challenging, appears more positive based on this recent assessment, especially with respect to public land. However, significant effort is required to improve strategy, policy and action if the substantial quantum of private land urban forest cover is to be maintained.

Introduction

A vibrant and extensive urban forest is essential to health and wellbeing in cities (Kendal et al 2016); and to the preservation of ecosystems and biodiversity (Threlfall et al 2019). An extensive urban forest reduces urban heat and heat related health impacts, which are severe in Australian cities (Duncan et al 2019); and can increase physical health and mental wellbeing. Urban forests support biodiversity and important ecosystem functions including healthy soil, clean air and water, and habitat for biodiversity.

However, urban tree canopy cover in Australian cities is under significant pressure and is declining in many areas (NY16005 Where should all the trees go? (Amati et al 2017)). In leading local government areas (LGAs), loss has been stemmed and gains are now occurring in the public realm; however, work remains to ensure parks, streetscapes and public land contribute effectively to the urban forest while managing conflicts with other urban infrastructure and activity demands. In most urban environments about half of the urban forest exists on private land, with the vast majority of this on residential land (Hurley et al 2019). Since the publication of the book "The life and death of the Australian Backyard" (Hall 2010) it has been known anecdotally that land use changes are significantly affecting the levels of greenery in Australian cities. Smaller lots sizes combined with a shift in consumer desire for larger housing footprints means that the amount of hard surfaces in Australian cities is rising inexorably.

While harder for government to influence, there is an important role for local government, supported by state policy frameworks and departments, to influence the extent of vegetation on private land (Phelan, Hurley and Bush 2019). Local government policy is in the vanguard of preventing or mitigating this long-term change through local laws, land use and planning policy, education campaigns and incentive programs (NY18002 Global review of incentive schemes for the retention and successful establishment of trees on private urban land (Ordonez et al 2020)).

Benchmarking of tree canopy and greening forms an essential part of the strategy for preserving trees, allowing councils to compare the investments they are making in planting as well as allowing them to reflect on the policy changes that are needed in the future. Accurate and robust benchmarking assists in setting targets (NY13028 Where are all the trees? (Jacobs et al (2014)) as well as identifying areas of most need demographically and for mitigating urban heat (NY16005 Where should all the trees go? (Amati et al 2017)). This project is a direct descendant of these reports.

At the same time, technology is improving and the interest that these analyses have generated have prompted investment by government in benchmarking exercises. The research of the Clean Air and Urban Landscapes Hub has helped deliver a more detailed understanding on canopy cover and its relationship to urban heat (Duncan et al 2019) and land-use (Hurley et al 2019).

This project provides the opportunity to:

- Enrich our collective understanding of the trajectory of urban canopy across all urban LGAs in Australia;
- To better understand the performance of LGAs in managing the urban forest and to better support LGAs in improving this management;
- and to chart a course from survey-based monitoring of urban canopy to more comprehensive and instructive census-based methodologies.

Project Objectives

This project aims to provide an assessment of current urban forest cover across Australian cities and associated urban forest management practices. Based on these assessments the project aims to reveal areas of challenge for the future of urban forest cover in Australian cities.

The project has three objectives:

- To provide an assessment of land cover in Australian cities for 2020 across 131 metropolitan LGAs and, in conjunction with previous studies (2013; 2016), produce an assessment of the current trajectory of urban forest cover in Australian cities;
- To evaluate the efforts of LGAs to manage, protect and enhance the urban forest, including an understanding of the role of institutional, community and state land-use policy contexts; and
- To forecast the challenges for urban forest cover and produce a 'challenge rating' for different LGAs in the coming years.

Methodology

The project has five components to deliver on the project objectives:

1. An assessment of land cover across 131 LGAs in Australia, covering all significant urban centres, using the i-Tree Canopy sampling methodology. This repeats similar studies done in 2013 and 2016, providing updated 2020 cover figures and allowing cover trends to be established across the three timepoints.
2. A review of state statutory planning policy looking at likely influences on the presence of trees through their retention, removal, management and establishment. This review helped inform the LGA survey (below) and informs discussion of the current state of urban forest management practice across LGAs and State Governments in Australia, particularly illuminating the role of land use planning policy.
3. A survey of local government professionals working in urban forest management. This survey was designed to allow LGA's in the study to self-report on their urban forest management status including their specific enablers and barriers to better urban forest management. The survey was sent to contacts in all 131 LGAs in the study. We received 169 completed responses covering 118 of the LGAs in the study. The survey gives us a rich picture of the state of urban forest management practice across the country focusing on the following issues: strategy and policy; resourcing; organisational support; community support; and the nature of state policy and processes.
4. Using the i-Tree results and survey results we produce a summary LGA assessment and future outlook for each of the 131 LGAs in the study. These reports present:
    - Key contextual data for the LGA, recognising that each LGA is different and faces particular urban forest management challenges related to their local circumstances.
    - A summary of urban forest management (UFM) at the LGA, state and national level is presented, based on the responses to the survey.
    - A summary of the land cover results for each LGA is presented, based on the i-Tree assessment. This includes the 2020 results and a look at cover trends across the 2013, 2016 and 2020 assessments.
    - An assessment of the future outlook of each LGA is presented, comparing the LGA to relevant comparator LGAs; calculating a "challenge factor" for maintaining or achieving a healthy urban forest cover based on a combination of current cover and cover trends; and identifying likely areas of challenge based on survey responses, i-Tree data and contextual data.
5. A brief comparative analysis between the i-Tree sampling method results and the results from a comprehensive vegetation cover assessment (using the CSIRO's Urban Monitor approach), comparing strengths and weaknesses to inform future studies.

i-Tree assessment

Consistent with previous years, we used the i-Tree Canopy point sampling method to conduct the 2020 assessment of land cover. i-Tree Canopy is a widely used approach developed by the United States Department of Agriculture Forest Service (i-Tree Canopy, 2020). It is a cost effective and robust method for estimating land cover types, appropriate for use in this study given the large study area, covering 131 LGAs across the nation. This makes comparison across the country possible with a consistent assessment method. It is also consistent with the method used in two previous studies, making comparison over time possible.

The i-Tree canopy method is a point sampling method, using aerial imagery, randomly distributed points and a visual interpretation of surface cover at those points to estimate cover proportions. Sampled

points are distributed within LGA boundaries, the same approach used for the 2013 and 2016 analysis. The results of this method have then provided estimates of the proportion of different land cover types at the LGA level. The 2020 assessment of land cover (tree canopy, shrubs, grass/bare-ground, hard surface) has been compared with the 2016 and 2013 results to determine a current canopy trajectory for each LGA.

The i-Tree Canopy software relies on Google Earth, which is updated frequently. In Australia, however, the image years can vary between cities, making a consistent nationwide assessment at one time point difficult. As a result, Nearmap imagery was used to supplement Google Earth to ensure all cities had up to date imagery for 2020. The project adopted a three-phase method to run a paired-sample i-Tree Canopy analysis. First, the random sampling points (1,000 per LGA) generated in the 2016 estimation (Amati et al 2017) - NY16005 - were converted to Google Earth and GIS format. The 2016 points were then used for the 2020 study. Using the same points over time allows for more detailed analysis of change over time, as you can track the specific changes occurring in cover at each point. Due to LGA amalgamations, several LGAs in the 2020 study now have more than 1000 points. There was a total of 146,998 points in the study.

A team of photo-interpreters were trained to use the i-Tree Canopy method which was followed by a period of practice and review with an experienced user of i-Tree Canopy to ensure reliability in data collection across the entire team. For each point, a team member classified the land cover based on a visual interpretation of the underlying Google Earth or Nearmap imagery. For consistency, land cover categories used for the 2016 study were again used for the 2020 update. These are: Tree, Shrub, Bare ground/grass, and Hard surface. It is important to run the point sampling when the trees are in full leaf so all imagery used was within the November to April period. The majority of imagery was from the 2019-2020 time period (Table 1). However, in some cases imagery was from an earlier period where recent imagery was of poor quality (with the earliest being January 2018).

Table 1. The details of imagery date used to run the i-Tree surveying

Imagery date (source)	Number of LGAs	LGA Names
December 2019 - April 2020 (Nearmap)*	11	Brisbane, Cairns, Gold Coast, Ipswich, Logan, Moreton Bay, Palmerston, Redland, Sunshine Coast, Toowoomba, Townsville
January 2018 - March 2020 (Google Earth)*	120	All remaining LGAs

*The photo-interpreter used the most current image with the highest visual quality within the selected period to detect the land cover.

For quality assurance purposes, a 5% random sample of points, as well as the points that photo-interpreters were not confident in, were reinterpreted by another trained photo-interpreter to check for classification accuracy (Nowak & Greenfield, 2020). Overall, the interpreters agreed on 90% of the cover class designations. The remaining 10% of designations on classes does not mean that there is an absolute 10% error as the misclassifications could, and often do, compensate (e.g., some tree points may be classified as grass, but also grass points are classified as trees), which would reduce overall misclassification error. Differences in interpretation could occur due to image quality (atmospheric haze, image darkness), mis-registration of points between original and second interpretation and/or interpreter error in classification or recording from the original interpreter or quality check interpreter (Nowak & Greenfield, 2020).

Following the i-Tree Canopy technical notes, a sample size of 1,000 points was determined adequate to reach a confidence level of 95% (Nowak & Greenfield, 2020). However, because each LGA has

differing land cover category compositions, the standard error and confidence interval varied by land cover category for each LGA. As this study was also a comparison of two i-Tree samples (i.e. estimating change between the 2016 and 2020 i-Tree samples), an additional statistical test (Two-Independent-Samples T Test) was calculated for the percentage difference in land cover categories between reports.

One issue that arose in interpreting results over different time periods was the potential misclassification between "trees" and "shrubs". Any significant changes over time in "tree" cover needed to be checked against the results of "shrub" cover. E.g. where there is a loss in tree cover but a gain in shrub cover, this may indicate higher than average levels of misclassification. Grass and bare ground were classified together following the approach established in the earlier studies to manage the misclassification that often happens between the two. This was especially the case for areas of sparse and dormant grass/vegetation, which is very common in Australian summers, when the image sampling was undertaken. In presenting the final statistics, we refer to green cover or urban forest cover, a combination of tree and shrub cover that excludes grass/bare ground. Given the misclassification errors that occur between tree and shrub, this combined measure provides the best measure for tracking urban vegetation cover over time.

A limitation that remains with the study approach is the focus on whole LGA analysis. All three studies have used this approach to ensure the resources available can cover a national assessment of urban areas. However, this means that LGAs with significant non-urban areas can generate skewed results, as sample points are randomly generated, with a proportion of those points occurring outside the urban area. As a proposed modification for subsequent studies, we produced additional "urban area only" results for LGAs that include non-urban land cover. This will have some impact on the statistical significance of results reported, but for many affected LGAs we will be able to produce a valid "urban only" result.

State policy review

The state policy assessment sought to identify all elements within land-use planning frameworks around Australia that are likely to influence the presence of trees through their retention, removal, management and establishment. The assessment looked at policies that directly influenced the behaviour of parties undertaking actions that resulted in the retention, removal, or establishment of trees in the urban environment.

We reviewed the key planning statute from each state and territory within Australia. There was an effort made to include other legislation that also influenced development and land-use outcomes with respect to trees, although it is difficult to confirm whether all relevant legislation has been included.

Only state level policy was considered during the assessment and only statute with legal authority were considered, with less formal documents such as guidelines and practice notes considered out of scope. Local planning schemes and precinct specific policies such as Precinct Structure Plans were not considered. While such documents may have an important role in influencing decision making and management of urban forests, their inclusion would require a more comprehensive study to understand their practical use. When analysing the policy data, states and territories were considered independently due to the significant variation in the policy architecture, application, and content across the states.

When reviewing each policy, the following steps were undertaken:

1. A word search was conducted to identify the use of the words *tree* and *trees*.
2. The reviewer then verified that each use of the word was in relation to the retention, removal, management or establishment of trees.
3. To supplement the word search, the policies were reviewed for any elements determined to potentially influence the presence of trees. This determination was based on the assessor and project team's professional experience and included subject areas such as those outlined in Table 2.

4. When a relevant policy element was identified, specific details were recorded. These details are listed below in Table 3.

Table 2. Example of subject areas assessed in policy review.

- Setbacks
- Development density
- Landscaping
- Private open space
- Bushfires
- Streetscape design
- Buildings spacing
- Site area
- Plot ratios
- Deep soil areas
- Communal open space
- Heritage
- Neighbourhood character

Table 3. Details recorded during assessment.

- The state/territory of the relevant policy
- The name of the policy
- Whether the policy related to private or public land
- Whether the policy had a direct or indirect impact on the presence of trees
- The subjective analysis of impact of each element
- Any other notes that were relevant

The assessment of the impact of each policy element was based on a subjective analysis of it's strength and likely influence, derived from the language used within the policy. High impact elements used words such as *must* and included prescriptive requirements unable to be varied. Lower impact elements allowed for greater flexibility, using *should* statements and relied more on performance-based criteria. The assessed impact value was based on observations of what was presented in the statute. The way each policy is interpreted in practice by the relevant decision makers may vary from our interpretation. Understanding the actual impact of the policy would require a more comprehensive study.

The distinction between private or public relevance was based principally on who was undertaking land management. For example, policy requiring new dwellings to include two canopy trees would be considered to impact private land. Alternatively, policy outlining the streetscape planting to be undertaken in a new subdivision would be considered to influence public land as these streetscapes would inevitably be transferred to council as part of the development approval process.

In addition to policy elements that seek to directly influence the presence of trees in the urban environment, there are many that impact the urban forest as an outcome of other intentions. We sought to identify policy elements that both directly and indirectly influence the urban forest. In determining whether an element of policy was direct or indirect, we relied principally on the language used in the policy. If reference was made to *trees* specifically, this was considered a direct element. Additionally, terms including *landscaping, soft landscaping*, or *deep soil areas* were considered direct elements as they intend to establish trees and vegetation through landscape management. Policy elements that discussed built form such as setbacks and plot ratios were considered to have a significant impact on the space available for the retention or establishment of trees; however, as their principal purpose relates to amenity and built form, they were considered indirect. See Appendix 1 for full review.

Survey of local government professionals

An online survey was designed to invite all LGA's in the study area to self-report on their urban forest management status including their specific enablers and barriers to better urban forest management.

The survey was conducted online using Qualtrics, with participants contacted via email. Participants

were LGA professionals working in urban forest management related roles within the 131 LGAs in the study. A data base of contacts was assembled using the Greener Spaces Better Places Living Network. This was augmented by collective networks and through our relationship with peak bodies in the urban planning, landscape architecture and horticultural sectors. For the few LGAs where no existing contacts were known, phone calls were made to establish appropriate contacts. The survey was sent to 390 contacts with all 131 LGA's receiving at least one invite to participate. The survey method was approved by RMIT University Research Ethics Committee on the 6th of July 2020 (Reference #: 2020-23336-10688).

The survey guided respondents to answer questions regarding:

- Extent of existing strategy and policy for urban forest management covering both public and private land.
- Use of canopy targets.
- Use and effectiveness of mechanisms to protect and enhance canopy cover (policy, tools, decision-guidelines etc).
- Nature and perceived effectiveness of projects and programs for urban greening.
- Adequacy of budgets and staff resourcing for urban greening initiatives and urban forest management.
- Institutional arrangements and support.
- Level of perceived state government support for and integration with local urban forest agendas/initiatives.
- Level of community support and community barriers and enablers.

See Appendix 2 for list of survey questions.

The survey was conducted in July and August of 2020. The response rate was maximised through follow up phone calls offering phone assisted interviews. We received 169 responses covering 118 of the 131 LGAs. See Appendix 3 for summary report on survey data.

The survey results were then aggregated to demonstrate trends at both State and National Level.

LGA assessment and future outlook.

Using the analysis of the i-Tree and survey data, the project produced LGA level summary reports for each of the 131 LGAs in the study. The purpose of these summary reports was to summarise the key data relevant to each LGA and to undertake an assessment of each LGA's outlook for urban forest management. The summary reports looked at green cover performance, comparison with similar LGAs, and self-reported survey responses, and are based on the LGA data workbook (see Appendix 4). The individual LGA reports are available via Greener Spaces Better Places (contact via https://www.greenerspacesbetterplaces.com.au/). An example report is included in Appendix 5.

Each LGA report is made up of the following four sections:

1. Key contextual data that acknowledges each LGA is different and faces urban forest management challenges related to their particular circumstances. Contextual data was then given a simple rank against other LGAs.
   - *Population*, *population growth*, *population density*, *% urban* and *proportion apartments* all help understand the built form of an LGA and the nature of urbanisation.
   - The *SIEFA-IRSAD* provides a measure of relative advantage and disadvantage; while *% parents born overseas* points to the diversity of cultures and languages potentially present.
   - *Average annual rainfall* and *% bushfire affected* provide an understanding of critical environmental factors that impact on urban forest management.

2. A summary of urban forest management (UFM) at the LGA, state and national level is presented based on the responses to the survey. It is important to note that this is based on

the self-reported evaluations of local government professionals working in urban forest management. Based on a combination of relevant survey question responses, a performance measure (weak, fair or strong) is determined for each of the following management indicators and reported at LGA, state and national level (see Appendix 4 for calculation method):

- *Strategy and policy for UFM on public land.*
- *Strategy and policy for UFM on private land.*
- *Resourcing for UFM on public land.*
- *Resourcing for UFM on private land.*
- *Organisational support for UFM on public land.*
- *Organisational support for UFM on private land.*
- *Community support for UFM on public land.*
- *Community support for UFM on private land.*
- *Support of state policy and process for local UFM.*

3. A summary of the land cover results for each LGA is presented, based on the i-Tree assessment. This includes the 2020 results and a look at cover trends across the 2013, 2016 and 2020 assessments.

4. An assessment of the future outlook of each LGA is presented, comparing the LGA to relevant comparator LGAs (via a clustering approach); calculating a "challenge factor" (low, moderate, high, very high) for maintaining or achieving a healthy urban forest cover based on a combination of current cover and cover trends; and identifying likely areas of challenge based on survey responses, i-Tree data and contextual data.

It is useful to compare performance within and across cities to understand what improvement might be possible with concerted effort and what deterioration might occur with complacency. However, all cities and regions within cities have differences, often significant. Therefore, comparison between urban areas needs to be done carefully, with transparency and with a recognition that all areas have specific local conditions that may play a significant role in determining future urban forest cover. To make comparison more useful/illuminating, we have done two key things:

- Presented a range of significant contextual data for each LGA, to help contextualise LGA level results.
- Grouped LGAs into clusters for direct comparison. There are many ways that we could group LGAs.

Based on a review literature and analysis of key factors, we have selected three attributes on which to cluster LGAs for comparison. We have used a simple descriptive clustering, rather than statistical clustering, to help simplify communication of results to a practice audience.

- First is rainfall, which has a significant impact on urban vegetation, its type and growth rate. We separate out low rainfall LGAs (bottom 40% of the LGAs covered), only comparing low rainfall LGAs with other low rainfall LGAs.
- Second is the extent of urban area. Many LGAs in the study have a mixture of urban and non-urban areas. Some are in fact mostly non-urban despite including significant urban areas. The cover assessment method used estimates cover for the whole LGA. Therefore, LGAs with large non-urban areas produce results that often reflect large areas of non-urban land such as forest or farmland. We divide the LGAs into mostly urban (over 50% urban, of which many are in fact 100% urban) and mostly non-urban (less than 50% urban). We only compare mostly non-urban with other mostly non-urban; and ditto for mostly urban.
- Third is population density. This measure allows us to separate the higher density, highly urban areas: typically CBDs and the inner suburbs of major cities. These areas face significant competition for space and thus can differ in the nature of the challenges faced from more suburban or regional LGAs. We separate out high density LGAs (top 40% of the LGAs covered), only comparing high density LGAs with other high density LGAs.

By applying these three factors, we end up with six clusters of LGAs and compare results within these clusters. This does not mean there are not significant differences within clusters and there are limits to valuable comparison. It also does not mean there is no value in comparing across clusters (for example for certain issues, comparing within a given state has value). However, our clustering approach provides the basis for a much more relevant and illuminating comparison in a quick and convenient manner. We also hope it will foster new peer-to-peer learning and support opportunities between LGAs within certain clusters.

The six clusters are:

- Mostly non-urban; low density; low rainfall.
- Mostly non-urban; low density; average-high rainfall.
- Urban or mostly urban; average-low density; low rainfall.
- Urban or mostly urban; average-low density; average-high rainfall.
- Urban; high density; low rainfall.
- Urban; high density; average-high rainfall.

Each LGA's current urban forest performance was then compared with other LGA's within their cluster. Urban forest performance was measured using physical forest coverage, their self-reported urban forest management status and the change in urban forest cover over time.

Using a scored method of evaluation, each LGA was then attributed a 'challenge rating'. This challenge rating helps understand the level of difficulty each place faces when it comes to maintaining and increasing urban green cover now and into the future. A low challenge rating means that it may be less difficult to achieve and maintain good urban forest cover. A high challenge rating means that greater effort may be required to maintain or increase urban forest cover. The challenge rating was determined by a mix of baseline green cover and change over time. Places that have a higher baseline urban forest cover are more likely to maintain that cover in the future; and places that are experiencing growth in urban forest cover are more likely to have higher green cover in the future.

Canopy monitoring methods comparison

Although an i-Tree Canopy point sampling approach has been used in three studies so far, sampling has well known flaws that limits its utility for policy makers. In particular, the cover changes *within* LGAs are needed to understand greening programs effectiveness for large areas or where land use and populations are highly diverse. Sampling to a scale that reveals these changes would be prohibitively expensive. Longer term, the team recommends a switch towards a census approach to land use cover change monitoring. The team has used a census-based approach, developed by the CSIRO, known as Urban Monitor™ in Sydney, Melbourne and Perth (Caccetta et al., 2012). This approach, where available, provides baseline green cover data at a much higher resolution (individual meshblock as opposed to whole LGA) and has the added benefit of determining vegetation height which reduces the imprecision of the distinction between trees and shrubs and enables the identification of large tree reduction.

In anticipation of this data being more widely available in other states, Melbourne data has been used to compare with the i-Tree results produced in this project for the same LGAs. This provides a means of triangulating our current data in these cities, but also enables us to project what the next generation of data collection will look like. The two methods were compared using linear regression analysis and were conducted on the LGAs of Greater Melbourne, which were entirely surveyed by both methods. This resulted into 27 LGAs being available for final comparison. From the i-Tree land cover we used only percentage tree cover. From the Urban Monitor data, the percentage tree cover was derived based on the average % tree per land use type.

Results

Review of state/territory statutory planning

Given the significant differences between state and territory's planning systems, each system was unable to be compared with each other. Instead, the relevant mechanisms for tree protection and enhancement, as well as the key focus areas, have been identified within each planning system. The results of each state/territory's statutory planning context is included in Appendix 1, with key focus areas summarised by state/territory in Table 4.

All states, except for Queensland included statute that related to the retention, removal, and establishment of trees on private land in the urban environment. The Queensland State Government puts a significantly greater focus on the agency of LGAs in responding to their own planning issues and priorities. As such the state planning framework was unable to be assessed due to its significant out-of-scope local content that would require assessment of individual LGA planning schemes.

Common planning focus areas between the remainder states and territories that directly relate to the presence of trees included: responding to bushfire threats, heritage concerns, and protection of significant trees. Building setbacks, site coverage, and the provision of private open space were commonly included elements that indirectly influenced the presence of trees.

Content relating to the establishment of trees was principally linked to the development of apartments, commercial and industrial areas, and greenfield areas. Apartment developments and car parks were two common areas in which the establishment of trees were explicitly encouraged/required. For apartment developments, this was principally observed in NSW and WA with their respective department design guidelines. The provision of deep soil zones was a commonly cited requirement, principally relevant to apartment developments, that was found throughout the planning systems assessed including: NSW, WA, NT, SA, and Victoria. For carparks, this was observed in ACT, SA, WA and Victoria, and related to shading and visual impact. Statute relating to low density housing included fewer requirements for the establishment of new trees, though this did occur in cases such as NSW and SA.

Table 4. Summary of statutory planning focus areas relating to trees by state/territory.

ACT
• Significant focus on the retention of high value trees.
• Establishment of new trees mostly for commercial and industrial areas, and multi-dwelling residential areas. No requirements for establishing new trees in low-density residential areas.
• 64 Statutory elements: 26 indirect, 38 direct.
NSW
• Apartment design standards focus on establishing new trees.
• Significant exemptions for the removal of non-significant trees and removal of trees for bushfire risk management.
• 129 Statutory elements: 56 indirect, 73 direct.
Western Australia
• Apartment design guidelines focus on establishing new trees.
• Apartment design guidelines include unique developer incentives to retain vegetation not seen in any other state.
• 35 Statutory elements: 19 indirect, 16 direct.
Tasmania
• No elements relating to the establishment of trees.
• Local planning schemes expected to contain more relevant content.
• 4 Statutory elements: 1 indirect, 3 direct.
Northern Territory
• Bushfire planning was not a significant variable in urban forestry policy.
• Focus on the retention and establishment of trees on high- and low-density residential land.
• 7 Statutory elements: 2 indirect, 5 direct.
South Australia
• Significant focus on bushfire planning, with siting and design of buildings as preliminary response.
• 135 Statutory elements: 100 indirect, 35 direct.
Victoria
• Significant focus on retention and removal of trees.
• Establishment of trees relates to neighbourhood character, apartment development, and non-residential land.
• Unique focus on tree retention for erosion management not seen in other states.
• 42 Statutory elements: 15 indirect, 27 direct.

Land cover assessment

The research project produced an i-Tree Canopy land cover assessment across 131 LGAs for 2020, adding to similar studies in 2013 and 2016. This section presents summary i-Tree results at the national, state/territory and LGA scale. The full dataset is provided in Appendix 4, with summary results by state/territory in Appendix 6 and standard error results for the 2020 data provided in Appendix 7.

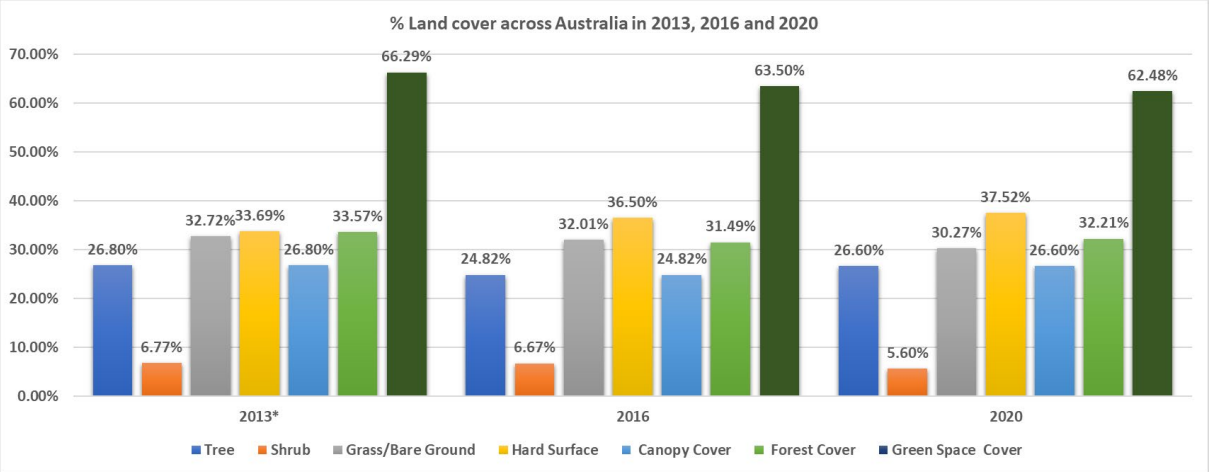
National level summary results

At the national scale, the results reveal the following insight (Figure 1):

- From 2013 to 2016, a decrease of tree (urban canopy cover) by -1.98%; from 2016 to 2020 an increase of 1.78%; for an overall slight decline of 0.20% between 2013 and 2020.
- From 2013 to 2016, a decrease of forest cover (tree + shrub) by -2.08%; from 2016 to 2020 an increase of 0.72%; for an overall decline of -1.36% between 2013 and 2020.
- From 2013 to 2016, an increase of hard surface by 2.81%; from 2016 to 2020 an increase of 1.02%; for an overall increase of 3.83% between 2013 and 2020.

This means that the trend in hard cover proportion in increasing, caused by urban expansion and intensification; and the trend in urban forest cover is decreasing. However, the recent aggregate trend in urban forest cover is encouraging, showing a gain between 2016 and 2020, although not making up for earlier losses.

Figure 1. Percentage of land cover across 131 LGAs in 2016 and 2020



** The percentage of land cover in 2013 was estimated as the "average of percentage of land cover" across the LGAs.*

Table 5 presents the transition matrix (also known as land cover change matrix) at the national scale for the change between 2016 and 2020, enabled by using the matched pairs approach outlined in the methods section. The matrix delivers detailed knowledge about the pattern and possible causes of land cover change. Across Australia, the land cover transition matrix shows that the expansion of hard surfaces has been a significant driver of green cover loss. From 2016 to 2020, almost 18% (3.94%+8.28%+5.92%) of green cover has been converted to hard surface (Table 5). However, this loss has been offset by the conversion of grass/bare-ground to urban forest cover (5.94% to tree and 15.57% to shrub).

Table 5. Matrix of land cover change from 2016 to 2020 across 131 LGAs

	Tree 2020	Shrub 2020	Grass/ Bare Ground 2020	Hard Surface 2020
Tree 2016	88.18%*	1.95%	5.94%	3.94%
Shrub 2016	21.27%	54.88%*	15.57%	8.28%
Grass/ Bar Ground 2016	7.50%	3.67%	82.92%*	5.92%
Hard Surface 2016	2.46%	0.78%	3.34%	93.41%*

*Percentage of land cover with no change from 2016 to 2020

Table 6 provides further insight about the patterns of land cover across Australia between 2016 and 2020. This table shows the differences nationwide for the change in land cover classes within urban and rural areas. It is encouraging to see that tree canopy cover is increasing in rural areas at 1.23% overall, presumably due to natural growth of trees which are potentially covering shrubs and grass. What is surprising is that urban canopy is also increasing, albeit at around half of the rate of a natural, rural environment (0.54%). This suggests that with increased greening efforts and tree protection mechanisms the urban tree canopy increases can grow over time. The change in Hard Surface between rural and urban areas is to be expected. From 2016 to 2020, hard surface decrease in rural areas is negligible as 0.02%. During this period, as it was expected hard surface has been increased in urban areas by 1.01%.

Table 6. Percentage of land cover in urban and rural areas of 131 LGAs in 2016 and 2020

	Tree	Shrub	Grass/BG	Hard Surface	Total
Rural 2016	10.04%	2.52%	12.53%	1.23%	100%
Urban 2016	14.83%	4.13%	19.48%	35.24%	
Rural 2020	11.27%	1.95%	11.89%	1.21%	100%
Urban 2020	15.37%	3.66%	18.40%	36.25%	
Rural Change	1.23%	-0.57%	-0.64%	-0.02%	
Urban Change	0.54%	-0.47%	-1.08%	1.01%	

Table 7. Matrix of land cover change across urban and rural areas of Australia (131 LGAs) from 2016 to 2020

		Tree 2020	Shrub 2020	Grass/BG 2020	Hard Surface 2020
Rural Areas	**Tree2016**	91.74%*	2.15%	5.74%	0.37%
	Shrub2016	32.56%	49.78%*	16.66%	1.00%
	Grass/BG2016	9.43%	3.76%	85.68%*	1.12%
	HardSurface2016	4.42%	1.00%	12.61%	81.97%*
		Tree 2020	**Shrub 2020**	**Grass/BG 2020**	**Hard Surface 2020**
Urban Areas	**Tree2016**	85.89%*	1.79%	6.04%	6.27%
	Shrub2016	14.17%	58.11%*	14.91%	12.80%
	Grass/BG2016	6.16%	3.65%	81.13%*	9.06%
	HardSurface2016	2.42%	0.79%	3.07%	93.72%*

*Percentage of land cover with no change from 2016 to 2020

The method used in these studies does not accommodate LGAs with large rural areas well, as the nature of the non-urban area affects the result. For example, LGAs with large forested areas will likely see a higher cover figure estimated than is present in the urban areas of the LGA. LGAs with large areas of grassland and farmland will see higher grass/bare-ground cover and likely low tree and shrub cover, producing a UF result that could be lower than is present in the urban areas of the LGA. In this study we have introduced an additional attribute to allow the separation of urban and non-urban sample points and recommend that if i-tree Canopy is used in future studies, that sampling points be increased in urban areas to allow urban only reporting for peri-urban and regional LGAs.

Table 7 demonstrates the use of this urban/non-urban separation, providing insight about the percentage of conversion from a given land cover to other land covers in urban and rural areas across Australia. This key data can be used by policy makers and urban planners to determine to the possible cause of change in a particular land cover and thus tailor the relevant policies accordingly. As shown in Table 7, in rural areas, that tree cover is the most stable land cover from 2016 to 2020. During this period, 91.74% of tree cover has remained as tree cover. In urban areas, on the other hand, hard surface is the most stable land cover which 93.72% of hard surface areas in 2016 have remained hard surface in 2020.

The most changeable land cover in the case of rural areas are shrubs (only 49.78% remain the same) with most of this land cover being converted to trees, (32.56%). Shrubs are also the most changeable land cover in urban areas (58.11%), but most of this cover becomes trees, grass or hard surface in roughly equal amounts.

The transition matrix also shows that expansion of hard surface possibly has been the main driver of urban green cover loss. From 2016 to 2020, almost 28.13% of urban green space (tree +shrub +grass/BG) has been converted to hard surface. In a more detailed result, Table 7 shows that the expansion of hard surface has been gained by the loss of shrub coverage (12.80%). This key result can be helpful for urban decision makers to clearly determine the trajectory of loss and gain in specific land covers during the process of urban development. Obviously, the decision makers and urban planners thus can design more sustainable urban growth strategies.

State/territory level summary results

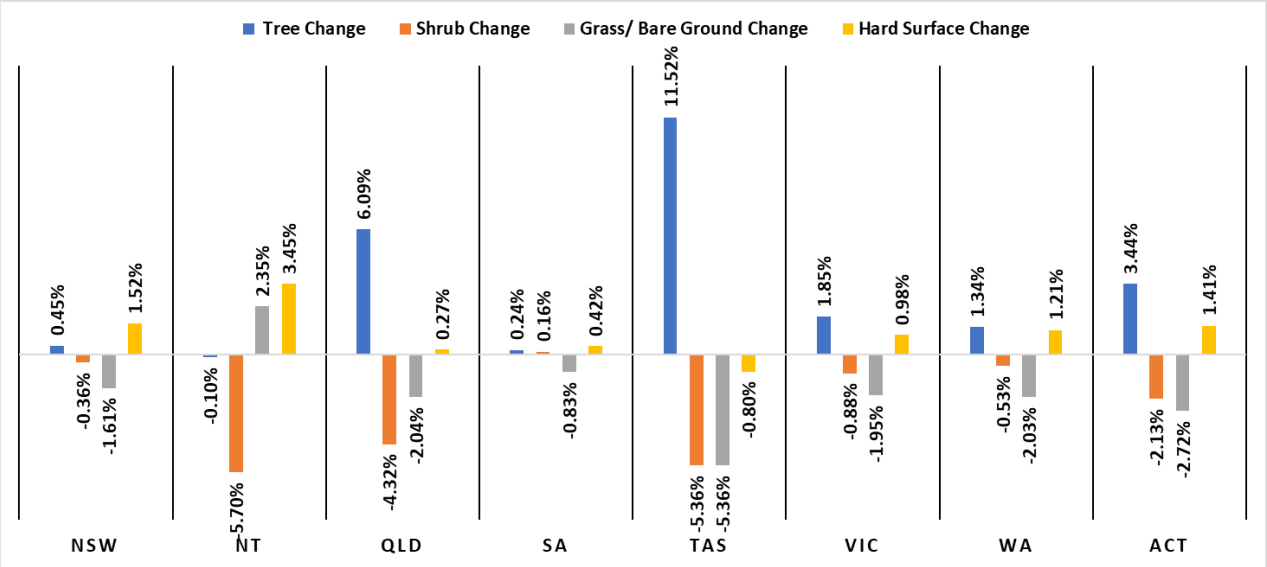
At the State level, the following key insights have been identified: (Table 8 and Figure 2 show the detail).

- From 2016 to 2020, Tasmania and Queensland have recorded the highest percentage of increase in the % tree (urban canopy) cover;
- From 2016 to 2020, all the states (except for South Australia) have experienced the decrease in the percentage of shrub cover;
- From 2016 to 2020, all the states (except for Northern Territory) have experienced decrease in the percentage of grass/ bare ground cover.

Table 8. Percentage of land cover across States and ACT Territory in 2016 and 2020

	Tree 2016	Shrub 2016	Grass/ BG 2016	HS 2016	Tree 2020	Shrub 2020	Grass/ BG 2020	HS 2020
NSW	26.93%	7.03%	23.12%	42.92%	27.38%	6.67%	21.51%	44.44%
NT	28.90%	10.90%	35.70%	24.50%	28.80%	5.20%	38.05%	27.95%
QLD	47.05%	8.74%	34.35%	9.85%	53.15%	4.42%	32.31%	10.12%
SA	19.45%	5.23%	32.11%	43.21%	19.69%	5.39%	31.28%	43.63%
TAS	44.71%	11.90%	33.43%	9.96%	56.23%	6.54%	28.07%	9.16%
VIC	18.92%	4.66%	39.20%	37.23%	20.77%	3.77%	37.25%	38.21%
WA	20.75%	7.12%	31.14%	40.99%	22.10%	6.59%	29.11%	42.20%
ACT	24.54%	8.14%	43.40%	23.91%	27.99%	6.01%	40.68%	25.32%

Figure 2. The percentage of land cover change across States and ACT territory from 20216 to 2020



LGA level summary results

Detailed LGA level reports and LGA comparison reports are available via Greener Spaces Better Places (contact via https://www.greenerspacesbetterplaces.com.au/) based on the data in Appendix 4. A summary of LGA level trends in presented here.

Cover varies dramatically across LGAs, often within metropolitan regions (see Figure 3). Across the length of the time series between 2013 and 2020 the majority of LGAs (69%) are losing green cover (see Figure 4). Only a small number of LGAs had significant increases in urban forest cover over this period, with only 3 out of 131 LGAs achieving a 20% or higher increase on the 2013 baseline cover. In the more recent time period between 2016 and 2020 the majority of LGAs (69%) are gaining green cover (see Figure 5).

Hard surface cover continues to increase in many urban areas, especially where there is high population growth. However, many of the LGAs gaining urban forest cover in the recent period are doing so while also gaining hard surface cover. These include Vincent (+2.3% urban forest cover; +2.1% hard surface), Parramatta (+2.8% urban forest cover; +1.2% hard surface), Adelaide (+3.6% urban forest cover; +1.2% hard surface) and Cockburn (+4.4% urban forest cover; +2.2% hard surface). This demonstrates that urban greening can and is occurring alongside urban development and intensification. Good planning, good design, and good management can see urban intensification alongside urban greening.

Therefore, recent trends are encouraging, but these gains do not yet make up for loses, and many LGAs are still losing cover.

Figure 3. Urban forest cover 2020 by LGA

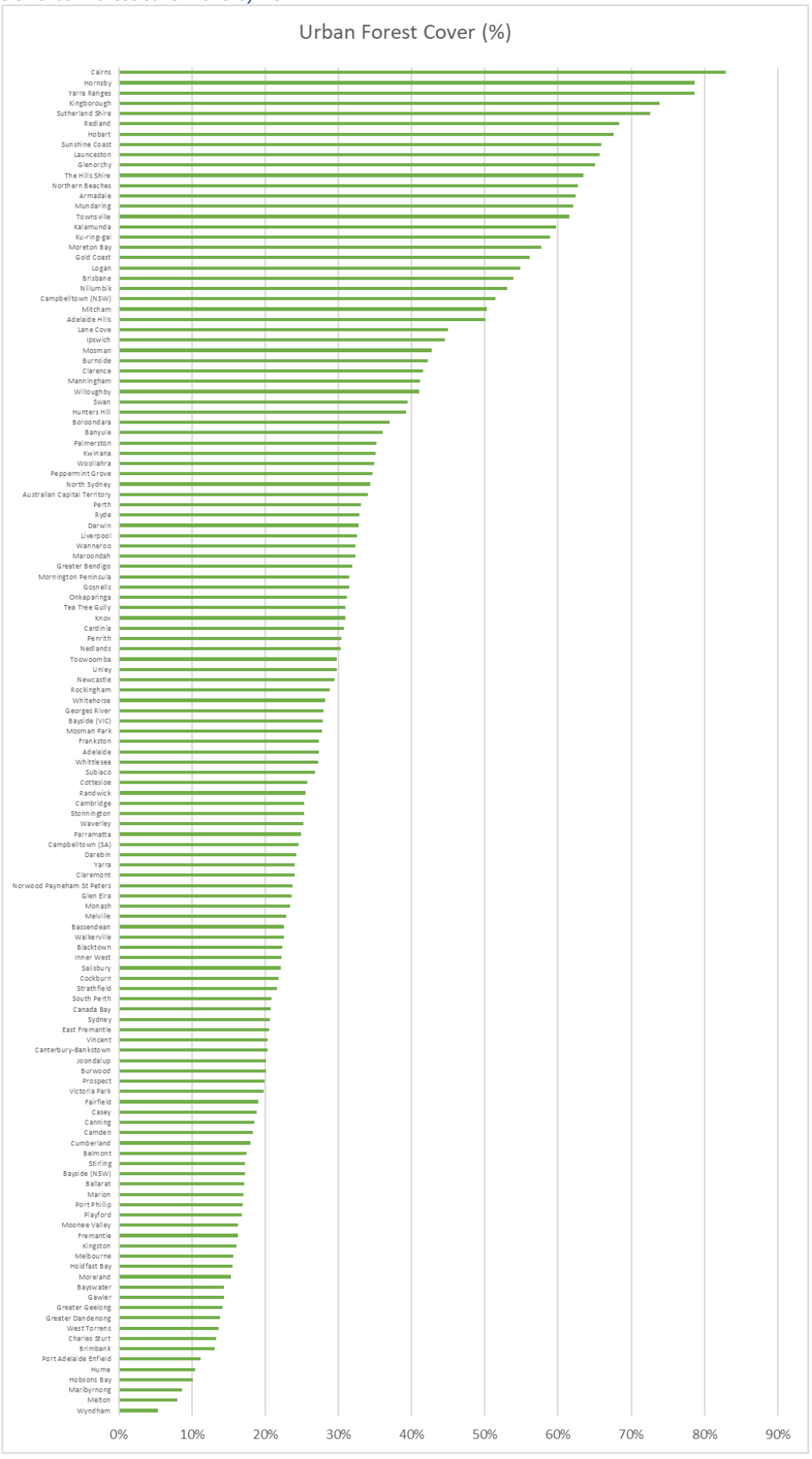


Figure 4. Urban forest and hard surface cover change 2013-2020

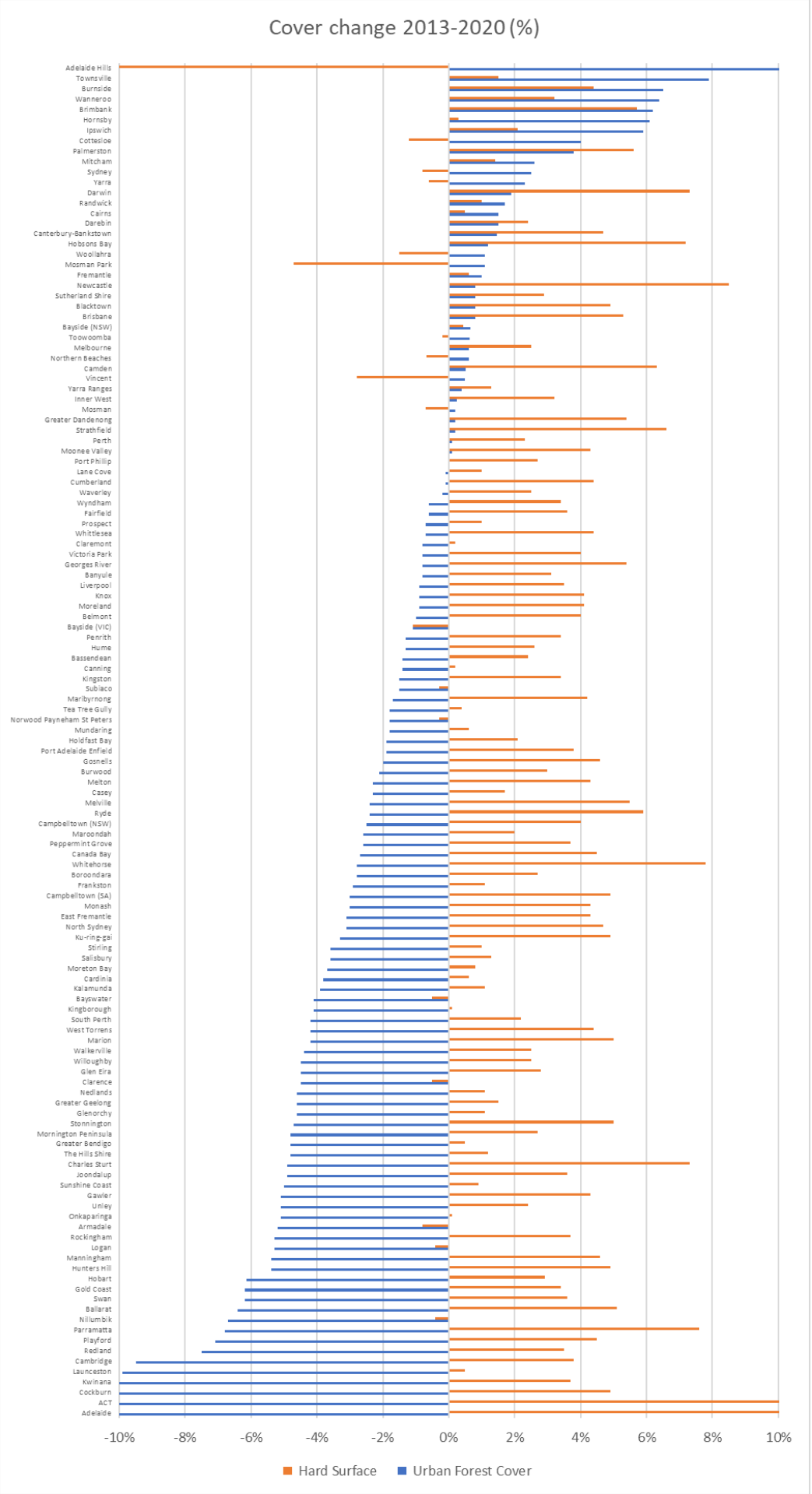
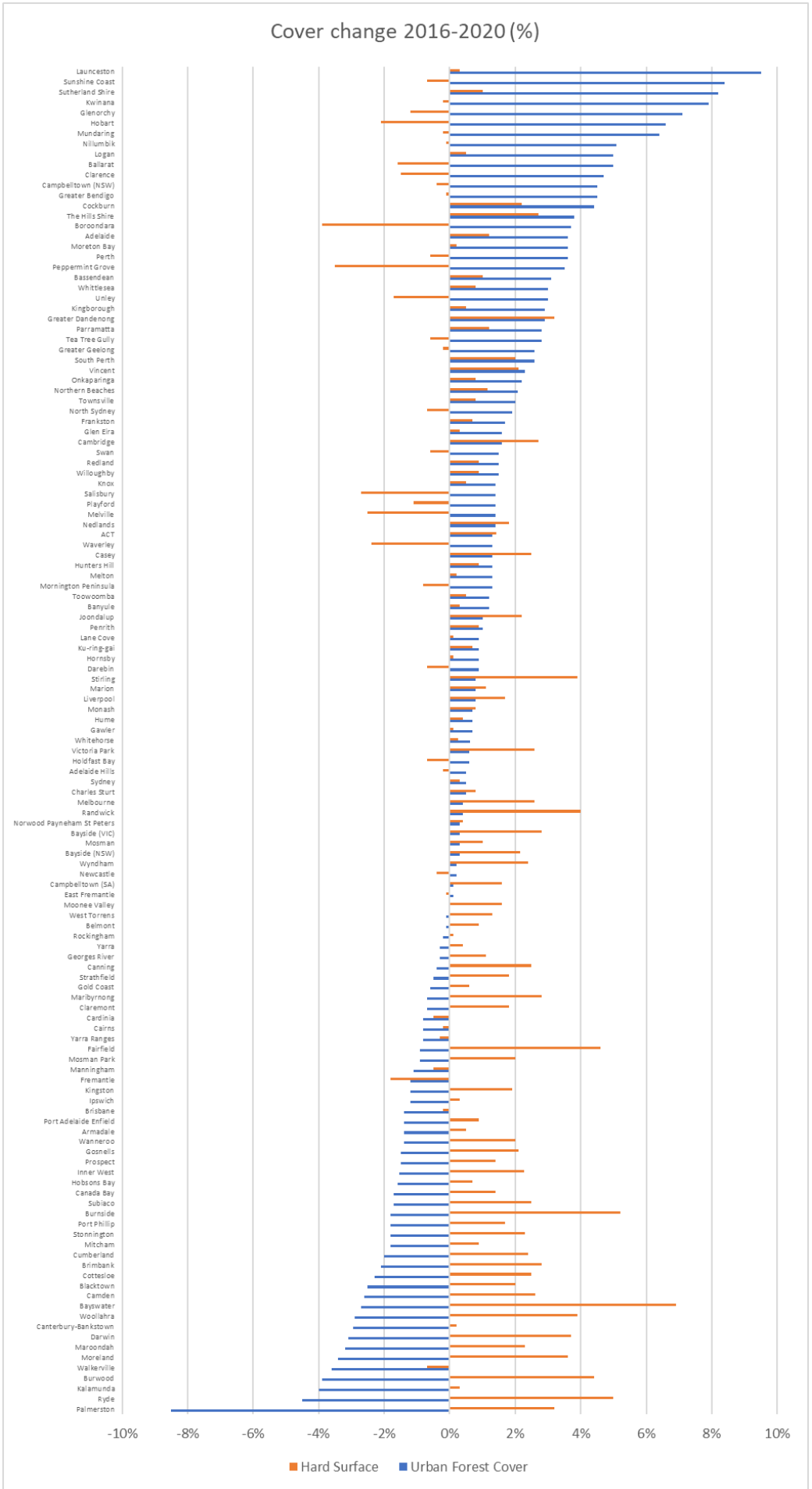


Figure 5. Urban forest and hard surface cover change 2016-2020



Canopy monitoring methods comparison

The graph below compares the two methods of i-Tree and Urban Monitor for the data that has been collected for across both areas. Figure 6 and Figure 7 show that the two methods produce approximately the same results for 2016-2020 % Tree cover respectively with an R squared of 66% and 67% respectively.

The differences between the two methods are likely attributable to:

- Slightly different time periods.
- Attribution of vegetation height is either collected automatically in the case of Urban Monitor or through human judgement in the case of i-Tree which can incur some error when classifying a shrub or small tree purely from aerial imagery
- The urban monitor data involves a census-based approach of all the trees in an LGA, whereas i-Tree involves a sample.

While these points would suggest that the urban monitor dataset is more accurate and therefore more useful, it is prohibitively expensive to perform nationwide.

% Tree (i-Tree – 2016) = 1.30 × (% Tree – Urban Monitor 2014) + 0.97 (R^2 = 66%)

% Tree (i-Tree – 2020) = 1.70 × (% Tree – Urban Monitor 2018) - 3.04 (R^2 = 67%)

Figure 6. Linear regression shows the relationship between the % tree obtained using Urban Monitor and i- Tree method in 2014 and 2016 respectively.

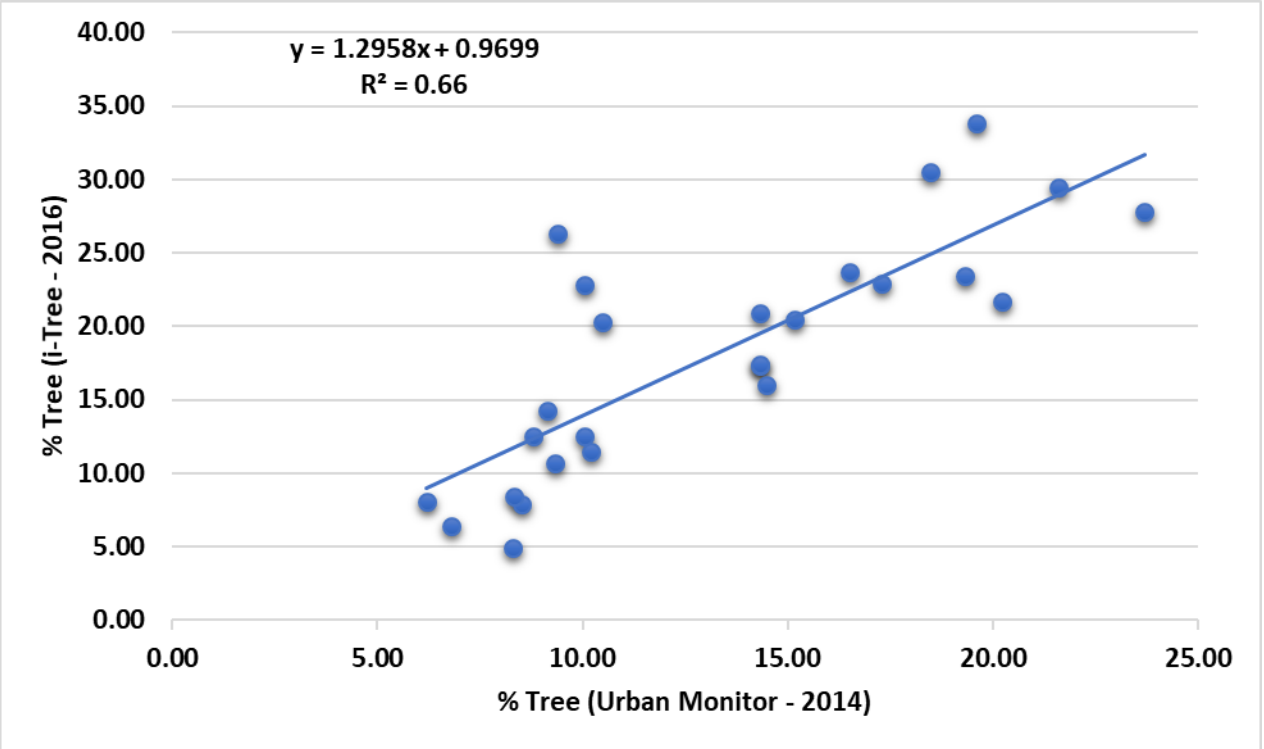
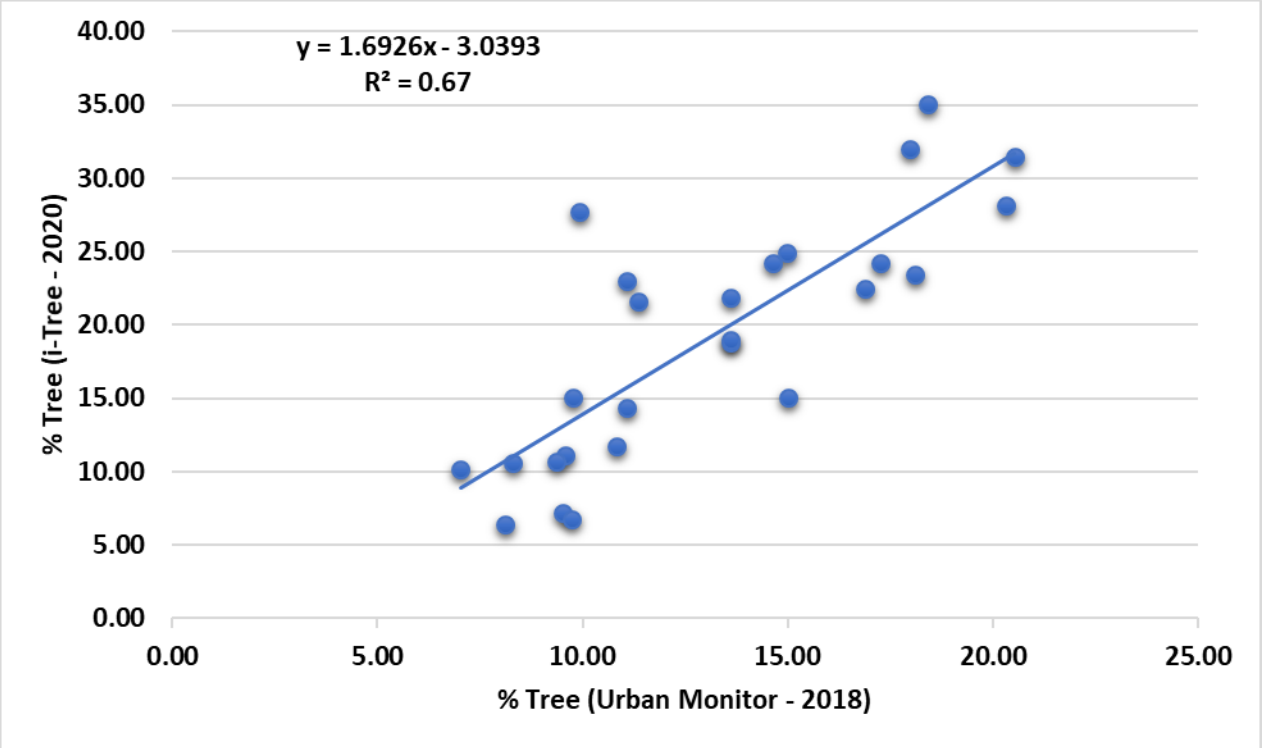


Figure 7. Linear regression shows the relationship between the % tree obtained using Urban Monitor and i- Tree method in 2018 and 2020 respectively.



Urban forest management (UFM) assessment

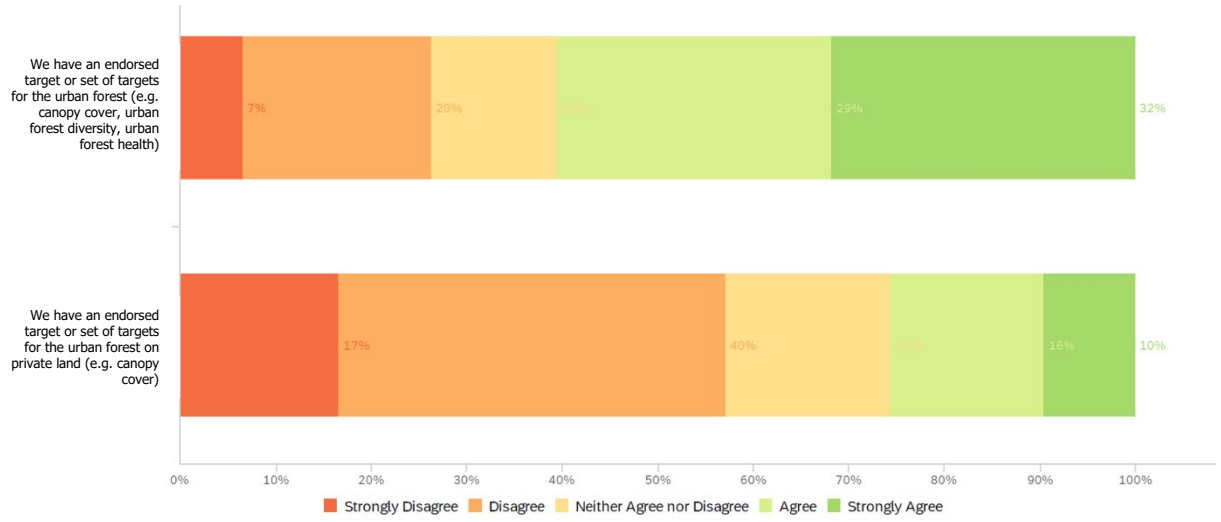
The national survey of urban forest management was sent to local government professionals in all 131 LGAs in the study. We received 169 responses across 118 LGAs. Survey questions are provided in Appendix 2 and a full summary report on the survey data is provided in Appendix 3. This section presents key findings from the survey.

Strategy and policy

Most respondents agree they have a good strategic basis for UFM with 149 responses (88%) agreeing they have an urban forest strategy *or* are developing one (19 reported they have no strategy *and* are not developing one; one respondent neither agreed or disagreed with both questions). However, the responses indicate that strategy and policy is mostly focused on public land. For example, most respondents agreed that they have endorsed canopy targets on public land (61% agree / 27% disagree) but fewer agreed they had targets on private land (26% agree / 57% disagree) (see Figure 8). This was reflected in the following comments on how to improve council strategic and/or policy responses:

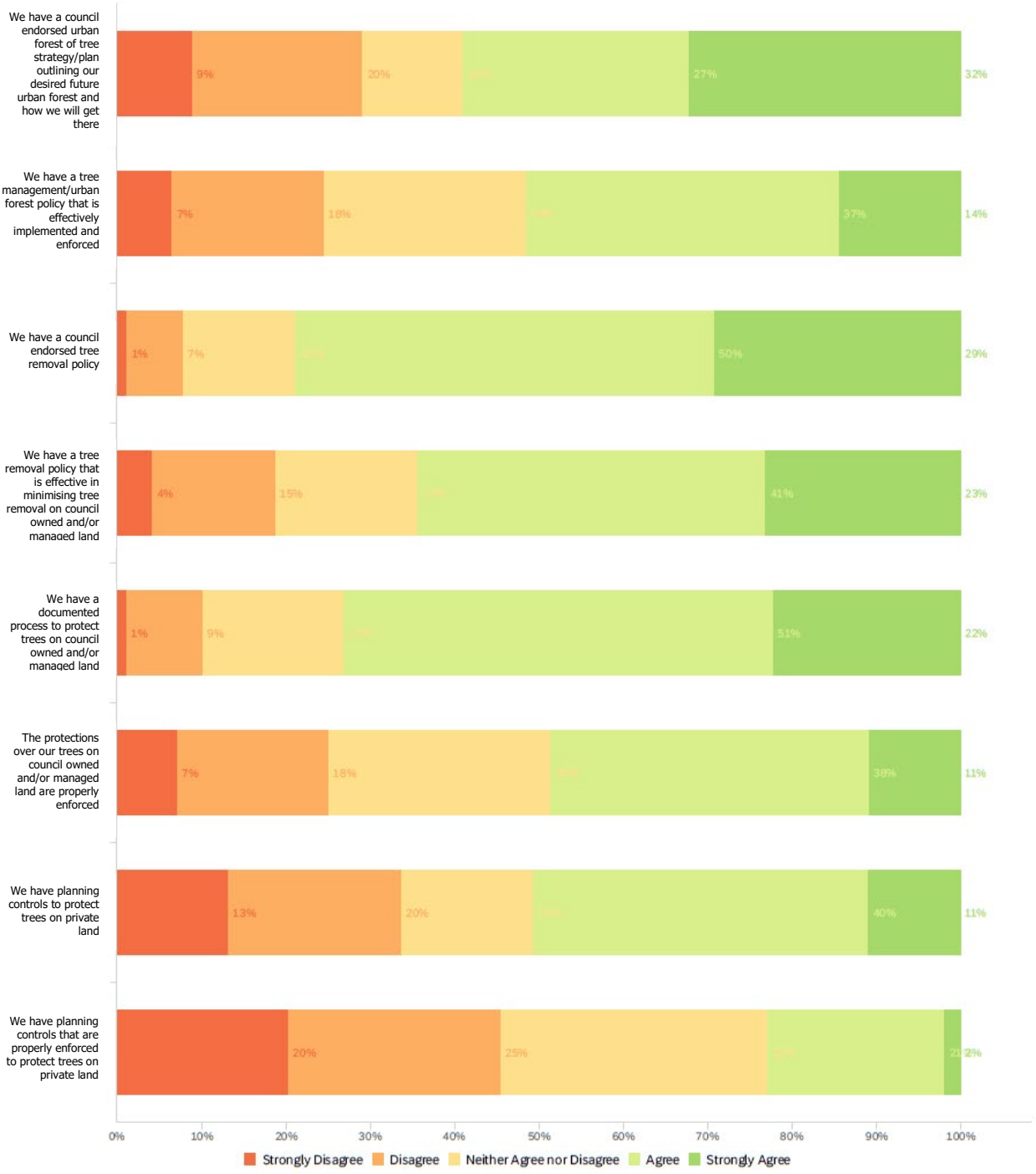
> *"Work out ways to encourage more private tree planting in the city".*
>
> *"Greater public support for and control of removal of trees on private property. (Our policy is effective for those it covers but this is limited). State wide approach would be beneficial as would public support".*
>
> *"Protection of trees on private land - we are currently working on a strategy to cover private trees, however the council do not wish to pursue a local law or planning scheme amendment to protect private trees…"*

Figure 8. Responses regarding endorsed canopy targets.



In general, most respondents reported good UFM Policy coverage across tree management (69%/18%), tree removal (79%/8%) and protection of trees on public land (73%/10%). However, when asked if these policies were effective both tree management and removal dropped slightly (to 51%/25% and 64%/19%), while tree protection on public land dropped significantly (49%/25%). These results are presented in Figure 9. This suggests that while strategy and policy for urban forest management is now the norm across most LGAs, there are some issues with the implementation and effectiveness of council policy and processes particularly in the protection of trees on council land. On private land, there was much less confidence in the policy basis. While half of the respondents reported that they had controls to protect trees on private land (51% agree / 33% disagree), far fewer reported that they have controls that are properly enforced (23% agree / 45% disagree) (see Figure 9).

Figure 9. Responses regarding policy and strategy coverage.

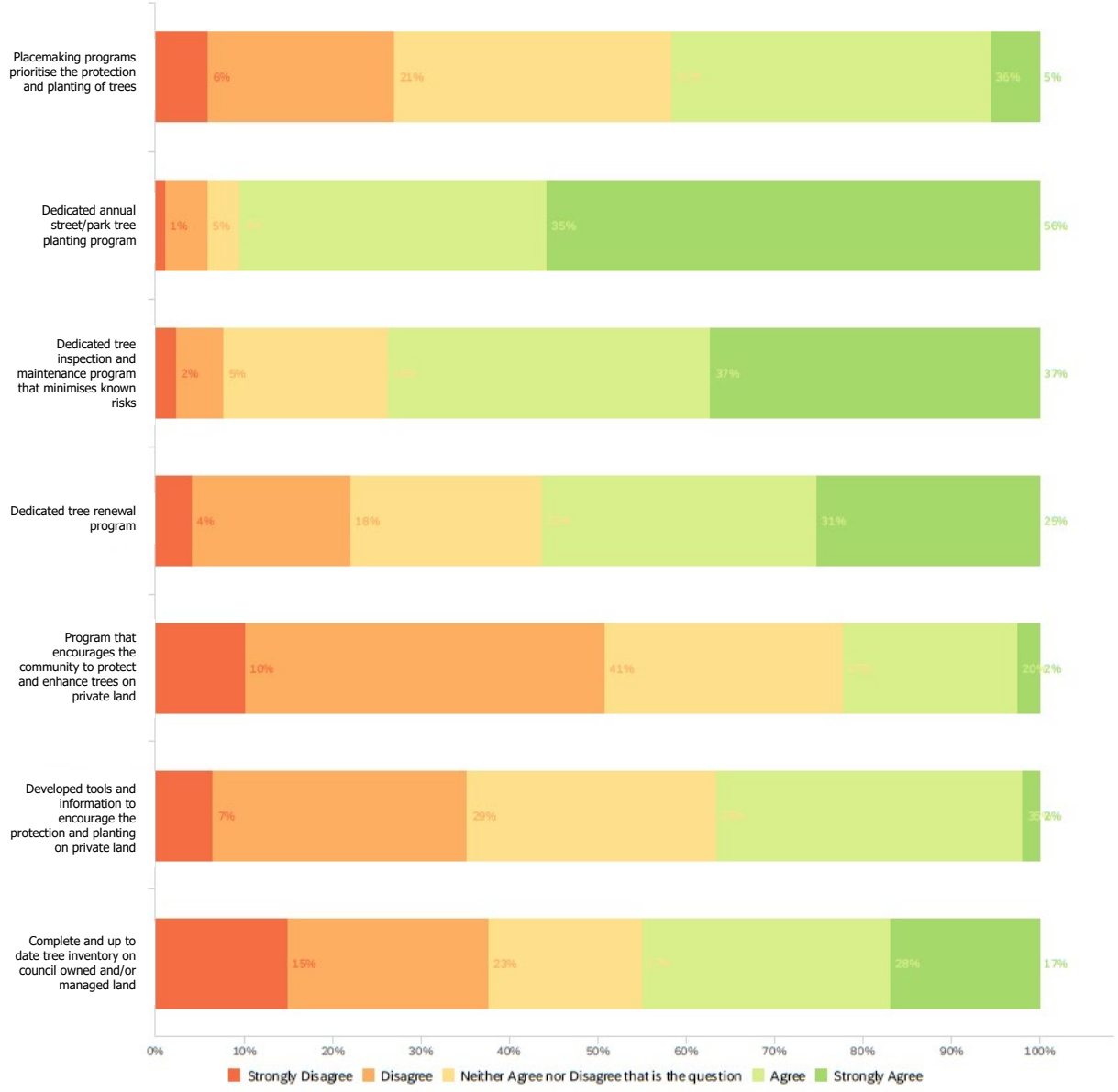


Programs, tools and information

Across most questions that probed programs and tools targeting public land planting, the majority of respondents agreed that measures were in place. Nearly all respondents agreed they had planting programs (91% agree, 6% disagree) on public land; and most agree that they have good tree inspection programs (74% agree / 7% disagree). However, there is less commitment to public land tree inventories (45%/38%), tree renewal programs (56%/20%) and integration of tree planning in placemaking activity (41%/26%). When asked about measures targeting private land there was a further drop in the proportion of respondents agreeing that measures were in place, with 37% agreeing (36% disagree) they had tools and information to encourage planting on private land, and only 22% agreeing (51% disagree) they had dedicated programs to encourage community to protect and enhance trees on private land. These results are presented in Figure 10. The results are typified by the following response on what can be done to improve programmes, tools and information to protect and enhance the urban forest:

> *"A Tree Protection Register for trees on private land and a dedicated officer who manages this register while also working with private landowners to plant more trees on private land."*

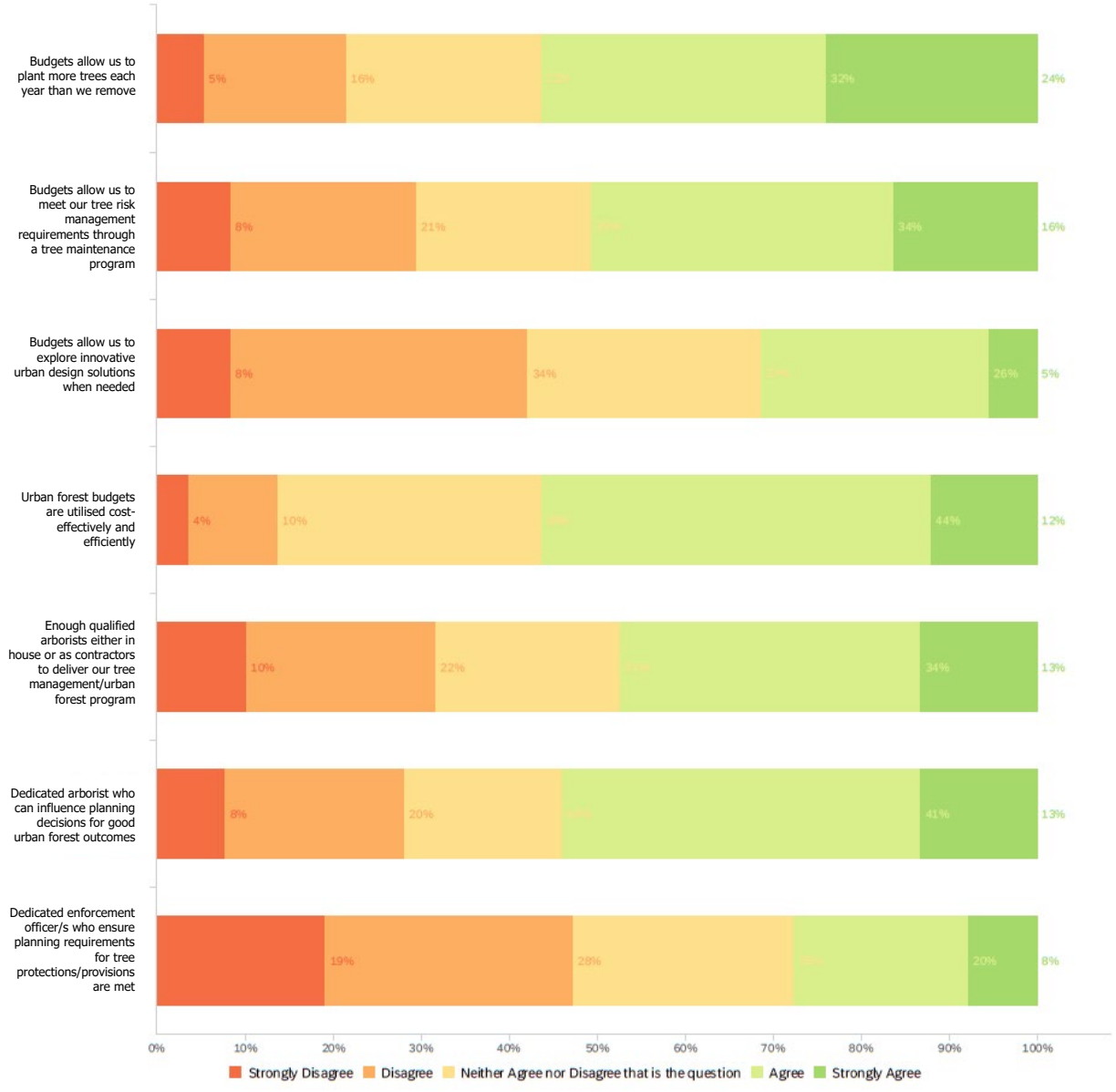
Figure 10. Responses regarding programs, tools and information.



Resourcing

Regarding the level of resources available for urban forest management, there were mixed results across the questions asked, reflecting a range of resourcing contexts across the LGAs in the study, with greater numbers reporting confidence in budget allocation and implementation. Across 4 questions probing budget suitability there was on average 48% agreement and 27% disagreement. There were also mixed results on the suitability of staffing levels, with some agreeing that they had enough arborists (47%/32%) who could influence planning decisions for good UF outcomes (54%/28%), but limited agreement that they had enforcement capability to ensure planning requirements for tree protection or provision are met (28%/47%). These results are presented in Figure 11. Resourcing for managing the urban forest on public land differs across states. Victoria and Western Australia report strong resourcing inputs. The ACT, NT, Queensland and South Australia all report only fair resourcing inputs, while Tasmania and New South Wales feel that they are under-resourced to manage their public urban forests.

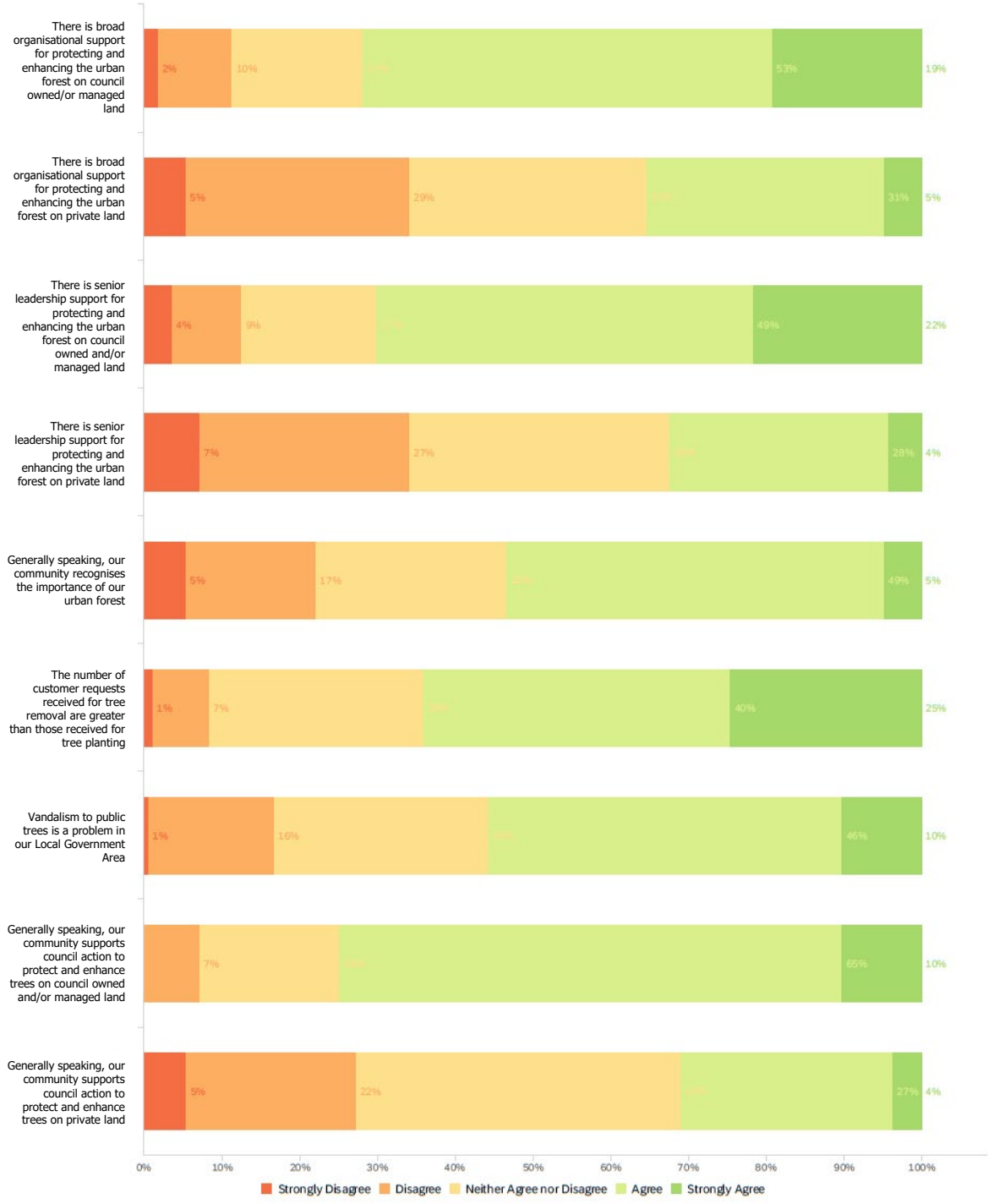
Figure 11. Responses regarding resourcing.



Enabling context

There is a clear distinction between support for council action on public land versus on private land. On public land organisational support was generally seen as good (72%/12%) as was support from senior leaders (71%/13%) and the community (75%/7%). On private land this support drops significantly: organisational support to 37%/34%; senior leader support to 32%/34%; and community support to 31%/27%. While community is more often than not seen as supporting urban forest management (54%/22%), most respondents agree that requests to remove trees outweighs requests to plant them (65%/8%) and agree that vandalism of trees is an issue (56%/17%). These results are presented in Figure 12. Respondents cite, amongst other factors, the need for increased community engagement and education on the benefits of the urban forest.

Figure 12. Responses regarding enabling context.



The view of local government towards state/territory level support reveals clear concerns. Only 13% agree (57% disagree) that there is adequate policy direction and land use controls to support urban forest management; and only 10% agree (52% disagree) that initiatives to change and improve local controls for urban forest management are encouraged and facilitated by state/territory processes (see Figure 13).

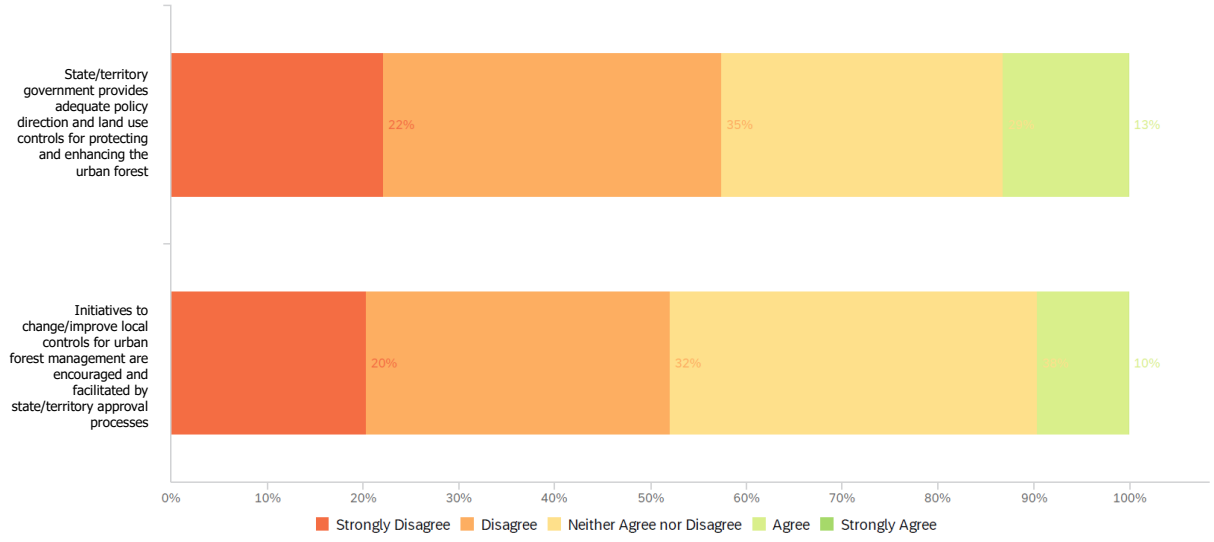
The tension between councils' influence on public and private land is typified in the following comment received where a respondent stated:

> *"On public land we are making fantastic progress toward our canopy targets, but on private land we fight a losing battle because we effectively [have] no power to prevent tree losses and limited influence over developer decision making."*

The state government enabling context is perceived as weak, as reflected in the following responses outlining the needs:

> *"Strengthening of planning provisions for retention of significant trees and retention and expansion of canopy coverage on private and public land"*
>
> *"Planning reforms to place greater importance on existing trees and allocation of adequate space for new trees"*
>
> *"Stronger planning controls in terms of requirements for tree retention/planting on properties pre and post-development. A contribution scheme for the loss of trees to ensure there is funding for identifying new tree planting sites, and undertaking tree planting. More control over as-of-right development and building permits to prevent unnecessary tree removal and ensure adequate replacement tree planting."*

Figure 13. Responses regarding state/territory level support.



Barriers

Overall, the key barriers identified for increased community support for tree planting and protection were: poor knowledge/understanding of trees; general mess created by trees; and impacts of trees on infrastructure (buildings, paths, fences, etc). The key barriers to council action were: limited/ineffective planning policy and controls; limited council resources; community sentiment.

Discussion and Conclusions

The urban forest is critical infrastructure for cities. It provides many benefits and essential services including heat mitigation, stormwater management, amenity and well-being, biodiversity, and supporting healthy active lifestyles. To grow and maintain an abundant and vibrant urban forest requires ongoing commitment and management. This project is targeted at supporting this effort, providing detailed LGA level results as well as the basis for more meaningful comparison and opportunities for learning between jurisdictions.

Through the completion of a land cover assessment, a survey of local government professionals and a State based policy review, this project has produced a national assessment of urban forest cover and urban forest management practices, highlighting areas of challenge for the future of urban forest cover in Australian cities.

The data produced has facilitated the production of several outputs targeting research, government, industry and community audiences. This research report has presented the research design and methods; along with the data produced and a summary analysis of this data. The report is supported by a Data Workbook containing all i-Tree data, contextual data, and summary survey data by LGA. Several outputs targeting key audiences are available via Greener Spaces Better Places (https://www.greenerspacesbetterplaces.com.au/). These are:

- A public facing benchmarking report titled "Where Will All the Trees Be? The 2020 update of green cover benchmarking in our cities and suburbs"
- An interactive website allowing users to enter their local area and view an online summary report for their LGA
- Individual LGA reports for all 131 LGAs in the study area (see Appendix 5 for example report; available by contacting Greener Spaces Better Places)

Central to this project was a 2020 assessment of urban land cover to add to previous studies in 2013 and 2016 using the i-Tree Canopy method. The results show that at a national level we are seeing a slight decline in urban forest cover when we hope to see growth. At the LGA level, since 2013 the majority (69%) of LGAs are going backwards, losing green cover. However, an encouraging trend is present in the more recent study period between 2016 and 2020, with the majority of local government areas (62%) gaining green cover – though in most cases not enough to make up for losses, but the trend is in the right direction. Also encouraging, is the number of LGAs gaining urban forest cover in the recent period while also seeing increases in hard surface cover, demonstrating that urban greening can and is occurring alongside urban development and intensification. This recent trend may indicate that the increased attention on urban forest management at the local government level, supported by programs such as Green Spaces Better Places, is starting to turn the tide on urban forest loss.

In addition to the land cover assessment, the survey of local government professionals provides insight into the state of urban forest management practice at the local level. The results indicate that the majority of LGAs are well progressed in developing and maintaining a strong management framework to address urban forest cover on public land, and that they have strong organisational and community support to do this work. However, most reported that that there is limited and ineffective effort to influence cover on private land, with lower organisational and community support to do this work. Despite challenges on private land, most recognise this is a critical area for improvement, with "Planning Controls to regulate what happens on private land" given the most weight by respondents from a list of barriers to increased tree planting and protection.

While the challenge of better management of the urban forest on private land is seen as being important, most respondents feel that state policy frameworks around land management do not support urban forest protection/enhancement on private land. This tension between councils' influence on public and private land is typified in the following response:

> *"On public land we are making fantastic progress toward our canopy targets, but on private land we fight a losing battle because we effectively have no power to prevent tree losses and limited influence over developer decision making."*

Many highlight the need for policy support, such as the following response outlining needs:

> *"Strengthening of planning provisions for retention of significant trees and retention and expansion of canopy coverage on private and public land"*

The survey results help to partially explain some of the losses and gains seen in green cover across States. While LGA's have direct control over managing vegetation in streets, parks and other public spaces, the ability to protect and enhance the urban forest on private land is much harder. A lack of resources, organisational and community support coupled with weak State Government enablers, demonstrate the challenges LGA's face in managing trees and vegetation on private land. Given that approximately half of most LGA's land cover is privately owned, the extent of this challenge is immense.

Given this challenge of influencing private land outcomes, the review of state/territory statutory planning provides insight into existing approaches, opportunities for cross jurisdictional learning, and of the gaps and challenges ahead. State Governments and Territories include various direct and indirect mechanisms within their planning frameworks that aim to protect and enhance trees on private land. Direct mechanisms such as tree protections, bushfire and heritage controls as well as indirect mechanisms such as setbacks, site coverage ratios and provision of private open space all impact private tree cover. What is less understood is how these mechanisms are applied and the effectiveness of their control.

All states, except for Queensland included statute that related to the retention, removal, and establishment of trees on private land in the urban environment. Queensland was unable to be assessed due to its significant out of scope local content. Content relating to the establishment of trees was principally linked to the development of apartments, commercial and industrial areas and greenfield areas. Statute relating to low density housing included fewer requirements to establishment of new trees, though this did occur in cases such as NSW and SA. Apartment developments and car parks were two common areas in which the establishment of trees were explicitly encouraged/required. For apartment developments, this was principally observed in NSW and WA with their respective department design guidelines. The provision of deep soil zones was a commonly cited requirement, principally relevant to apartment developments, that was found throughout the planning systems assessed including NSW, WA, NT, SA, and Victoria. For carparks, this was observed in ACT, SA, WA and Victoria, and related to shading and visual impact.

Urban expansion and intensification are key drivers of tree loss in cities. This study shows that hard surfaces continue to increase in cities, and most LGAs are seeing a loss of urban forest cover when we need to see gains. Over the 2013-2020 study period only 3 of 131 LGAs show an increase of over 20% from the 2013 baseline urban forest cover. And only 29% of LGAs show an increase at all. However, the results show that in the more recent period between 2016-2020 most LGAs (63%) and now seeing an increase in urban forest cover.

As cities grow, we need to also grow our green cover. This is possible and is happening in many places across the country that we can learn from. The outlook for most LGAs, while challenging, appears more positive due to the large amount of collective action generated by LGAs, particularly on public land. The majority of LGAs report robust urban forest management frameworks, adequate resourcing, and good organisation and community support for public land urban forest management. However, the large majority of LGAs recognise the significant challenge and opportunity of private land urban forest management; and acknowledge they are weak in this area. They also report poor state policy frameworks and support for action on private land. This suggests significant effort is required, particularly in strengthening the strategy and policy of state and local government that affects private land, if the substantial quantum of private land urban forest cover is to be maintained.

Recommendations

- The longitudinal research between 2013 and 2020 has identified that while green cover is declining in most LGAs, in the recent period of assessment (2016-2020) almost two thirds of LGAs are seeing an increase in green cover. This suggests that increased efforts to improve and protect green cover, particularly on public land, are working. It is recommended that local government maintain a focus on building capacity for urban forest management in communication with initiatives such as Green Places Better Places, to consolidate this trend.
- The research has identified that most LGAs now deploy good strategies, policies and programs for effective urban forest management on public land. It is recommended that programs focus on cementing these gains, disseminating best practice to areas in need, and on evaluating and improving initiatives.
- The research has identified both the importance of community support to enable good urban forest management and the variable nature of this support by area and issue. It is recommended that programs continue to focus on community education, engagement and participation to enhance the success of urban forest management, especially with regard to private land.
- The research has identified that most LGAs recognise improving urban forest outcomes on private land as a critical challenge and that there is limited action, capacity and support in this space. It is recommended that programs seeking to improve urban forest management elevate the management of private land as a key strategic objective, with strategies and programs of action developed to reflect this.
- To support improved urban forest management on private land there is a need for research to better understand the drivers of private land loss and the values and attitudes of residents towards management of the urban forest on private land
- To support improved urban forest management on private land there is a need for research that evaluates the impact of strategy, policy, programs and regulation that target the private realm. There is a need to understand what works and why so that successful mechanisms can be transferred and scaled up.
- To support community engagement there is a need for research and tool development to enable effective knowledge building among residents on tree protection and planting strategy and action.
- This research provides a comprehensive urban assessment of land cover, allowing for comparison across the county and across three time points. There is value in continuing the approach taken in this research. However, if continued, it is strongly recommended that the method be adjusted to allow for robust assessment of urban-only areas of LGAs with large non-urban areas.
- As urban forest management becomes more sophisticated, the demand for more fine-grained data at the local scale becomes more important to inform and evaluate strategy and action that is relevant to the individual land manager. Increasingly LGAs are gaining access to such data either through self-funding or via State Government. In addition, new methods incorporating artificial intelligence and deep learning are increasing the detail, accuracy and resource efficiency of green cover assessments. It is recommended that a feasibility assessment of transitioning to a full national urban assessment of cover using alternative methods be conducted to overcome some of the limitations of a sampling method and to better service the needs of the sector. An important principle here is to ensure full data coverage and comparability; as well as to support comparable data collection over time.

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Appendices

Appendix 1 - Review of State/Territory statutory planning
Appendix 2 - Survey questions
Appendix 3 - Summary survey report
Appendix 4 - LGA Data workbook – meta data; additional information; data tables
Appendix 5 - Example LGA report
Appendix 6 - Summary i-Tree results by state/territory
Appendix 7 - i-Tree standard error results by LGA

Appendix 1 - Review of state/territory statutory planning

Australian Capital Territory

Key takeaways
Significant focus on the retention of high value trees
Establishment of new trees mostly for commercial and industrial areas, and multi-dwelling residential. No requirements for establishing new trees in low-density residential areas.
64 Statutory elements: 26 indirect, 38 direct

The policy review identified three principal documents of relevance to the retention, management, removal and establishment of trees on private land within the urban environment. These documents were the: Tree Protection Act 2005; Heritage Act 2004; Territory Plan 2008. The Territory Plan 2008, the principal statutory planning document for the ACT, contained the most relevant statutory content for the purpose of this review.

The Territory Plan 2008 applies planning control principally through the use of zones, which outline land-use objectives and permitted/prohibited land-uses, and codes, which provide additional development controls. The most relevant elements within the Territory Plan 2008 for the purpose of this review were Development Codes and General Codes, which outline specific requirements to be met by development applications. The Development and General Codes apply across the territory and are tied to specific zones (Development Codes) and types of development (General Codes).

14 Development and General Codes were identified as relevant to the presence of trees on urban private land. Within these codes, 64 statutory elements were identified as relevant. 26 of these statutory elements were identified as indirectly impacting the presence of trees. These related predominantly to built form requirements such as: plot ratios; building envelopes; side and rear setbacks; private open space provision. 38 statutory elements were identified as directly relevant to the presence of trees. These related to: bushfire; heritage; tree protection; landscaping; open space provision; front setbacks for the explicit purpose of establishing trees. Landscaping mostly related to the establishment of trees in carparks in commercial and industrial areas, and within the grounds of multi-unit dwellings. development and general codes relevant to single dwelling developments only included statutory elements relating to the retention of trees or responding to bushfire threats, there were no instances observed requiring the establishment of trees.

The Development and General Codes within he ACT system rely on a system of rules and criteria that development applications are required to meet. The system allows for variation in certain circumstances. The requirements relating to the removal, retention, management and establishment of trees are considered well supported by the statute.

The ACT Planning system focussed significantly on the retention of specific, high value trees. This is seen through the existence of the Tree Protection Act 2005, legislation intended specifically to retain high value trees. There were no other states territories that had comparable tree protections legislation. The focus on tree retention was also reflected through the Development and General Codes within the Territory Plan 2008, which focused more on the retention of existing trees than the establishment of new trees.

The ACT Planning system has a strong precinct focus, giving statutory weight to policies that apply to specific precincts and areas. These policies and statutory elements include the National Capital Plan (NCP), Precinct Codes, and Development Control Codes and are likely to include place specific requirements relating to trees. However, precinct specific documents were outside the scope of the assessment and were not included in our review.

New South Wales

Key takeaways
Apartment design standards focus on establishing new trees
Significant exemptions for the removal of non-significant trees and removal of trees for bushfire risk management
129 Statutory elements: 56 indirect, 73 direct

The NSW planning system includes three types of instruments: Strategic planning instruments; Environmental Planning instruments (EPIs); Development control plans (DCPs). Of these, the EPIs are divided into State Environmental Planning Policies (SEPPs), prepared by the state and apply across the state and to specific regions of state planning significance, and Local Environmental Plans (LEPs), Prepared by individual local governments.

This policy review principally looked at the SEPPs as they were considered the most relevant planning instrument for the sake of this project. 12 SEPPs were considered relevant to the presence of trees in private urban land in NSW. Within these SEPPs, 129 relevant statutory elements were identified. 56 statutory elements within the SEPPs were indirectly related to the presence of trees. These elements related to built form elements such as: setbacks; building envelopes; maximum site coverage and floor area. 73 statutory elements related directly to the establishment, retention, or removal of trees. These elements related to areas such as: landscaping; establishing deep soil zones; energy efficient built form; private open space; exemptions for the removal of trees; bushfire; heritage; protection of significant trees; neighbourhood amenity; establishment of large trees.

There is significant repetition of statutory elements within the NSW planning system, such as within *SEPP (Exempt and Complying Development Codes) 2008,* where different classes of development include the same standards. As such, while the number of statutory elements were more significant in NSW than other states, this is likely more a result of repetition than an increased policy focus on tree related policy.

An element within the NSW planning system that is of particular relevance to the establishment of trees is *SEPP 65 – Design Quality of Residential Apartment Development* and the *Apartment Design Guide* therein. The design guide differs from the rest of the planning system in its focus on using trees to achieve secondary design objectives. For example, the design guide encourages the use of trees for energy efficiency and shading outcomes as well as to improve visual privacy. This differs from the rest of the NSW planning system which largely focuses on prescriptive instructions for the retention or removal of trees. Far from being prescriptive, the impact of the apartment design guidelines is uncertain as the language used within the policy is often discretionary and allows for variation based on the given application.

SEPP (Exempt and Complying Development Codes) 2008 is a significant element of the NSW planning framework, constituting 43% of all observed statutory elements relevant to trees. the focus on exemptions to planning approval is largely unique to the NSW system, and was not observed to the same extent in other states. The exemptions and complying development codes principally relate to the retention of significant trees and the removal of non-significant trees, as well as bushfire protection and built form elements. The focus on establishing new trees is limited but present for greenfield areas, commercial and industrial areas, and low-rise housing areas. The application of the exemption and complying development codes are principally mandatory exemptions or conditions to be placed on complying development; as such, they are considered to have significant statutory weight.

The only other example of a statutory element explicitly requiring the establishment of new trees was under *SEPP (Educational Establishments and Child Care Facilities) 2017.* Under this SEPP, trees are explicitly required to be established as a condition of development approvals for land on school and Uni/TAFE grounds immediately adjacent to residential zones.

Other planning docs identified as relevant to the presence of trees include: Rural Fires Act 1997; the

Planning for Bushfire Protection Policy; Standard Instruments – Principal Local Environmental Plan.

The Rural Fires Act 1997 outlines the types of vegetation able to be removed without planning permission, for the sake of bushfire mitigation. This document was identified but not thoroughly reviewed in this assessment.

The Planning for Bushfire Protection Policy is given power through several SEPPs and outlines, among other things, requirements for the removal of vegetation to manage bushfire risk. This document was identified but not thoroughly reviewed in this assessment.

The Standard Instruments – Principal Local Environment Plan outline a standard format document to assist local government in preparing their Local Environmental Plans. These documents were considered relevant as they are prepared at the state level. The standard instruments include four statutory elements relevant to urban trees, including two directly relevant (relating to heritage and bushfire reduction) and two indirectly relevant (relating to built form elements such as subdivision lot sizes and floor space ratios).

Western Australia

Key takeaways
Apartment design guidelines focus on establishing new trees
Apartment design guidelines include unique developer incentives to retain vegetation not seen in any other state
35 Statutory elements: 19 indirect, 16 direct

The WA planning system has a mix of state and regional strategic policy, as well as state planning controls and local planning schemes that influence development outcomes. Additionally, there are a series of operational policies that guide decision making in response to subdivision and structure planning. For the purpose of this policy review, State Planning Policies (SPPs) were the principal focus as they were considered to most relate to the retention, removal, and establishment of trees on urban private land. Other policies such as Development Control and Operational Polices, and the *Liveable Neighbourhoods 2015* policy were reviewed as they influence planning approval decisions for subdivision and precinct planning matters.

Five SPPs were considered relevant to the presence of trees on urban private land. Within these SPPs, 35 statutory elements were identified as relating to trees. Of these 35 statutory elements, 19 were identified as indirectly influencing the presence of trees. These related to areas such as: Site cover area and plot ratios; setbacks; open space provision; landscaping and water sensitive urban design not explicitly relating to trees. 16 statutory elements related directly to the presence of trees, including areas such as: retention of bushland vegetation; bushfires; landscaping and open space provision; carpark design; building setbacks and orientation for the purpose of tree retention; provision of deep soil zones.

The tree related content was principally located within *SPP 7.3 Vol 1 and Vol 2 – Residential Design Codes.* SPP 7.3 introduces the residential design codes which outline development controls for most residential development in WA. Volume 1 of SPP 7.3 relates to developments of single, grouped or multi-dwelling developments in lower density areas. Volume 2 of SPP 7.3 relates to apartment developments in higher density areas. Both volumes area currently being reviewed as part of part of states response to COVID-19 pandemic.

Compared to other states and other SPPs, SPP 7.3 had a significant focus on establishing new trees, such as through requiring deep root zones. SPP 7.3 also encourages the use of trees to address secondary design outcomes such as visual privacy and public realm interfacing. As with NSW's *Apartment Design Guide*, the impact of SPP 7.3 is uncertain as the language used within the policy is often discretionary and allows for variation based on the given application.

Interestingly, Volume 2, which related to apartment developments, had significantly greater tree establishment content than Volume 1 which focused on lower density areas. This is similar to the NSW system where a significant amount of tree establishment content was located in the *Apartment design Guide*.

SPP 7.3 – Vol 2 included a provision whereby developers where incentivised to include features in their proposal's that provided community benefit above the minimum required standard in exchange for additional development potential. This policy is unique in its encouragement to retain additional vegetation as a community benefit. This policy relates only to the retention of significant mature or native vegetation and not to the establishment of additional vegetation. It is uncertain from this review whether the option to retain addition vegetation is taken up by the development industry.

In addition to the SPPs, Development Control Policies and the *Liveable Neighbourhoods 2015* policy was assessed due their influence on subdivision and precinct planning applications. Both the policy areas were less significantly concerned with trees generally, only including provisions that sought to retain large trees where possible. Additionally, the Guidelines for Planning in Bushfire Prone Areas, given statutory power through *SPP 3.7 – Planning in a Bushfire Prone Area* was also identified as being relevant to the presence of trees on private urban land.

Tasmania

Key takeaways
No elements relating to the establishment of trees.
Local planning schemes expected to contain more relevant content.
4 Statutory elements: 1 indirect, 3 direct

The Tasmanian planning system includes both state and local content comprising of: State Policies and National Environmental Protection Measures (NEPMs), Planning Directives prepared at the state level, regional strategic land-use plans, and local planning schemes. Most content relevant to the policy review was included in the Planning Directives currently issued by the Minister for Planning and Local Governments. These directives provide state level direction of particular planning matters and include information to be included in local planning schemes. The assessment also investigated State Policies and NEPMs but found these to contain no relevant content for the purpose of the review. Local planning schemes are expected to contain more relevant content but were outside the scope of the policy review due to their local nature.

Two Planning Directives were identified to contain content relevant to the existence of trees on urban private land. These included *Planning Directive no. 4.1 – Standards for Residential Development in the General Residential Zone* and *Planning Directive no. 5.1 – Bushfire-Prone Areas Code.* Within these Planning Directives, four statutory elements were identified as relevant. Three of these statutory elements were identified as indirectly impacting the presence of trees. These related to the following areas: site cover areas; setbacks; private open space provision. One of the statutory elements was identified as directly impacting the presence of trees, this related to planning in bushfire prone areas.

The content within the Planning Directives includes a mix of mandatory objectives with variation in how these objectives are achieved. While Planning Directives such as *No. 5.1* are required to be included in local planning schemes, this requirement can be overridden by Ministerial approval. Overall, the observed requirements that relating to the removal, retention, management and establishment of trees are considered well supported by the statute.

Northern Territory

Key takeaways
Bushfire planning was not a significant variable in urban forestry policy
Focus on the retention and establishment of trees on high- and low-density residential land
7 Statutory elements: 2 indirect, 5 direct

The *NT Planning Scheme* (NTPS) is the principal planning document within the NT planning system and outlines the standards to which land-use and development can occur within the territory. In addition to including regional specific strategic content, The NTPS is applied across the entire territory with minor exceptions.

There were 7 statutory elements identified within the NTPS relating to the retention, removal or establishment of urban trees on private land. Two of these were indirectly related to the presence of trees. five were directly relevant to the presence of trees. The NTPS applies consistent Development Requirements across multiple land-use zones. The policy review found three Development Requirements that related to the retention, removal, and establishment of urban trees on private land. Two of the Development Requirements were directly relevant to the presence of urban private trees, focusing on landscaping requirements and private open space. Landscaping requirements focused principally on the retention of existing vegetation, whereas requirements for private open space focused on providing deep soil zones for the establishment of new trees. One of the Development Requirements was indirectly related to the presence of urban private trees, focusing on building setbacks. These Development Requirements apply across 19 zones including low, medium and high-density residential zones as well as commercial and industrial zones.

In addition to the Development Requirements, two Overlays and One Subdivision and Land Consolidation Requirement was found to relate to the presence of trees on urban private land, these related to the retention and removal of native vegetation and minimum lot sizes for new subdivisions.

The removal of vegetation to respond to bushfire threats were not found to be a significant component in the NTPS.

In addition to the NTPS, the *Northern Territory Compact Urban Growth Policy* was also found to influence the presence of urban trees on private land. This policy outlines requirements for high density development in brownfield and greenfield areas and was found to Influence the presence of urban trees indirectly through neighbourhood character controls.

South Australia

Key takeaways
Significant focus on bushfire planning, with siting and design of buildings as preliminary response.
135 Statutory elements: 100 indirect, 35 direct

The SA state government is currently undertaking review of the state's planning system. The newly proposed planning system is being introduced through a staged process. The new system is anticipated to apply to all urban areas at some point in 2021. The policy review investigated the incoming planning system.

The principal statutory document within SA's incoming planning system is the Planning and Design Code. This code stipulates the requirements for land-use and development throughout the state. While at a strategic level, policies apply both state-wide and regionally specific scales, the Planning Design Codes are a consistent set of planning regulations that apply across the entire state (or will do once the new planning system is brought in).

Within the Planning Design Codes, 135 statutory elements were identified as relating to the retention, removal, or establishment of urban trees on private land. Of these, 100 were identified as indirectly

relevant to the presence of trees, concerning subject areas such as: setbacks; siting of buildings; site coverage, private open space provision. 35 statutory elements were identified as directly relevant to the presence of trees, concerning subject areas such as: landscaping; provision of private open space with trees and deep root zones; retention of native vegetation; heritage; bushfire. Landscaping relates to both new developments and the design of carparks to increase shading and soften visual appearance. Private open space explicitly relates to establishing new trees and providing deep soil zones in higher density developments. These statutory elements apply across residential areas of high and low densities, as well as employment areas. These elements relate to all three elements: the retention, removal and establishment of trees.

The Planning and Design Codes within the SA system includes a series of performance criteria that allow for variation in achieving of mandatory planning objectives. The system appears to strongly support the stated requirements for the retention, removal and establishment of urban trees on private land.

SA system includes a notification exemption component for "tree damaging activity" considered minor by the relevant authority. This exemption is applied across 11 zones. It is uncertain whether this would have any significant impact on the urban forest as it is not articulated in the statute what constitutes works of a minor nature.

The SA system includes several overlays relating to the management of vegetation in response to bushfire risk. Generally, the policies seek to maintain trees through requiring the siting of new buildings to be located away from existing vegetation. Additionally, design and siting requirements of buildings in bushfire areas are required to consider the existing site conditions to minimise the need for vegetation removal.

Queensland

Key takeaways
No relevant content identified

The Queensland planning scheme contains only strategic content at the state level, with local planning schemes containing all statutory requirements relating to land-use and development. As such, the policy found no relevant state level policy relating to the retention, removal and establishment of trees on private land in the urban environment.

Victoria

Key takeaways
Significant focus on retention and removal of trees
Establishment of trees relates to neighbourhood character, apartment development, and non-residential land.
Unique focus on tree retention for erosion management not seen in other states
42 Statutory elements: 15 indirect, 27 direct

The principal state level statutory policy in Victoria responsible for the retention, removal, and establishment of new trees are the Victorian Planning Provisions (VPPs). The VPPs outline the standard zones, Overlays, and other provisions able to be included within local government planning schemes. These standard provisions allow for locally specific content to be included as a schedule, without amending the pre-defined head clause. This assessment focused on the VPPs and not locally specific content included in particular planning schemes.

Within the Victorian system a total of 42 statutory elements were identified as relating to the retention,

removal and establishment of urban trees on private land. Of these, 15 were indirectly related to the presence of trees, relating to areas such as: private open space; setbacks; site permeability; lot size; site coverage. 27 statutory elements were directly relevant to the presence of trees, relating to areas such as: minimum garden requirements; heritage; neighbourhood character; bushfire; protection of significant vegetation; landscaping; erosion management; native vegetation retention. As with many states, landscaping related to the establishment of trees, provision of deep root zones, and the use of trees within ground floor carparks for shading and softening the visual impact.

Throughout the VPPs, statutory elements principally relate to the retention and removal of trees and less so to the establishment of new trees. Where new trees were required to be established, this usually related to ensuring consistency with the dominant neighbourhood character. As defining neighbourhood character is often at the discretion of the planning officer assessing an application, it is uncertain how significantly this would impact the development of an urban forest. Additionally, as neighbourhood character relates to responding to the existing urban conditions, it is uncertain how effective these measures would be at increasing urban canopy.

Of the three identified statutory elements relating to the establishment of trees for reasons other than neighbourhood character, two related to non-residential land-uses (shading of carparks and visual screening of extractive industry areas), and one related to apartment developments (provision of deep soil zones for the establishment of canopy trees). This continues the theme observed throughout the policy review, where low density residential development is less likely to require relating to the establishment of trees.

The VPPs include two provisions that relate to the retention of trees for the purpose of erosion control: Clause 44.01 – Erosion Management Overlay and Clause 44.02 – Salinity Management Overlay. These were the only instance where erosion control through vegetation management that was observed throughout the policy review.

Similar to the NSW planning system, the VPPs include several planning permit exemptions relating to the removal of trees and vegetation. While this doesn't occur to the same extent as the NSW system, it may impact the retention of less significant trees otherwise not protected by the statute. These exemptions relate to multiple provisions but principally to bushfire management as seen by the existence of Clause 52.12 – Bushfire Protection Exemptions.

Appendix 2 – Survey questions

In what Local Government Area do you work? (Note: only the LGAs covered by the study area are available for selection).

▼

How many years have you been employed at your current place of work?

- ○ Less than 1
- ○ 1-2 years
- ○ 3-5 year
- ○ 5-10 years
- ○ More than 10 years

How many years have you worked in the area of urban forests or green space?

- ○ Less than 1
- ○ 1-2 years
- ○ 3-5 year
- ○ 5-10 years
- ○ More than 10 years

What professional field do you most closely identify with?

- ○ Urban Forestry
- ○ Arboriculture
- ○ Urban Planning
- ○ Open Space / Recreation planning
- ○ Other _____

To what extent do you agree or disagree with the following statements on Strategy and Policy in your Local Government Area?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
We have a council endorsed Urban Forest or Tree Strategy/Plan outlining our desired future urban forest and how we will get there	○	○	○	○	○
We are currently developing an Urban Forest or Tree Strategy/Plan	○	○	○	○	○
We have an endorsed target or set of targets for the urban forest (e.g. canopy cover, urban forest diversity, urban forest health)	○	○	○	○	○
We have an endorsed target or set of targets for the urban forest on private land (e.g. canopy cover)	○	○	○	○	○
We have a Council endorsed Tree Management/Urban Forest Policy (e.g. a documented process for the management of urban trees)	○	○	○	○	○
We have a Tree Management/Urban Forest policy that is effectively implemented and enforced	○	○	○	○	○
We have a council endorsed Tree Removal Policy	○	○	○	○	○
We have a Tree Removal Policy that is effective in minimising tree removal on Council owned and/or managed land	○	○	○	○	○
We have a documented process to protect trees on Council owned and/or managed land	○	○	○	○	○
The protections over our trees on Council owned and/or managed land are properly enforced	○	○	○	○	○
We have planning controls to protect trees on private land	○	○	○	○	○
We have planning controls that are properly enforced to protect trees on private land	○	○	○	○	○

Based on your experience, what do you believe is needed to improve your LGA's strategic and/or policy response for the urban forest? If relevant, list the key barriers.

_____

_____

To what extent do you agree or disagree with the following statements on programs, tools and information in your Local Government Area?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Our placemaking programs (e.g. structure plans, urban design, capital works) prioritise the protection and planting of trees	○	○	○	○	○
We have a dedicated annual street/park tree planting program	○	○	○	○	○
We have a dedicated tree inspection and maintenance program that minimises known risks	○	○	○	○	○
We have a dedicated tree renewal program i.e. when trees reach the end of their useful lives or are removed, they are replaced	○	○	○	○	○
We have a program that encourages the community to protect and enhance trees on private land	○	○	○	○	○
We have developed tools and information to encourage the protection and planting on private land (e.g. developer guidelines, resident tree planing/management guidelines)	○	○	○	○	○
We have a complete and up to date tree inventory on Council owned and/or managed land	○	○	○	○	○
Our tree inventory is included in Councils asset management system	○	○	○	○	○
We monitor and evaluate trends in our canopy cover (with local, State or other data)	○	○	○	○	○
We record the number of customer requests received and actioned in relation to urban trees or the urban forest	○	○	○	○	○
We record the number of planning referrals that relate to urban trees or the urban forest and whether they resulted in tree removals/tree plantings	○	○	○	○	○

Based on your experience, what do you believe is needed to improve your LGA's programs, tools and information to protect and enhance the urban forest? If relevant, list the key barriers.

_____

_____

To what extent do you agree or disagree with the following statements on resources in your Local Government Area?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Our budgets allow us to plant more trees each year than we remove	○	○	○	○	○
Our budgets allow us to meet our tree risk management requirements through a proactive tree maintenance program	○	○	○	○	○
Our budgets allow us to explore innovative urban design solutions when needed (e.g. water sensitive urban design, structural soils, green roofs)	○	○	○	○	○
Our urban forest budgets are utilised cost-effectively and efficiently	○	○	○	○	○
We have enough qualified arborists either in house or as contractors to deliver our tree management/ urban forest program	○	○	○	○	○
We have a dedicated arborist who has the capacity and skills required to influence planning decisions for good urban forest outcomes	○	○	○	○	○
We have dedicated enforcement officer/s who ensure that planning requirements for tree protection and provision are met	○	○	○	○	○

Based on your experience, what, if any, resourcing requirements are needed by your LGA to improve outcomes for the urban forest? If relevant, list the key barriers.

_____

_____

_____

To what extent do you agree or disagree with the following statements on support for urban forest management in your Local Government Area?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
There is broad organisational support for protecting and enhancing the urban forest on Council owned and/or managed land (e.g. street, parks, council properties)	○	○	○	○	○
There is broad organisational support for protecting and enhancing the urban forest on private land (e.g. incentives; controls; enforcement)	○	○	○	○	○
There is senior leadership support (Executive and Councillor) for protecting and enhancing the urban forest on Council owned and/or managed land (e.g. street, parks, council properties)	○	○	○	○	○
There is senior leadership support (Executive and Councillor) for protecting and enhancing the urban forest on private land (e.g. incentives; controls; enforcement)	○	○	○	○	○
Our State/Territory Government provides adequate policy direction and land use controls for protecting and enhancing the urban forest	○	○	○	○	○
Initiatives to change/improve local controls for urban forest management are encouraged and facilitated by State/Territory approval processes	○	○	○	○	○
Generally speaking, our community recognises the importance of our urban forest	○	○	○	○	○
The number of customer requests received for tree removal are greater than those received for tree planting	○	○	○	○	○
Vandalism to public trees is a problem in our Local Government Area	○	○	○	○	○
We find that some community members or groups prevent us from actioning our work to protect and enhance the urban forest	○	○	○	○	○
Generally speaking, our community supports council action to protect and enhance trees on Council owned and/or managed land (e.g. streets, parks and council managed land)	○	○	○	○	○
Generally speaking, our community supports council action to protect and enhance trees on private land (e.g. incentives, rules/actions to protect private trees)	○	○	○	○	○

To what extent do the following reflect the main barriers to increased community support for tree protection and planting? (Allocate percentage, must sum to 100%):
Poor knowledge/understanding of trees generally : _____
Risk profile of the community : _____
Bushfire threat : _____
General mess created by trees : _____
Impacts on infrastructure (buildings, fences, footpaths) : _____
Access to views : _____
Poor relationship between Council and community generally : _____
Other, please specify : _____
Total : _____

Based on your experience, what do you believe is needed from the State/Territory Government to enable better urban forest outcomes?

_____

_____

Based on your experience, what do you believe is needed to increase community support for the urban forest in your LGA?

_____

_____

To what extent do the following reflect the main barriers to increased community support for tree protection and planting? (Allocate percentage, must sum to 100%):
Policy/Strategy : _____
Planning Controls to regulate what happens on private land : _____
State Government policies and planning controls : _____
Availability of good data : _____
Council Resources : _____
Community sentiment : _____
Climate change : _____
Management of risk : _____
Supportive State Government policies and planning controls : _____
Other, please specify : _____
Total : _____

Please list any other comments you would like to make regarding your urban forest program.

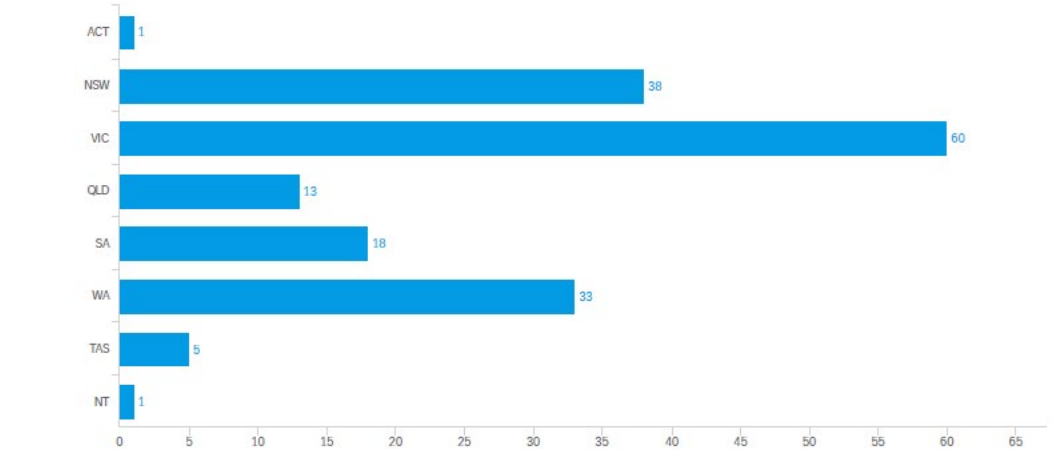
_____

_____

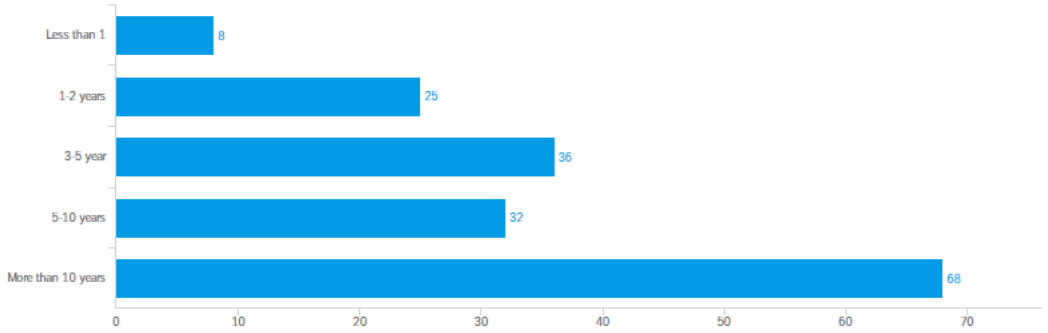
_____

Appendix 3 – Survey report

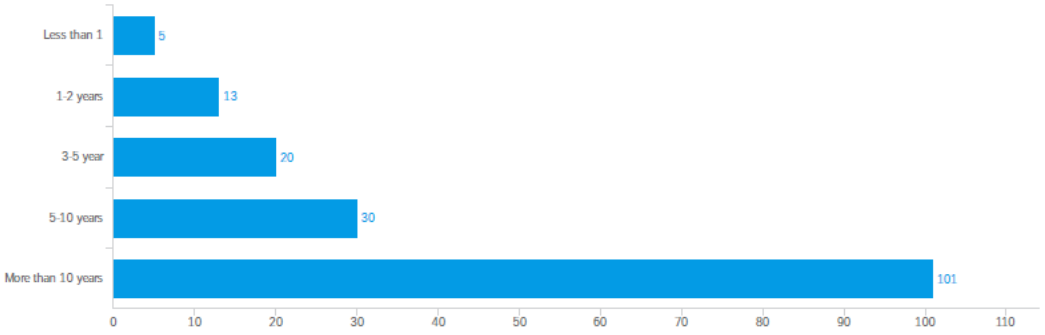
Surveys Completed

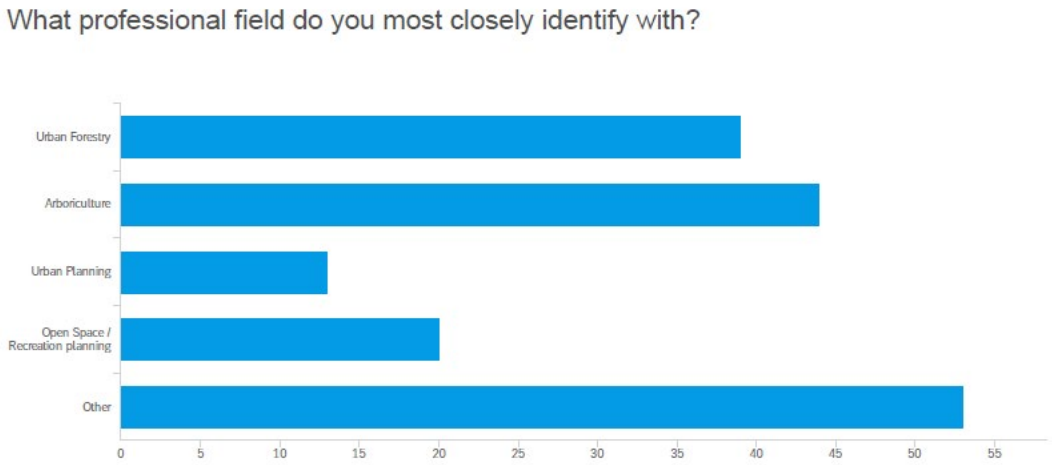


How many years have you been employed at your current place of work?

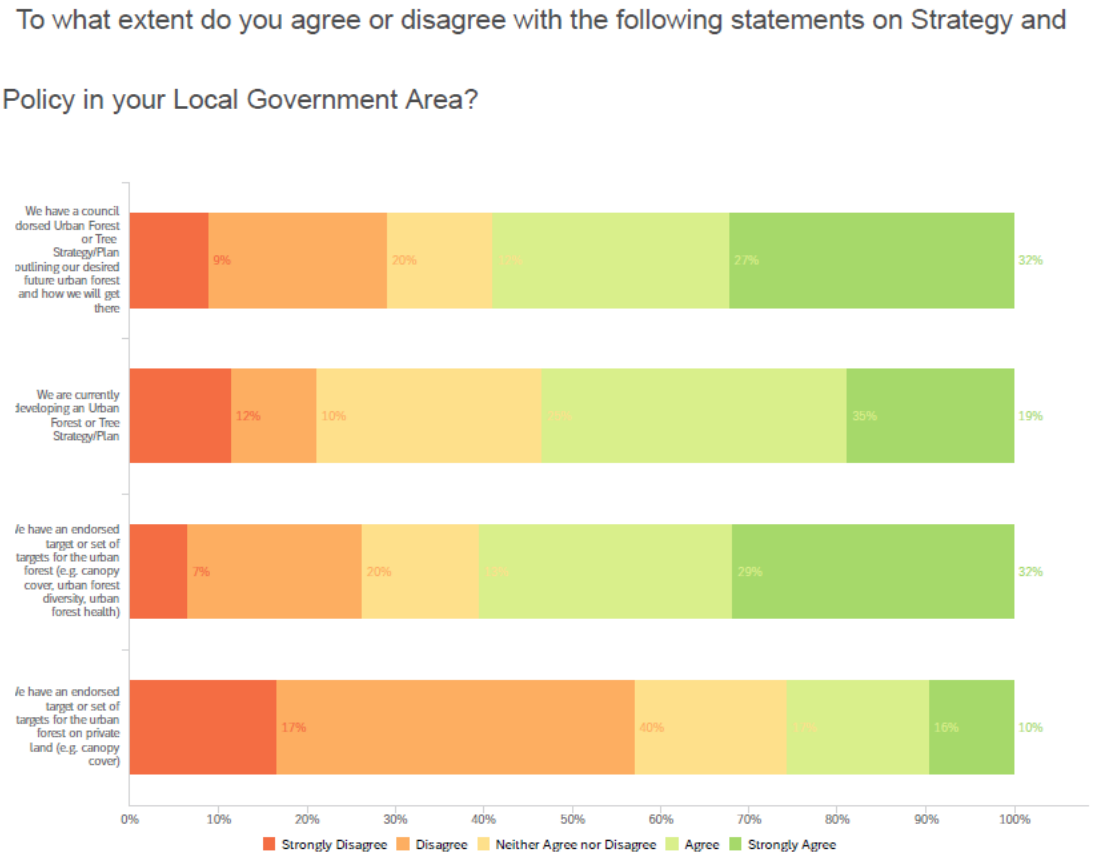


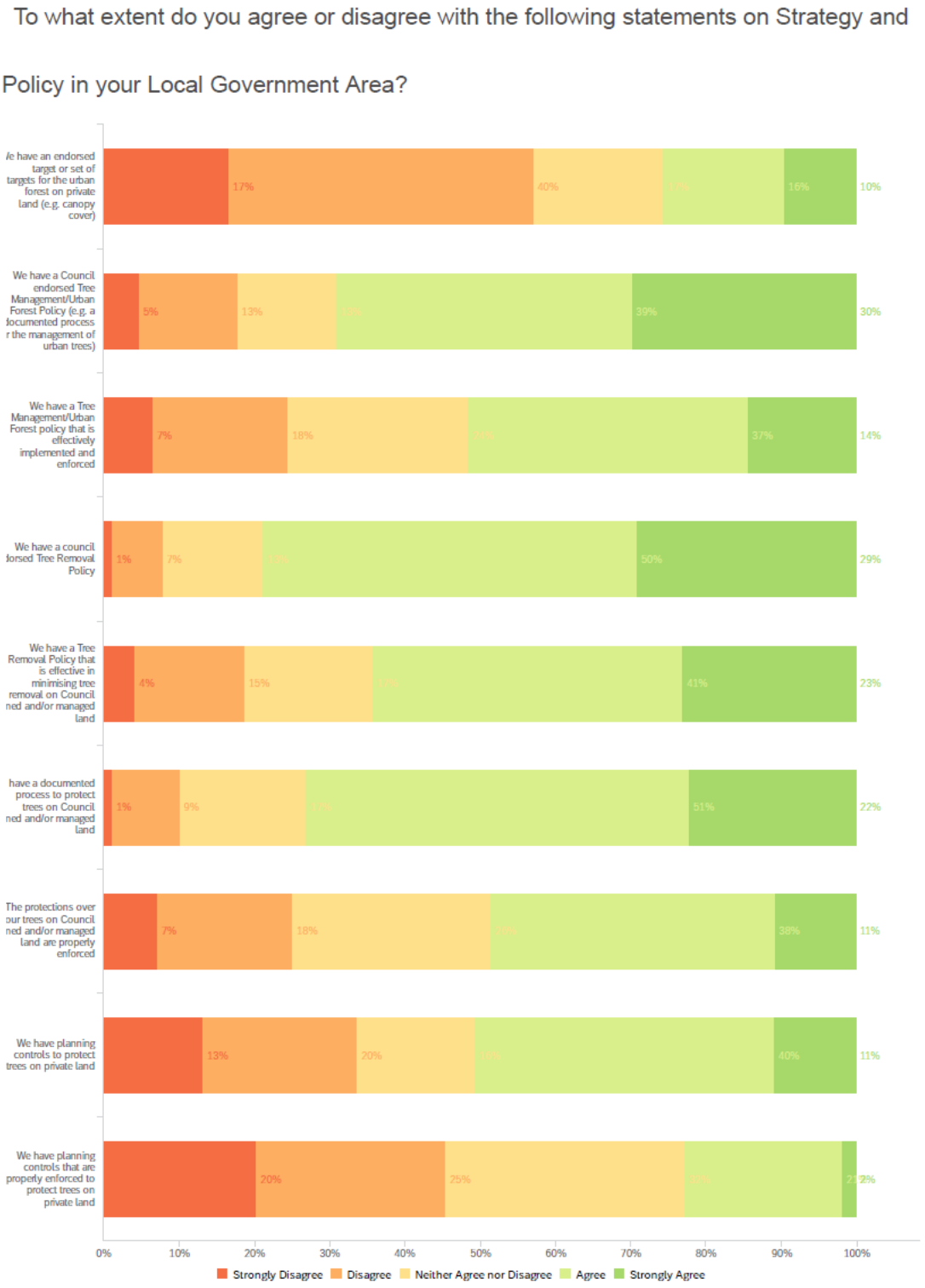
How many years have you worked in the area of urban forests or green space?



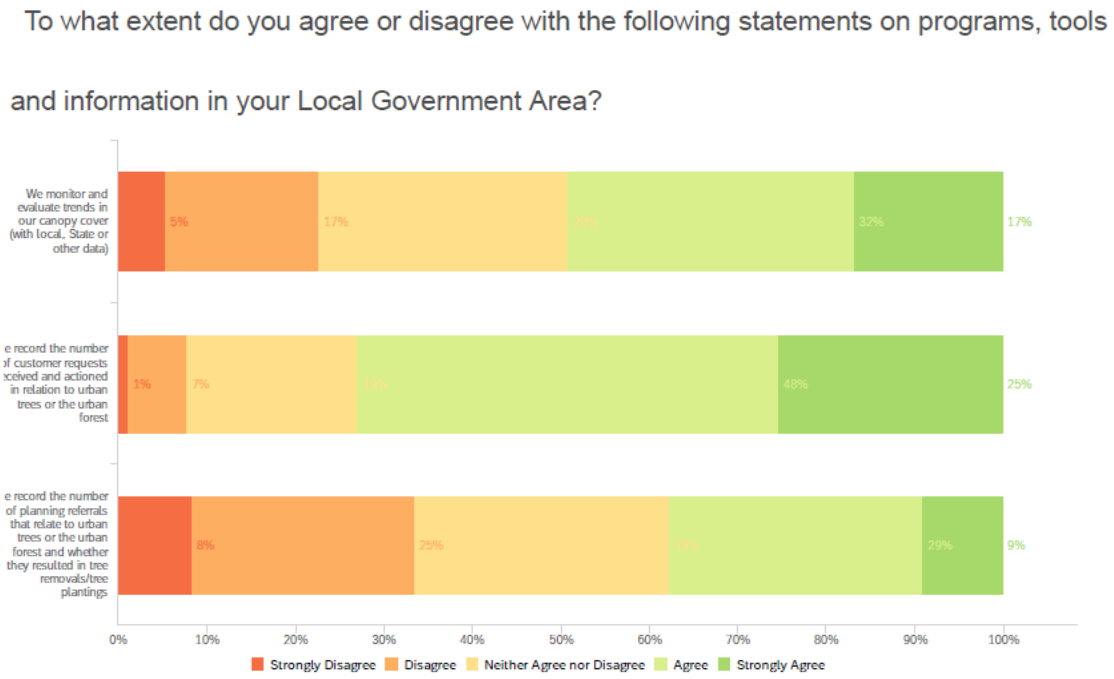

What professional field do you most closely identify with?
Urban Forestry
Arboriculture
Urban Planning
Open Space / Recreation planning
Other
0
5
10
15
20
25
30
35
40
45
50
55


maintenance
biodivers
engineering
horticulture
design
landscape
environmental
management
plan
sustainable
park
urban
restoration
bushland
climate
project
civil
natural
conservation
policy
scientist
environment
change
arboriculture
assessment
amenity
ecology
architect
ecological

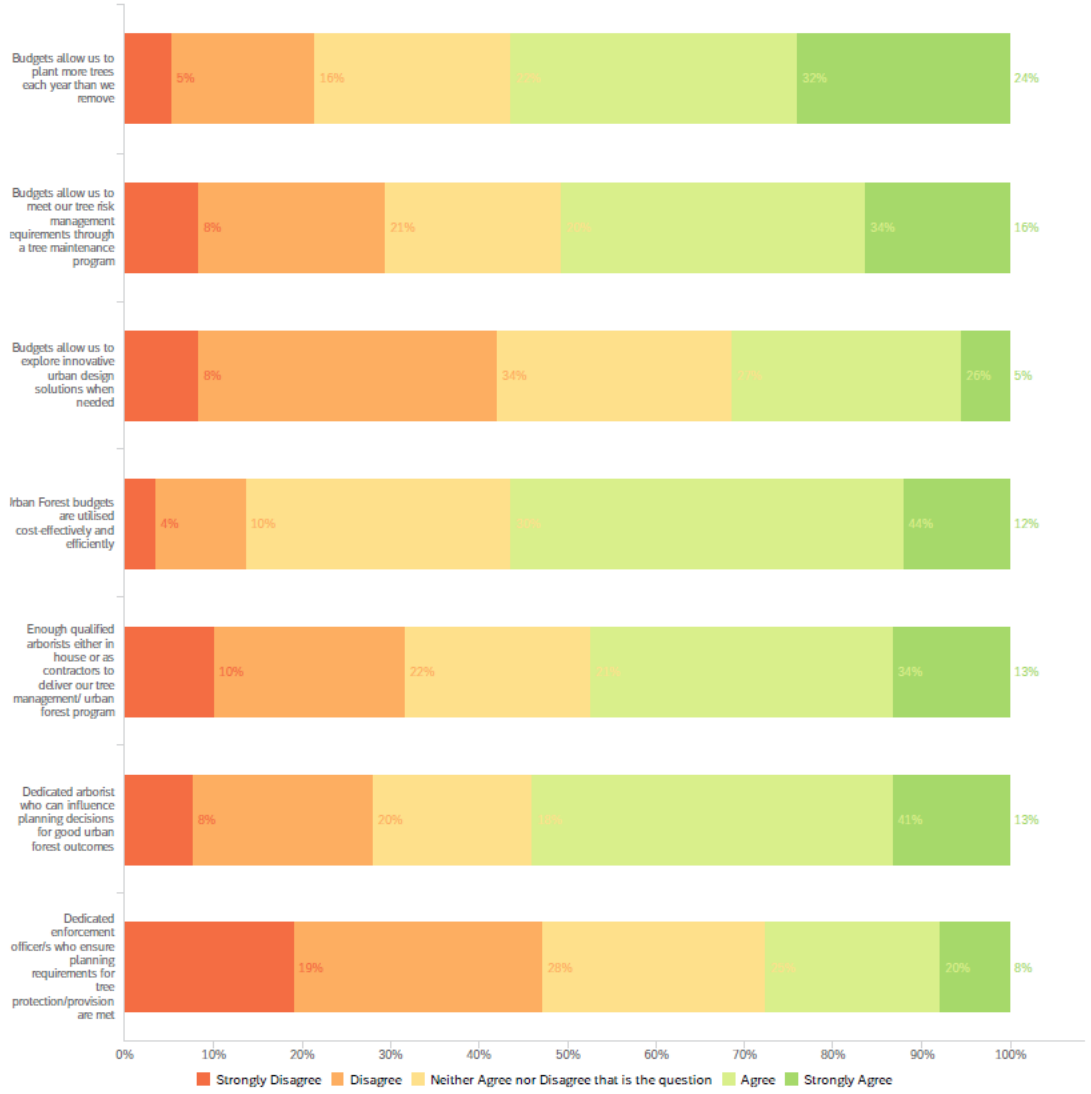

To what extent do you agree or disagree with the following statements on Strategy and Policy in your Local Government Area?
We have a council dorsed Urban Forest or Tree Strategy/Plan outlining our desired future urban forest and how we will get there
9%
20%
27%
32%
We are currently developing an Urban Forest or Tree Strategy/Plan
12%
10%
35%
19%
We have an endorsed target or set of targets for the urban forest (e.g. canopy cover, urban forest diversity, urban forest health)
7%
20%
29%
32%
We have an endorsed target or set of targets for the urban forest on private land (e.g. canopy cover)
17%
40%
16%
10%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree


To what extent do you agree or disagree with the following statements on Strategy and Policy in your Local Government Area?
/e have an endorsed target or set of targets for the urban forest on private land (e.g. canopy cover)
17%
40%
16%
10%
We have a Council endorsed Tree Management/Urban Forest Policy (e.g. a documented process r the management of urban trees)
5%
13%
39%
30%
We have a Tree Management/Urban Forest policy that is effectively implemented and enforced
7%
18%
37%
14%
We have a council orsed Tree Removal Policy
1%
7%
50%
29%
We have a Tree Removal Policy that is effective in minimising tree removal on Council ned and/or managed land
4%
15%
41%
23%
have a documented process to protect trees on Council ned and/or managed land
1%
9%
51%
22%
The protections over our trees on Council ned and/or managed land are properly enforced
7%
18%
38%
11%
We have planning controls to protect trees on private land
13%
20%
40%
11%
We have planning controls that are properly enforced to protect trees on private land
20%
25%
2%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree

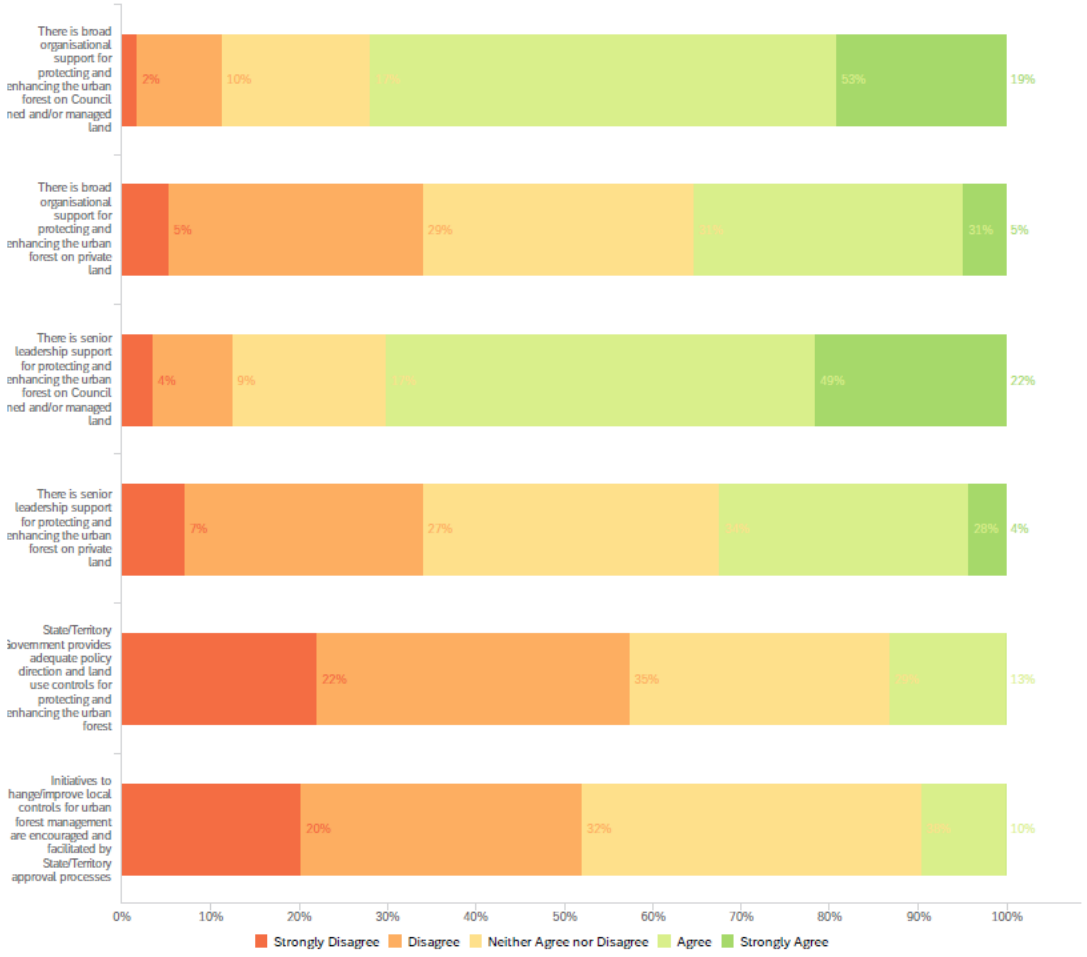
To what extent do you agree or disagree with the following statements on programs, tools and information in your Local Government Area?

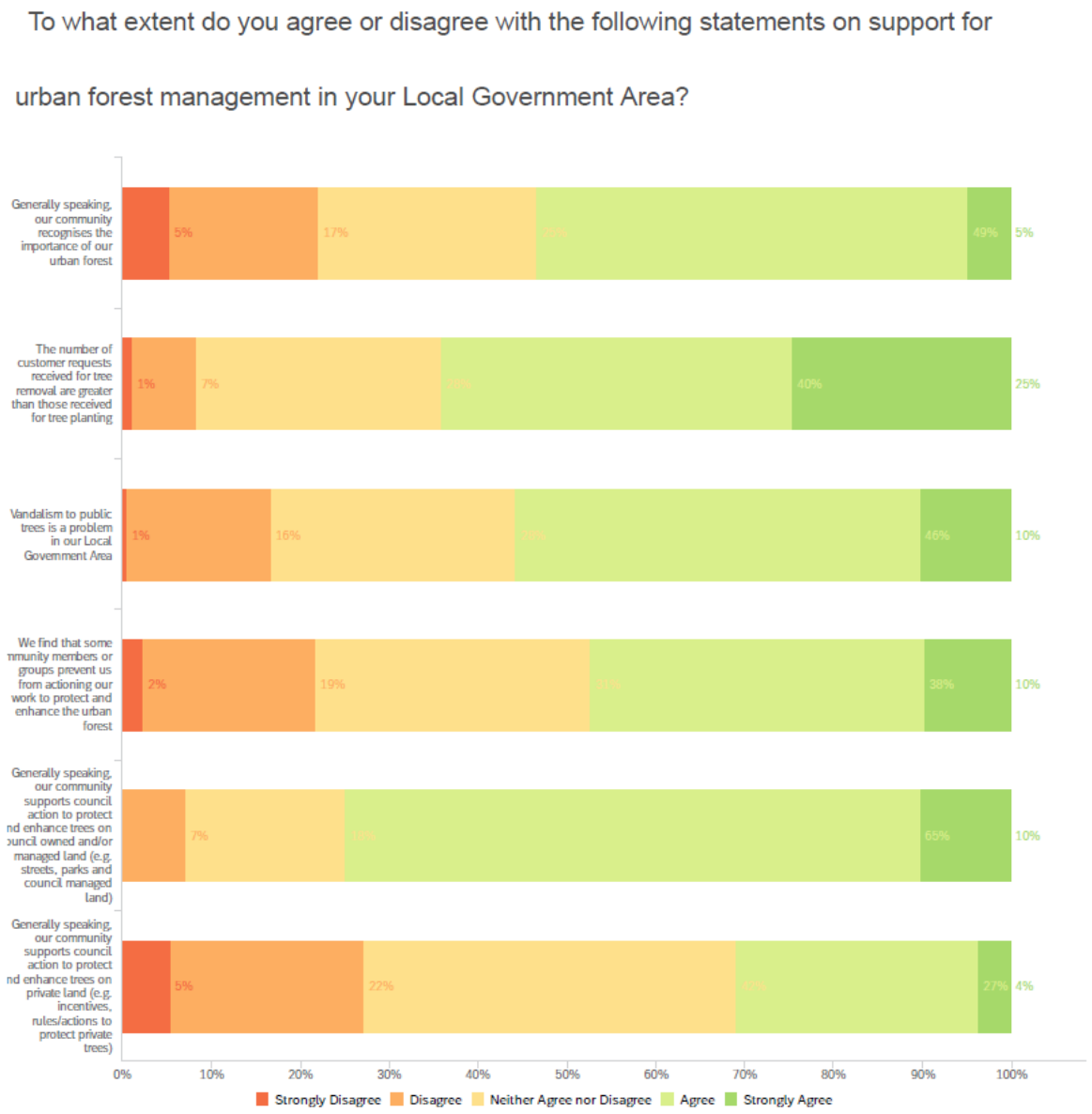

To what extent do you agree or disagree with the following statements on programs, tools and information in your Local Government Area?
We monitor and evaluate trends in our canopy cover (with local, State or other data)
5%
17%
32%
17%
e record the number of customer requests ceived and actioned in relation to urban trees or the urban forest
1%
7%
48%
25%
e record the number of planning referrals that relate to urban trees or the urban forest and whether they resulted in tree removals/tree plantings
8%
25%
29%
9%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree

To what extent do you agree or disagree with the following statements on resources in your Local Government Area?

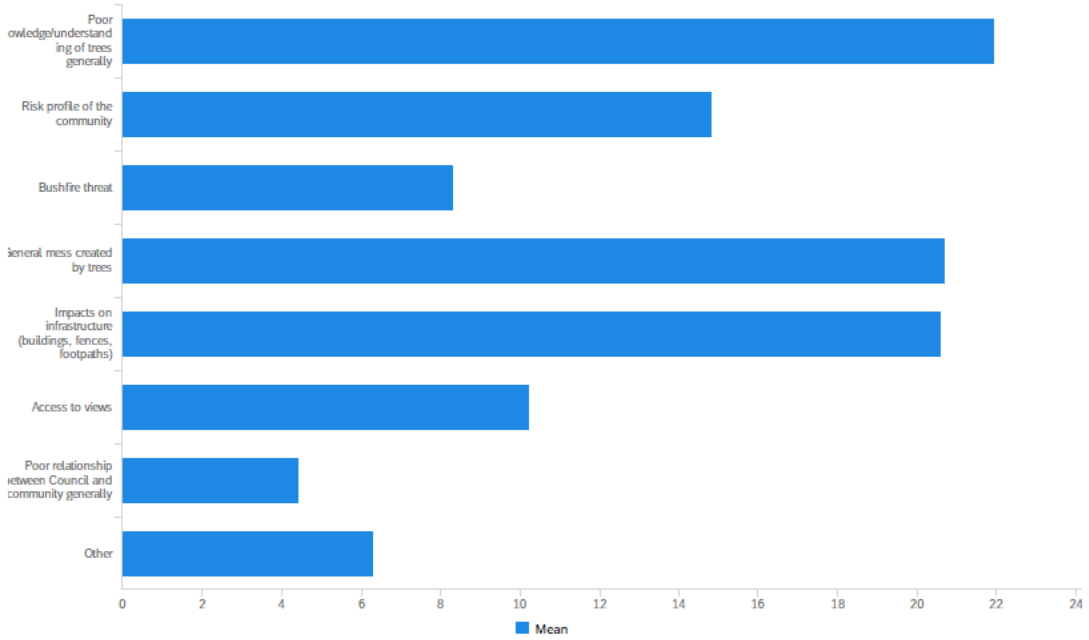


To what extent do you agree or disagree with the following statements on support for urban forest management in your Local Government Area?

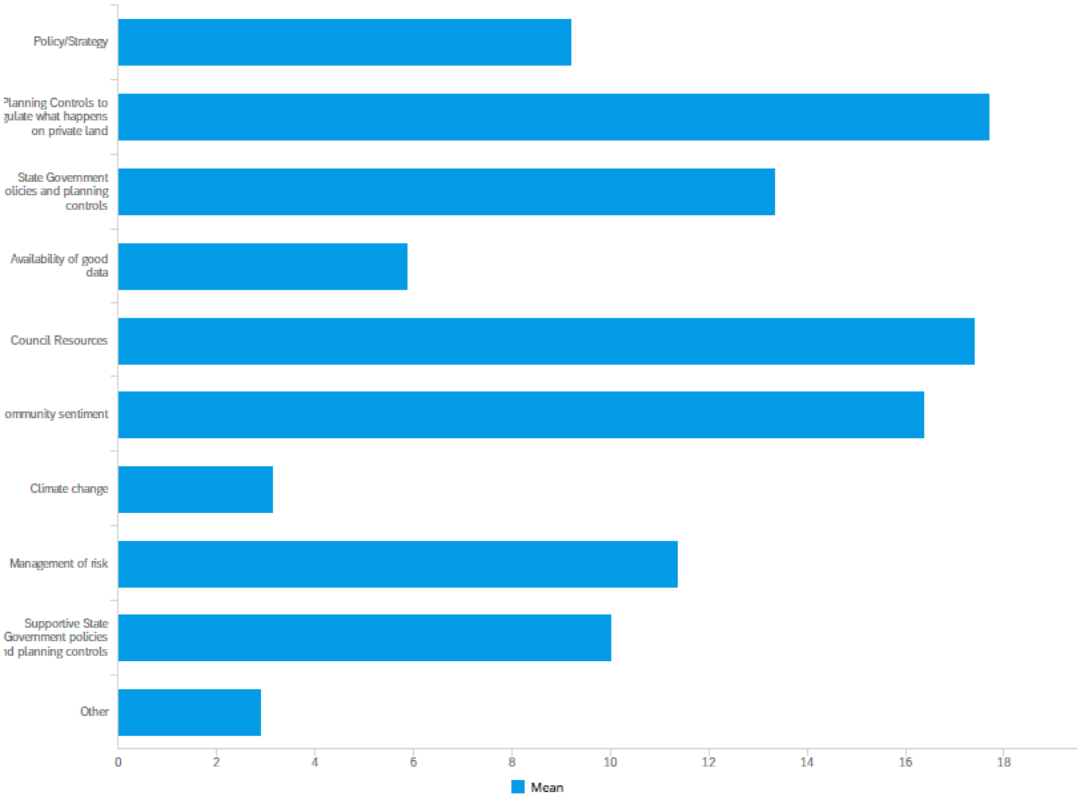



To what extent do you agree or disagree with the following statements on support for urban forest management in your Local Government Area?
Generally speaking, our community recognises the importance of our urban forest
5%
17%
49%
5%
The number of customer requests received for tree removal are greater than those received for tree planting
1%
7%
40%
25%
Vandalism to public trees is a problem in our Local Government Area
1%
16%
46%
10%
We find that some nmunity members or groups prevent us from actioning our work to protect and enhance the urban forest
2%
19%
38%
10%
Generally speaking, our community supports council action to protect nd enhance trees on ouncil owned and/or managed land (e.g. streets, parks and council managed land)
7%
65%
10%
Generally speaking, our community supports council action to protect nd enhance trees on private land (e.g. incentives, rules/actions to protect private trees)
5%
22%
27%
4%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree

To what extent do the following reflect the main barriers to increased community support for tree protection and planting? (Allocate percentage, must sum to 100%):



To what extent do the following reflect the main barriers to increased community support for tree protection and planting? (Allocate percentage, must sum to 100%):



Appendix 4 - LGA data workbook

Attribute table

Field Name	Description
LGAName2	Local government area name - simple
State	Name of State or Territory
LGACode	Local Government Area 5-didgit code from Austrlaian Bureau of Statistics (ABS)
LGA_Cluster	Number for 1 to 6 identifying LGA cluster (see "clustering of LGAs" in additional information)
StratPublic	Qualitative aggregated survey response (weak, fair, strong) - Strategy and Policy context on public land
StratPrivate	Qualitative aggregated survey response (weak, fair, strong) - Strategy and Policy context on private land
ResourcePublic	Qualitative aggregated survey response (weak, fair, strong) - resourcing context on public land
ResourcePrivate	Qualitative aggregated survey response (weak, fair, strong) - resourcing context on private land
OrgSupPublic	Qualitative aggregated survey response (weak, fair, strong) - organisational support context on public land
OrgSupPrivate	Qualitative aggregated survey response (weak, fair, strong) - organisational support context on private land
ComSupPublic	Qualitative aggregated survey response (weak, fair, strong) - community support context on public land
ComSupPrivate	Qualitative aggregated survey response (weak, fair, strong) - community support context on private land
StateFramework	Qualitative aggregated survey response (weak, fair, strong) - state policy and support context
ERP_2019	LGA Estimated Residential Population in 2019 from ABS
PopGrowth2001_2019	LGA average annual population growth (%) based on 2001-2019 population statistics from ABS
PopDens	LGA population density (people per square kilometre) from ABS 2019 population figures and LGA area calculated in ESRI ArcMap
%Urban	Proportion of LGA (%) designated as urban based on the Urban Centres and Localities designation of the ABS in 2016
%Apartments	LGA proportion of dwellings that are apartments (%) from ABS 2016 Census data.
IRSAD	LGA result for the Index of Relative Socio-economic Advantage and Disadvantage. From ABS Socio-Economic Indexes for Areas (SEIFA) 2016.
%ParentsOS	LGA proportion of population with both parents born overseas (%) from ABS 2016 Census data.
MeanRainfall	LGA average annual rainfall 30 -year climatology (1986 - 2015) (millimetres) drawn from Bureau of Meteorology
%FireAffected	Proportion of LGA area (%) affected by bushfire between 2011 and 2016 drawn from "Fires in Australia's forests 2011–16 (2018)" data available on Department of Agriculture, Water and the Environment website.
ERP_2019_q5	Quintile for attribute based on 131 LGAs. Quintile 1 is low; quintile 5 is high.
PopGrowth2001_2019_q5	Quintile for attribute based on 131 LGAs. Quintile 1 is low; quintile 5 is high.

Field Name	Description
PopDens_q5	Quintile for attribute based on 131 LGAs. Quintile 1 is low; quintile 5 is high.
%Urban_class	Class for attribute: "1" < 50% urban (n=38); "2" >50% and < 100% urban (n=24); "3" = 100% urban (n=69)
%Apartments_q5	Quintile for attribute based on 131 LGAs. Quintile 1 is low; quintile 5 is high.
IRSAD_q5	Quintile for attribute based on 131 LGAs. Quintile 1 is low; quintile 5 is high.
%ParentsOS_q5	Quintile for attribute based on 131 LGAs. Quintile 1 is low; quintile 5 is high.
MeanRainfall_q5	Quintile for attribute based on 131 LGAs. Quintile 1 is low; quintile 5 is high.
%FireAffected_class	Class for attribute: "1" < 0.5% fire affected (n=82); "2" >0.5% and < 3.8% fire affected (n=26); "3" > 3.8% fire affected (n=23)
Tree2013	Proportion of i-Tree sample points classed as "tree" (%) (2013)
Shrub2013	Proportion of i-Tree sample points classed as "shrub" (%) (2013)
Grass/bare-ground2013	Proportion of i-Tree sample points classed as "grass/bare-ground" (%) (2013)
Hard surface2013	Proportion of i-Tree sample points classed as "hard surface" (%) (2013)
CanopyCover2013	Canopy cover 2013 (%) = tree cover
UrbanForestCover2013	Urban forest cover 2013 (%) = tree + shrub cover
GreenSpaceCover2013	Green space cover 2013 (%) = tree + shrub _grass/bare-ground cover
Tree2016	Proportion of i-Tree sample points classed as "tree" (%) (2016)
Shrub2016	Proportion of i-Tree sample points classed as "shrub" (%) (2016)
Grass/bare-ground2016	Proportion of i-Tree sample points classed as "grass/bare-ground" (%) (2016)
HardSurface2016	Proportion of i-Tree sample points classed as "hard surface" (%) (2016)
CanopyCover2016	Canopy cover 2016 (%) = tree cover
UrbanForestCover2016	Urban forest cover 2016 (%) = tree + shrub cover
GreenSpaceCover2016	Green space cover 2016 (%) = tree + shrub _grass/bare-ground cover
Tree2020	Proportion of i-Tree sample points classed as "tree" (%) (2020)
Shrub2020	Proportion of i-Tree sample points classed as "shrub" (%) (2020)
Grass/bare-ground2020	Proportion of i-Tree sample points classed as "grass/bare-ground" (%) (2020)
HardSurface2020	Proportion of i-Tree sample points classed as "hard surface" (%) (2020)
CanopyCover2020	Canopy cover 2020 (%) = tree cover
UrbanForestCover2020	Urban forest cover 2020 (%) = tree + shrub cover
GreenSpaceCover2020	Green space cover 2020 (%) = tree + shrub _grass/bare-ground cover
Cluster_Mean_UF2020	Mean 2020 urban forest cover (tree+shrub) for LGA cluster (%)
Cluster_SD_UF2020	Standard deviation of 2020 urban forest cover (tree+shrub) mean for LGA cluster (%)
Cluster_Mean_DiffUF2016-2020	Mean urban forest cover (tree+shrub) change 2013 - 2020 for LGA cluster (%)

Field Name	Description
Cluster_SD_DiffUF2016-2020	Standard deviation of the mean of tree cover change (tree+shrub) 2013 - 2020 for LGA cluster (%)
UF_cover_class	Within each cluster, LGAs are classed into 1 of 4 categories: see "Urban Forest Cover class" for class categories and method in additional information
UF_change_class_2016-2020	Within each cluster, LGAs are classed into 1 of 4 categories: see "Urban Forest Cover class" for class categories and method in additional information
Outlook_class_num	Within each cluster, LGAs are classed into 1 of 16 categories: see "Outlook and challenge rating class" for class categories and method in additional information
Challenge_rating_num	Within each cluster, LGAs are classed into 1 of 4 categories: see "Outlook and challenge rating class" for class categories and method in additional information

Additional information

Clustering of LGAs.

Attribute: LGA_Cluster

Clustering of LGAs is based on the following method:

1. LGAs separated into Urban or mostly urban (urban area > 50%) and mostly non-urban (urban area < 50%)
2. LGAs separated into high density (density quintile 4 and 5 LGAs) and average-low density suburbs (density quintile 1,2 and 3). (Note, for the mostly non-urban LGAs (urban area < 50%) all LGAs are low density (density quintile 1 and 2).
3. LGAs separated into low rainfall (rainfall quintile 1 and 2) and average-high rainfall (rainfall quintile 3,4 and 5).

The following clusters are produced:

LGA_Cluster	number	Description
1	13	Mostly non-urban; low density; low rainfall
2	25	Mostly non-urban; low density; average-high rainfall
3	21	Urban or mostly urban; average-low density; low rainfall
4	20	Urban or mostly urban; average-low density; average-high rainfall
5	23	Urban; high density; low rainfall
6	29	Urban; high density; average-high rainfall
Total	131	

Urban Forest Cover class

Attribute: UF_cover_class

Within each cluster group, LGAs are assigned an urban forest class as follows:

UF_cover_class	Description
1	Urban forest cover is less than the cluster mean minus 1 standard deviation
2	Urban forest cover between the cluster mean minus 1 standard deviation and the mean
3	Urban forest cover is between the cluster mean and the cluster mean plus 1 standard deviation
4	Urban forest cover is greater than the cluster mean plus 1 standard deviation

Urban Forest Cover change class

Attribute: UF_Change_class_2016-2020

Within each cluster group, LGAs are assigned an urban forest change class as follows:

UF_Change_class_2016-2020	Description
1	Urban forest cover change from 2016 to 2020 is <-1%
2	Urban forest cover change from 2016 to 2020 is between -1% and zero
3	Urban forest cover change from 2016 to 2020 is between zero and 2%
4	Urban forest cover change from 2013 to 2020 is >+2%

Outlook and challenge rating class

Attributes: Challenge_rating_num

"Within each cluster group, LGAs are assigned a challenge rating based on the combination of UF-cover_class and UF_change_class as follows:"

UF_cover_class	UF_Change_class_2016-2020	Challenge_rating_num	Challenge_text
1	4	2	moderate
1	3	3	high
1	2	3	high
1	1	4	very high
2	4	2	moderate
2	3	3	high
2	2	3	high
2	1	4	very high
3	4	1	low
3	3	1	low
3	2	2	moderate
3	1	3	high
4	4	1	low
4	3	1	low
4	2	1	low
4	1	3	high

Urban forest management measures calculation method

The LGA reports use nine urban forest management measures, presented at LGA, state/territory and national level. The table below identifies the survey questions that were used to produce the measures, with results combined to give either a weak, fair, or strong result for the measure. Responses were aggregated to the LGA, state/territory and national level to produce results.

Measure	Survey questions
Strategy and policy for UFM on public land	• We have a council endorsed Urban Forest or Tree Strategy/Plan outlining our desired future urban forest and how we will get there (*x2 weighting*) / OR We have an endorsed target or set of targets for the urban forest (e.g. canopy cover, urban forest diversity, urban forest health) • We have a Council endorsed Tree Management/Urban Forest Policy (e.g. a policy that reflects the decision making approaches to the management of urban trees) • We have a Tree Management/Urban Forest policy that is effectively implemented and enforced • We have a council endorsed Tree Removal Policy • We have a Tree Removal Policy that is effective in minimising tree removal on Council owned and/or managed land • We have a documented process to protect trees on Council owned and/or managed land • The protections over our trees on Council owned and/or managed land are properly enforced
Strategy and policy for UFM on private land	• We have a council endorsed Urban Forest or Tree Strategy/Plan outlining our desired future urban forest and how we will get there (x2 weighting) / OR We have an endorsed target or set of targets for the urban forest (e.g. canopy cover, urban forest diversity, urban forest health) • We have an endorsed target or set of targets for the urban forest on private land (e.g. canopy cover) • We have planning controls to protect trees on private land • We have planning controls that are properly enforced to protect trees on private land
Resourcing for UFM on public land	• Our placemaking programs (e.g. structure plans, urban design, capital works, asset renewal) prioritise the protection and planting of trees • We have a dedicated annual street/park tree planting program • We have a dedicated tree inspection and maintenance program that minimises known risks • We have a dedicated tree renewal program i.e. when trees reach the end of their useful lives or are removed, they are replaced • We have a complete and up to date tree inventory on Council owned and/or managed land • Our tree inventory is included in Councils asset management system • We monitor and evaluate trends in our canopy cover (with local, State or other data) and make changes to our urban forest program • We record the number of customer requests received and actioned in relation to urban trees or the urban forest • Our budgets allow us to plant more trees each year than we remove • Our budgets allow us to meet our tree risk management requirements through a proactive tree maintenance program • Our budgets allow us to explore innovative urban design solutions when needed (e.g. water sensitive urban design, structural soils, green roofs, whole streetscape renewals) • Our urban forest budgets are utilised cost-effectively and efficiently • We have enough qualified arborists either in house or as contractors to deliver our tree management/ urban forest program

Measure	Survey questions
Resourcing for UFM on private land	• We have a program that encourages the community to protect and enhance trees on private land (x2 weighting) • We have developed tools and information to encourage the protection and planting on private land (e.g. developer guidelines, resident tree management guidelines, preferred tree species lists etc) (x2 weighting) • We monitor and evaluate trends in our canopy cover (with local, State or other data) and make changes to our urban forest program • We record the number of customer requests received and actioned in relation to urban trees or the urban forest • We record the number of planning referrals that relate to urban trees or the urban forest and whether they resulted in tree removals/tree plantings (x2 weighting) • We have a dedicated arborist who has the capacity and skills required to influence planning decisions in favour of urban forest outcomes (x2 weighting) • We have dedicated enforcement officer/s who ensure that planning requirements for tree protection and provision are met (x2 weighting)
Organisational support for UFM on public land	• There is sufficient broad organisational support for protecting and enhancing the urban forest on Council owned and/or managed land (e.g. in street, parks and on council properties) • There is sufficient senior leadership support (Executive and Councillor) for protecting and enhancing the urban forest on Council owned and/or managed land (e.g. in street, parks and on council properties)
Organisational support for UFM on private land	• There is sufficient broad organisational support for protecting and enhancing the urban forest on private land (e.g. offering incentives; developing/maintain controls; enforcement and fines) • There is sufficient senior leadership support (Executive and Councillor) for protecting and enhancing the urban forest private land (e.g. offering incentives; developing/maintain controls; enforcement and fines)
Community support for UFM on public land	• Generally speaking, our community recognises the importance of our urban forest • The number of customer requests received for tree removal are greater than those received for tree planting • Vandalism to public trees is a problem in our LGA • We find that some community members or groups prevent us from actioning our work to protect and enhance the urban forest • Generally speaking, our community supports council action to protect and enhance trees on Council owned and/or managed land (e.g. streets, parks and council managed land) (x2 weighting)
Community support for UFM on private land	• Generally speaking, our community recognises the importance of our urban forest • We find that some community members or groups prevent us from actioning our work to protect and enhance the urban forest • Generally speaking, our community supports council action to protect and enhance trees on private land (e.g. incentives, rules/actions to protect private trees) (x2 weighting)
Support of state policy and process for local UFM	• Our State/Territory Government provides adequate policy direction and land use controls for protecting and enhancing the urban forest (not relevant for ACT govt) • In practice, initiatives to change/improve local controls for urban forest management are encouraged and facilitated by state approval processes

Data tables

LGAName2	State	LGACode	LGA_Cluster	StratPublic	StratPrivate	ResourcePublic	ResourcePrivate	OrgSupPublic	OrgSupPrivate	ComSupPublic	ComSupPrivate	StateFramework
Bayside (NSW)	NSW	10500	6	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Blacktown	NSW	10750	4	fair	fair	weak	weak	fair	fair	fair	fair	weak
Burwood	NSW	11300	6	strong	strong	fair	strong	weak	weak	weak	weak	fair
Camden	NSW	11450	3	fair	fair	weak	fair	strong	strong	strong	strong	weak
Campbelltown (NSW	NSW	11500	2	strong	fair	fair	fair	fair	fair	weak	weak	fair
Canada Bay	NSW	11520	6	fair	fair	weak	weak	strong	strong	fair	fair	weak
Canterbury-Banksto	NSW	11570	6	fair	fair	weak	fair	weak	weak	weak	weak	fair
Cumberland	NSW	12380	6	fair	weak	weak	fair	fair	fair	weak	weak	weak
Fairfield	NSW	12850	6	weak	weak	weak	weak	weak	weak	weak	weak	fair
Georges River	NSW	12930	6	strong	fair	weak	fair	strong	fair	strong	strong	weak
Hornsby	NSW	14000	2	fair	fair	weak	weak	fair	fair	fair	weak	weak
Hunters Hill	NSW	14100	6	fair	fair	weak	weak	strong	strong	fair	strong	fair
Inner West	NSW	14170	6	strong	strong	strong	strong	strong	weak	fair	fair	weak
Ku-ring-gai	NSW	14500	4	strong	fair	fair	fair	strong	fair	fair	fair	fair
Lane Cove	NSW	14700	6	strong	strong	fair	fair	strong	strong	fair	fair	weak
Liverpool	NSW	14900	4	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Mosman	NSW	15350	6	strong	strong	strong	strong	strong	fair	strong	strong	weak
Newcastle	NSW	15900	4	fair	fair	fair	weak	weak	weak	fair	fair	weak
North Sydney	NSW	15950	6	strong	strong	strong	fair	strong	strong	strong	strong	fair
Northern Beaches	NSW	15990	4	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Parramatta	NSW	16260	6	fair	fair	weak	weak	fair	weak	weak	weak	weak
Penrith	NSW	16350	2	fair	weak	fair	weak	strong	fair	weak	weak	weak
Randwick	NSW	16550	6	fair	fair	fair	strong	strong	strong	strong	strong	fair
Ryde	NSW	16700	6	strong	fair	weak	weak	weak	weak	fair	weak	weak
Strathfield	NSW	17100	6	weak	weak	weak	fair	fair	fair	fair	strong	weak
Sutherland Shire	NSW	17150	2	strong	fair	fair	strong	fair	fair	strong	fair	weak
Sydney	NSW	17200	6	strong	strong	strong	fair	strong	strong	fair	fair	weak
The Hills Shire	NSW	17420	2	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Waverley	NSW	18050	6	strong	fair	fair	weak	weak	weak	fair	weak	weak
Willoughby	NSW	18250	6	strong	fair	weak	fair	fair	fair	strong	fair	fair
Woollahra	NSW	18500	6	fair	fair	fair	fair	strong	fair	fair	fair	weak
Ballarat	VIC	20570	1	strong	fair	strong	fair	strong	fair	fair	fair	strong
Banyule	VIC	20660	5	fair	fair	fair	strong	strong	strong	fair	fair	weak
Bayside (VIC)	VIC	20910	5	strong	fair	strong	strong	strong	strong	strong	strong	fair
Boroondara	VIC	21110	5	fair	fair	fair	weak	strong	strong	strong	strong	fair
Brimbank	VIC	21180	3	strong	fair	strong	fair	strong	fair	fair	weak	weak
Cardinia	VIC	21450	2	weak	weak	weak	weak	fair	fair	fair	fair	fair
Casey	VIC	21610	4	fair	weak	fair	weak	strong	fair	fair	weak	weak
Darebin	VIC	21890	5	strong	strong	strong	strong	strong	strong	fair	strong	fair
Frankston	VIC	22170	3	fair	strong	fair	fair	fair	strong	strong	fair	weak
Glen Eira	VIC	22310	5	strong	fair	strong	weak	fair	fair	fair	strong	strong
Greater Bendigo	VIC	22620	1	strong	fair	strong	fair	strong	weak	fair	weak	weak
Greater Dandenong	VIC	22670	3	strong	weak	fair	fair	fair	weak	weak	weak	weak
Greater Geelong	VIC	22750	1	strong	fair	fair	fair	strong	weak	fair	weak	fair
Hobsons Bay	VIC	23110	3	fair	fair	fair	weak	strong	strong	fair	fair	weak
Hume	VIC	23270	1	strong	fair	strong	fair	strong	fair	fair	weak	fair
Kingston	VIC	23430	3	strong	fair	fair	fair	strong	strong	strong	strong	fair
Knox	VIC	23670	4	strong	fair	strong	strong	fair	weak	weak	weak	fair
Manningham	VIC	24210	4	fair	fair	fair	fair	fair	fair	fair	weak	fair
Maribyrnong	VIC	24330	5	fair	fair	fair	weak	fair	weak	fair	weak	weak

LGAName2	ERP_2019	PopGrowth2001_2019	PopDens	%Urban	%Apartments	IRSAD	%ParentsOS	MeanRainfall	%FireAffected	ERP_2019_q5	PopGrowth2001_2019 q5	PopDens_q5	%Urban_class	%Apartments_q5	IRSAD_q5	%ParentsOS_q5	MeanRainfall_q5	%FireAffected_class
Bayside (NSW)	178396	1.8	3576	100	60	1025	44	1132	0.0	4	4	5	3	5	2	4	5	1
Blacktown	374451	2.0	1560	95	5	993	51	838	1.0	5	4	3	2	2	2	5	3	2
Burwood	40612	1.6	5698	100	40	1043	65	1032	0.0	2	4	5	3	5	3	5	4	1
Camden	101437	4.6	505	56	1	1056	21	739	0.0	3	5	2	2	1	3	1	2	1
Campbelltown (NSW	170943	0.8	548	36	4	948	41	863	0.8	4	2	2	1	2	1	4	4	2
Canada Bay	96074	2.5	4822	100	47	1107	50	1084	0.0	3	5	5	3	5	4	5	4	1
Canterbury-Banksto	377917	1.2	3428	98	24	961	60	976	0.1	5	3	5	2	4	1	5	4	1
Cumberland	241521	1.9	3376	100	25	959	65	919	0.0	5	4	5	3	5	1	5	4	1
Fairfield	211695	0.7	2086	95	13	896	74	839	0.0	5	2	4	2	4	1	5	4	1
Georges River	159471	1.3	4159	100	31	1043	57	1019	0.0	4	3	5	3	5	3	5	4	1
Hornsby	152059	0.8	334	17	16	1115	44	1095	8.0	3	2	2	1	4	4	4	4	3
Hunters Hill	14980	0.7	2620	100	20	1143	32	1112	0.2	1	1	4	3	4	4	2	4	1
Inner West	200811	1.0	5677	100	37	1097	40	1116	0.0	4	3	5	3	5	4	3	4	1
Ku-ring-gai	127153	1.0	1489	86	21	1166	45	1153	2.0	3	2	3	2	4	5	4	5	2
Lane Cove	40155	1.3	3832	100	47	1154	40	1116	0.0	2	3	5	3	5	4	3	4	1
Liverpool	227585	2.0	744	59	13	972	56	789	3.3	5	4	2	2	3	1	5	3	2
Mosman	30981	0.6	3582	100	46	1165	35	1218	0.8	1	1	5	3	5	5	3	5	2
Newcastle	165571	0.9	887	71	11	996	16	1128	1.5	4	2	2	2	3	2	1	5	2
North Sydney	75021	1.4	7155	100	66	1159	40	1175	0.0	2	3	5	3	5	4	3	5	1
Northern Beaches	273499	1.0	1076	63	29	1120	33	1252	16.0	5	2	3	2	5	4	2	5	3
Parramatta	257197	2.3	3068	100	36	1063	56	966	0.1	5	4	4	3	5	3	5	4	1
Penrith	212977	1.1	526	44	6	988	29	784	4.4	5	3	2	1	2	2	2	3	3
Randwick	155649	1.3	4284	100	51	1096	46	1233	0.1	4	3	5	3	5	4	4	5	1
Ryde	131271	1.6	3243	100	33	1088	53	1105	1.2	3	4	5	3	5	3	5	4	2
Strathfield	46926	2.7	3352	100	46	1063	63	1032	0.0	2	5	5	3	5	3	5	4	1
Sutherland Shire	230611	0.5	691	34	20	1088	24	1090	4.6	5	1	2	1	4	3	1	4	3
Sydney	246343	3.7	9212	100	68	1095	46	1166	0.0	5	5	5	3	5	4	4	5	1
The Hills Shire	177969	2.3	461	20	5	1133	43	940	6.7	4	5	2	1	2	4	4	4	3
Waverley	74295	0.9	7945	100	55	1140	43	1284	0.0	2	2	5	3	5	4	4	5	1
Willoughby	81189	1.6	3620	100	42	1136	51	1182	0.2	2	3	5	3	5	4	5	5	1
Woollahra	59387	0.7	4837	100	49	1165	37	1284	0.0	2	2	5	3	5	5	3	5	1
Ballarat	109505	1.6	148	21	3	965	11	649	2.5	3	4	1	1	2	1	1	2	2
Banyule	131631	0.6	2105	100	6	1055	31	653	0.0	3	1	4	3	2	3	2	2	1
Bayside (VIC)	106862	1.1	2872	100	11	1125	30	615	0.0	3	3	4	3	3	4	2	2	1
Boroondara	183199	0.9	3044	100	21	1128	37	666	0.0	4	2	4	3	4	4	3	2	1
Brimbank	209523	1.3	1698	100	4	930	64	524	0.0	5	3	3	3	2	1	5	1	1
Cardinia	112159	5.0	87	8	0	996	22	928	0.8	3	5	1	1	1	2	1	4	2
Casey	353872	3.8	864	56	1	991	45	779	0.1	5	5	2	2	1	2	4	3	1
Darebin	164184	1.4	3071	100	13	1020	42	636	0.0	4	3	5	3	4	2	4	2	1
Frankston	142643	1.3	1101	100	2	981	27	733	0.3	3	3	3	3	2	1	2	2	1
Glen Eira	156511	1.4	4045	100	22	1092	44	663	0.0	4	3	5	3	4	4	4	2	1
Greater Bendigo	118093	1.6	39	6	1	961	9	514	2.9	3	4	1	1	1	1	1	1	2
Greater Dandenong	168201	1.5	1298	100	10	915	69	719	0.0	4	3	3	3	3	1	5	2	1
Greater Geelong	258934	1.7	208	20	2	980	20	523	0.1	5	4	1	1	2	1	1	1	1
Hobsons Bay	97751	0.9	1522	100	6	1020	40	526	0.0	3	2	3	3	2	2	3	1	1
Hume	233471	3.1	463	44	3	947	46	564	0.1	5	5	2	1	2	1	4	1	1
Kingston	165782	1.2	1814	100	12	1042	38	674	0.0	4	3	3	3	3	3	3	2	1
Knox	164538	0.6	1444	89	2	1032	39	855	0.6	4	1	3	2	1	2	3	4	2
Manningham	127573	0.7	1126	78	6	1076	50	753	0.3	3	2	3	2	2	3	5	3	1
Maribyrnong	93448	2.4	2993	100	21	1019	47	544	0.0	2	5	4	3	4	2	5	1	1

LGAName2	Tree2013	Shrub2013	Grass/bare-ground2013	Hard surface2013	CanopyCover2013	UrbanForestCover2013	GreenSpaceCover2013	Tree2016	Shrub2016	Grass/bare-ground2016	HardSurface2016	CanopyCover2016	UrbanForestCover2016	GreenSpaceCover2016
Bayside (NSW)	12.3%	4.0%	27.5%	56.7%	12.3%	16.3%	43.8%	13.7%	3.2%	26.0%	57.2%	13.7%	16.9%	42.9%
Blacktown	19.2%	4.9%	47.6%	28.3%	19.2%	24.1%	71.7%	19.6%	5.3%	41.9%	33.2%	19.6%	24.9%	66.8%
Burwood	21.5%	4.6%	17.2%	56.7%	21.5%	26.1%	43.3%	19.6%	4.4%	16.3%	59.7%	19.6%	24.0%	40.3%
Camden	17.0%	3.4%	69.9%	9.7%	17.0%	20.4%	90.3%	17.5%	3.4%	63.1%	16.0%	17.5%	20.9%	84.0%
Campbelltown (NSW	34.2%	15.3%	38.5%	12.0%	34.2%	49.5%	88.0%	32.2%	14.8%	37.0%	16.0%	32.2%	47.0%	84.0%
Canada Bay	20.0%	5.2%	23.2%	51.6%	20.0%	25.2%	48.4%	17.4%	5.1%	21.4%	56.1%	17.4%	22.5%	43.9%
Canterbury-Banksto	17.3%	4.5%	26.0%	52.4%	17.3%	21.8%	47.8%	19.7%	3.6%	19.7%	57.1%	19.7%	23.3%	42.9%
Cumberland	16.2%	3.9%	30.0%	49.9%	16.2%	20.1%	50.1%	17.0%	3.1%	25.7%	54.3%	17.0%	20.0%	45.7%
Fairfield	16.0%	4.6%	43.6%	35.8%	16.0%	20.6%	64.2%	15.5%	4.5%	40.6%	39.4%	15.5%	20.0%	60.6%
Georges River	23.1%	6.0%	22.3%	48.6%	23.1%	29.1%	51.4%	23.8%	4.6%	17.7%	54.0%	23.8%	28.3%	46.0%
Hornsby	59.0%	12.6%	20.0%	8.4%	59.0%	71.6%	91.6%	68.4%	9.3%	13.6%	8.7%	68.4%	77.7%	91.3%
Hunters Hill	36.0%	7.3%	20.8%	35.9%	36.0%	43.3%	64.1%	32.7%	5.2%	21.3%	40.8%	32.7%	37.9%	59.2%
Inner West	18.8%	4.7%	16.3%	60.2%	18.8%	23.5%	39.8%	20.2%	3.6%	12.8%	63.4%	20.2%	23.8%	36.6%
Ku-ring-gai	52.1%	9.2%	17.2%	21.5%	52.1%	61.3%	78.5%	50.8%	7.2%	15.6%	26.4%	50.8%	58.0%	73.6%
Lane Cove	37.8%	6.4%	15.3%	40.5%	37.8%	44.2%	59.5%	38.1%	6.0%	14.4%	41.5%	38.1%	44.1%	58.5%
Liverpool	23.2%	9.4%	51.1%	16.3%	23.2%	32.6%	83.7%	20.3%	11.4%	48.5%	19.8%	20.3%	31.7%	80.2%
Mosman	32.5%	9.7%	10.0%	47.8%	32.5%	42.2%	52.2%	33.3%	9.1%	10.5%	47.1%	33.3%	42.4%	52.9%
Newcastle	23.4%	5.1%	47.2%	24.3%	23.4%	28.5%	75.7%	23.0%	6.3%	37.9%	32.8%	23.0%	29.3%	67.2%
North Sydney	28.6%	7.0%	10.6%	53.8%	28.6%	35.6%	46.2%	27.3%	5.2%	9.0%	58.5%	27.3%	32.5%	41.5%
Northern Beaches	49.5%	10.5%	15.5%	24.5%	49.5%	60.0%	75.5%	41.6%	19.0%	15.6%	23.8%	41.6%	60.6%	76.2%
Parramatta	23.0%	5.9%	27.7%	43.4%	23.0%	28.9%	56.6%	18.7%	3.4%	26.9%	51.0%	18.7%	22.1%	49.0%
Penrith	25.0%	5.7%	54.0%	15.3%	25.0%	30.7%	84.7%	22.5%	6.9%	51.9%	18.7%	22.5%	29.4%	81.3%
Randwick	14.2%	9.2%	30.8%	45.8%	14.2%	23.4%	54.2%	17.2%	7.9%	28.1%	46.8%	17.2%	25.1%	53.2%
Ryde	32.7%	7.1%	21.6%	38.6%	32.7%	39.8%	61.4%	30.8%	6.6%	18.1%	44.5%	30.8%	37.4%	55.5%
Strathfield	18.4%	3.5%	25.3%	52.8%	18.4%	21.9%	47.2%	15.4%	6.7%	18.5%	59.4%	15.4%	22.1%	40.6%
Sutherland Shire	42.1%	21.5%	23.1%	13.3%	42.1%	63.6%	86.7%	41.4%	23.0%	19.4%	16.2%	41.4%	64.4%	83.8%
Sydney	15.2%	2.5%	13.2%	69.1%	15.2%	17.7%	30.9%	18.8%	1.4%	11.5%	68.3%	18.8%	20.2%	31.7%
The Hills Shire	53.7%	10.8%	23.8%	11.6%	53.7%	64.5%	88.3%	51.2%	8.5%	27.5%	12.8%	51.2%	59.7%	87.2%
Waverley	17.1%	7.0%	16.8%	59.1%	17.1%	24.1%	40.9%	20.4%	3.5%	14.5%	61.6%	20.4%	23.9%	38.4%
Willoughby	37.0%	7.0%	13.4%	42.6%	37.0%	44.0%	57.4%	32.3%	7.2%	15.4%	45.1%	32.3%	39.5%	54.9%
Woollahra	30.0%	6.7%	15.3%	48.0%	30.0%	36.7%	52.0%	32.4%	5.4%	15.7%	46.5%	32.4%	37.8%	53.5%
Ballarat	17.0%	1.5%	71.5%	10.0%	17.0%	18.5%	90.0%	9.9%	2.2%	72.8%	15.1%	9.9%	12.1%	84.9%
Banyule	29.6%	6.0%	26.1%	38.3%	29.6%	35.6%	61.7%	30.5%	4.3%	23.8%	41.4%	30.5%	34.8%	58.6%
Bayside (VIC)	21.0%	7.7%	19.1%	52.2%	21.0%	28.7%	47.8%	22.9%	4.7%	21.3%	51.1%	22.9%	27.6%	48.9%
Boroondara	28.1%	8.0%	15.5%	48.4%	28.1%	36.1%	51.6%	29.5%	3.8%	15.6%	51.1%	29.5%	33.3%	48.9%
Brimbank	6.2%	2.8%	49.5%	41.5%	6.2%	9.0%	58.5%	8.1%	7.1%	37.6%	47.2%	8.1%	15.2%	52.8%
Cardinia	32.2%	3.1%	60.5%	4.2%	32.2%	35.3%	95.8%	26.3%	5.2%	63.7%	4.8%	26.3%	31.5%	95.2%
Casey	12.6%	7.2%	60.3%	19.9%	12.6%	19.8%	80.1%	14.3%	3.2%	60.9%	21.6%	14.3%	17.5%	78.4%
Darebin	17.3%	4.6%	25.7%	52.4%	17.3%	21.9%	47.6%	20.3%	3.1%	21.8%	54.8%	20.3%	23.4%	45.2%
Frankston	22.3%	6.2%	41.4%	30.1%	22.3%	28.5%	69.9%	20.5%	5.1%	43.2%	31.2%	20.5%	25.6%	68.8%
Glen Eira	20.0%	6.5%	15.0%	58.5%	20.0%	26.5%	41.5%	17.4%	4.6%	16.7%	61.3%	17.4%	22.0%	38.7%
Greater Bendigo	28.3%	3.9%	64.6%	3.2%	28.3%	32.2%	96.8%	23.1%	4.3%	68.9%	3.7%	23.1%	27.4%	96.3%
Greater Dandenong	8.2%	2.6%	49.8%	39.4%	8.2%	10.8%	60.6%	8.4%	2.6%	44.2%	44.8%	8.4%	11.0%	55.2%
Greater Geelong	10.9%	5.3%	74.3%	9.5%	10.9%	16.2%	90.5%	7.8%	3.8%	77.4%	11.0%	7.8%	11.6%	89.0%
Hobsons Bay	7.6%	2.9%	45.5%	44.0%	7.6%	10.5%	56.0%	7.9%	3.8%	37.1%	51.2%	7.9%	11.7%	48.8%
Hume	7.9%	3.1%	77.3%	11.7%	7.9%	11.0%	88.3%	6.4%	3.3%	76.0%	14.3%	6.4%	9.7%	85.7%
Kingston	14.2%	4.6%	35.6%	45.6%	14.2%	18.8%	54.4%	10.7%	6.6%	33.7%	49.0%	10.7%	17.3%	51.0%
Knox	24.2%	6.2%	33.1%	36.5%	24.2%	30.4%	63.5%	23.7%	5.8%	29.9%	40.6%	23.7%	29.5%	59.4%
Manningham	40.1%	7.6%	29.0%	23.3%	40.1%	47.7%	76.7%	33.8%	8.5%	29.8%	27.9%	33.8%	42.3%	72.1%
Maribyrnong	7.4%	3.6%	30.8%	58.2%	7.4%	11.0%	41.8%	4.9%	4.4%	28.3%	62.4%	4.9%	9.3%	37.6%

LGAName2	Tree2020	Shrub2020	Grass/bare-ground2020	HardSurface2020	CanopyCover2020	UrbanForestCover2020	GreenSpaceCover2020	Cluster_Mean_UF2020	Cluster_SD_UF2020	Cluster_Mean_DiffUF2016-2020	Cluster_SD_DiffUF2016-2020	UF_cover_class	UF_Change_class_2016-2020	Outlook_class_num	Challenge_rating_num
Bayside (NSW)	14.4%	2.9%	23.5%	59.3%	14.4%	17.2%	40.7%	26.1%	8.4%	-0.1%	2.1%	1	3	2	3
Blacktown	17.1%	5.3%	42.4%	35.2%	17.1%	22.4%	64.8%	34.8%	14.9%	0.2%	3.5%	2	1	8	4
Burwood	16.9%	3.2%	15.8%	64.1%	16.9%	20.1%	35.9%	26.1%	8.4%	-0.1%	2.1%	2	1	8	4
Camden	15.3%	3.0%	63.1%	18.6%	15.3%	18.3%	81.4%	22.7%	10.5%	0.6%	2.1%	2	1	8	4
Campbelltown (NSW	37.2%	14.3%	32.9%	15.6%	37.2%	51.5%	84.4%	57.8%	15.3%	2.5%	3.5%	1	4	1	2
Canada Bay	17.6%	3.2%	21.7%	57.5%	17.6%	20.8%	42.5%	26.1%	8.4%	-0.1%	2.1%	2	1	8	4
Canterbury-Banksto	17.2%	3.1%	22.4%	57.3%	17.2%	20.3%	42.7%	26.1%	8.4%	-0.1%	2.1%	2	1	8	4
Cumberland	15.1%	2.9%	25.3%	56.7%	15.1%	18.0%	43.3%	26.1%	8.4%	-0.1%	2.1%	2	1	8	4
Fairfield	14.5%	4.6%	36.9%	44.0%	14.5%	19.1%	56.0%	26.1%	8.4%	-0.1%	2.1%	2	2	7	3
Georges River	23.7%	4.4%	16.9%	55.1%	23.7%	28.0%	44.9%	26.1%	8.4%	-0.1%	2.1%	3	2	11	2
Hornsby	71.7%	6.9%	12.6%	8.8%	71.7%	78.6%	91.2%	57.8%	15.3%	2.5%	3.5%	4	3	14	1
Hunters Hill	33.8%	5.4%	19.1%	41.7%	33.8%	39.2%	58.3%	26.1%	8.4%	-0.1%	2.1%	4	3	14	1
Inner West	19.3%	2.9%	12.1%	65.7%	19.3%	22.2%	34.3%	26.1%	8.4%	-0.1%	2.1%	2	1	8	4
Ku-ring-gai	51.5%	7.4%	14.0%	27.1%	51.5%	58.9%	72.9%	34.8%	14.9%	0.2%	3.5%	4	3	14	1
Lane Cove	40.2%	4.8%	13.4%	41.6%	40.2%	45.0%	58.4%	26.1%	8.4%	-0.1%	2.1%	4	3	14	1
Liverpool	20.5%	12.0%	46.0%	21.5%	20.5%	32.5%	78.5%	34.8%	14.9%	0.2%	3.5%	2	3	6	3
Mosman	33.7%	9.0%	9.2%	48.1%	33.7%	42.7%	51.9%	26.1%	8.4%	-0.1%	2.1%	4	3	14	1
Newcastle	24.4%	5.1%	38.1%	32.4%	24.4%	29.5%	67.6%	34.8%	14.9%	0.2%	3.5%	2	3	6	3
North Sydney	30.6%	3.8%	7.8%	57.8%	30.6%	34.4%	42.2%	26.1%	8.4%	-0.1%	2.1%	3	3	10	1
Northern Beaches	42.5%	20.1%	12.3%	25.0%	42.5%	62.7%	75.0%	34.8%	14.9%	0.2%	3.5%	4	4	13	1
Parramatta	20.2%	4.7%	22.9%	52.2%	20.2%	24.9%	47.8%	26.1%	8.4%	-0.1%	2.1%	2	4	5	2
Penrith	25.6%	4.8%	50.0%	19.6%	25.6%	30.4%	80.4%	57.8%	15.3%	2.5%	3.5%	1	3	2	3
Randwick	17.2%	8.3%	23.7%	50.8%	17.2%	25.5%	49.2%	26.1%	8.4%	-0.1%	2.1%	2	3	6	3
Ryde	29.1%	3.8%	17.6%	49.5%	29.1%	32.9%	50.5%	26.1%	8.4%	-0.1%	2.1%	3	1	12	3
Strathfield	16.0%	5.6%	17.2%	61.2%	16.0%	21.6%	38.8%	26.1%	8.4%	-0.1%	2.1%	2	2	7	3
Sutherland Shire	48.4%	24.2%	10.2%	17.2%	48.4%	72.6%	82.8%	57.8%	15.3%	2.5%	3.5%	3	4	9	1
Sydney	19.1%	1.6%	10.7%	68.6%	19.1%	20.7%	31.4%	26.1%	8.4%	-0.1%	2.1%	2	3	6	3
The Hills Shire	55.4%	8.1%	21.0%	15.5%	55.4%	63.5%	84.5%	57.8%	15.3%	2.5%	3.5%	3	4	9	1
Waverley	20.2%	5.0%	15.6%	59.2%	20.2%	25.2%	40.8%	26.1%	8.4%	-0.1%	2.1%	2	3	6	3
Willoughby	35.1%	5.9%	13.0%	46.0%	35.1%	41.0%	54.0%	26.1%	8.4%	-0.1%	2.1%	4	3	14	1
Woollahra	30.3%	4.6%	14.7%	50.4%	30.3%	34.9%	49.6%	26.1%	8.4%	-0.1%	2.1%	4	1	16	3
Ballarat	15.8%	1.3%	69.4%	13.5%	15.8%	17.1%	86.5%	23.5%	12.1%	2.1%	1.9%	2	4	5	2
Banyule	32.0%	4.0%	22.3%	41.7%	32.0%	36.0%	58.3%	22.5%	6.9%	-0.2%	1.8%	4	3	14	1
Bayside (VIC)	22.5%	5.4%	18.2%	53.9%	22.5%	27.9%	46.1%	22.5%	6.9%	-0.2%	1.8%	3	3	10	1
Boroondara	31.5%	5.5%	15.8%	47.2%	31.5%	37.0%	52.8%	22.5%	6.9%	-0.2%	1.8%	4	4	13	1
Brimbank	10.2%	2.9%	36.9%	50.0%	10.2%	13.1%	50.0%	22.7%	10.5%	0.6%	2.1%	2	1	8	4
Cardinia	27.7%	3.0%	65.0%	4.3%	27.7%	30.7%	95.7%	57.8%	15.3%	2.5%	3.5%	1	2	3	3
Casey	15.1%	3.7%	57.1%	24.1%	15.1%	18.8%	75.9%	34.8%	14.9%	0.2%	3.5%	1	3	2	3
Darebin	21.6%	2.7%	21.6%	54.1%	21.6%	24.3%	45.9%	22.5%	6.9%	-0.2%	1.8%	3	3	10	1
Frankston	24.2%	3.1%	40.8%	31.9%	24.2%	27.3%	68.1%	22.7%	10.5%	0.6%	2.1%	3	3	10	1
Glen Eira	19.0%	4.6%	14.8%	61.6%	19.0%	23.6%	38.4%	22.5%	6.9%	-0.2%	1.8%	3	3	10	1
Greater Bendigo	30.8%	1.1%	64.5%	3.6%	30.8%	31.9%	96.4%	23.5%	12.1%	2.1%	1.9%	3	4	9	1
Greater Dandenong	10.6%	3.3%	38.1%	48.0%	10.6%	13.9%	52.0%	22.7%	10.5%	0.6%	2.1%	2	4	5	2
Greater Geelong	11.1%	3.1%	75.0%	10.8%	11.1%	14.2%	89.2%	23.5%	12.1%	2.1%	1.9%	2	4	5	2
Hobsons Bay	7.2%	2.9%	38.0%	51.9%	7.2%	10.1%	48.1%	22.7%	10.5%	0.6%	2.1%	1	1	4	4
Hume	6.4%	4.0%	74.9%	14.7%	6.4%	10.4%	85.3%	23.5%	12.1%	2.1%	1.9%	1	3	2	3
Kingston	10.7%	5.4%	33.0%	50.9%	10.7%	16.1%	49.1%	22.7%	10.5%	0.6%	2.1%	2	1	8	4
Knox	24.9%	6.0%	28.0%	41.1%	24.9%	30.9%	58.9%	34.8%	14.9%	0.2%	3.5%	2	3	6	3
Manningham	35.1%	6.1%	31.4%	27.4%	35.1%	41.2%	72.6%	34.8%	14.9%	0.2%	3.5%	3	1	12	3
Maribyrnong	6.8%	1.8%	26.2%	65.2%	6.8%	8.6%	34.8%	22.5%	6.9%	-0.2%	1.8%	1	2	3	3

LGAName2	State	LGACode	LGA_Cluster	StratPublic	StratPrivate	ResourcePublic	ResourcePrivate	OrgSupPublic	OrgSupPrivate	ComSupPublic	ComSupPrivate	StateFramework
Maroondah	VIC	24410	4	strong	weak	strong	fair	strong	weak	strong	fair	weak
Melbourne	VIC	24600	5	strong	fair	strong	fair	strong	weak	fair	weak	weak
Melton	VIC	24650	1	strong	fair	fair	fair	strong	strong	fair	fair	fair
Monash	VIC	24970	6	fair	fair	fair	weak	fair	weak	fair	fair	weak
Moonee Valley	VIC	25060	5	strong	strong	strong	fair	strong	strong	fair	fair	strong
Moreland	VIC	25250	5	fair	fair	fair	fair	fair	fair	fair	fair	weak
Mornington Peninsul	VIC	25340	2	fair	fair	weak	weak	strong	strong	fair	strong	fair
Nillumbik	VIC	25710	2	weak	weak	weak	fair	strong	strong	strong	strong	fair
Port Phillip	VIC	25900	5	strong	weak	strong	weak	strong	fair	fair	fair	fair
Stonnington	VIC	26350	5	strong	fair	fair	weak	fair	weak	weak	weak	weak
Whitehorse	VIC	26980	6	strong	fair	fair	fair	fair	strong	strong	strong	weak
Whittlesea	VIC	27070	1	fair	fair	fair	fair	strong	strong	fair	weak	strong
Wyndham	VIC	27260	1	fair	fair	strong	fair	strong	fair	fair	fair	weak
Yarra	VIC	27350	5	strong	fair	fair	weak	strong	fair	fair	weak	weak
Yarra Ranges	VIC	27450	2	fair	fair	weak	weak	strong	fair	strong	fair	weak
Brisbane	QLD	31000	4	strong	strong	strong	fair	strong	fair	fair	strong	fair
Cairns	QLD	32080	2	strong	fair	fair	fair	strong	weak	strong	strong	weak
Gold Coast	QLD	33430	2	weak	weak	fair	fair	fair	fair	weak	weak	fair
Ipswich	QLD	33960	2	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Logan	QLD	34590	2	weak	weak	weak	weak	weak	weak	weak	weak	fair
Moreton Bay	QLD	35010	2	fair	strong	strong	strong	strong	strong	fair	strong	strong
Redland	QLD	36250	2	fair	weak	fair	fair	strong	fair	fair	strong	weak
Sunshine Coast	QLD	36720	2	strong	fair	fair	fair	fair	weak	fair	fair	weak
Toowoomba	QLD	36910	1	fair	weak	fair	fair	fair	weak	weak	weak	weak
Townsville	QLD	37010	2	strong	strong	strong	strong	strong	strong	fair	fair	strong
Adelaide	SA	40070	3	strong	weak	strong	weak	strong	weak	strong	fair	weak
Adelaide Hills	SA	40120	2	fair	fair	weak	weak	weak	weak	weak	weak	weak
Burnside	SA	40700	3	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Campbelltown (SA)	SA	40910	5	weak	fair	weak	weak	fair	fair	fair	fair	weak
Charles Sturt	SA	41060	5	strong	fair	fair	fair	strong	fair	fair	weak	weak
Gawler	SA	42030	3	weak	fair	fair	fair	strong	fair	strong	fair	fair
Holdfast Bay	SA	42600	5	fair	weak	weak	weak	strong	weak	weak	weak	weak
Marion	SA	44060	3	strong	fair	fair	weak	strong	weak	fair	weak	weak
Mitcham	SA	44340	3	fair	fair	fair	fair	strong	fair	fair	fair	weak
Norwood Payneham	SA	45290	5	fair	fair	fair	weak	weak	weak	strong	fair	weak
Onkaparinga	SA	45340	1	strong	fair	fair	weak	weak	weak	fair	weak	weak
Playford	SA	45680	1	fair	fair	weak	weak	weak	weak	weak	weak	weak
Port Adelaide Enfield	SA	45890	3	fair	weak	fair	weak	fair	fair	strong	strong	weak
Prospect	SA	46510	5	strong	fair	strong	fair	strong	strong	strong	strong	fair
Salisbury	SA	47140	3	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Tea Tree Gully	SA	47700	3	fair	fair	fair	weak	weak	weak	weak	weak	weak
Unley	SA	47980	5	fair	fair	strong	strong	strong	strong	strong	fair	weak
Walkerville	SA	48260	5	strong	weak	fair	weak	strong	fair	strong	fair	weak
West Torrens	SA	48410	3	strong	fair	fair	fair	strong	fair	strong	fair	weak
Armadale	WA	50210	2	fair	weak	fair	weak	weak	weak	fair	weak	fair
Bassendean	WA	50350	4	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Bayswater	WA	50420	6	fair	weak	fair	fair	strong	weak	strong	fair	weak
Belmont	WA	50490	4	strong	fair	fair	fair	strong	strong	fair	fair	weak
Cambridge	WA	51310	3	strong	fair	fair	fair	strong	weak	fair	fair	weak
Canning	WA	51330	4	fair	fair	fair	weak	weak	weak	fair	weak	weak
Claremont	WA	51750	5	strong	fair	strong	fair	strong	fair	strong	fair	weak

LGAName2	ERP_2019	PopGrowth2001_2019	PopDens	%Urban	%Apartments	IRSAD	%ParentsOS	MeanRainfall	%FireAffected	ERP_2019_q5	PopGrowth2001_2019_q5	PopDens_q5	%Urban_class	%Apartments_q5	IRSAD_q5	%ParentsOS_q5	MeanRainfall_q5	%FireAffected_class
Maroondah	118558	1.0	1931	100	2	1034	29	854	0.0	3	2	3	3	1	3	2	4	1
Melbourne	178955	6.7	4791	100	71	1071	47	577	0.0	4	5	5	3	5	3	5	1	1
Melton	164895	6.6	313	24	1	981	39	505	0.0	4	5	1	1	1	1	3	1	1
Monash	202847	1.3	2489	100	11	1060	56	747	0.1	4	3	4	3	3	3	5	3	1
Moonee Valley	130294	1.2	3020	100	19	1046	38	544	0.0	3	3	4	3	4	3	3	1	1
Moreland	185767	1.8	3646	100	15	1026	42	582	0.0	4	4	5	3	4	2	4	1	1
Mornington Peninsul	167636	1.4	232	33	3	1013	21	780	0.2	4	3	1	1	2	2	1	3	1
Nillumbik	65094	0.4	151	15	2	1093	22	799	0.2	2	1	1	1	1	4	1	3	1
Port Phillip	115601	2.1	5582	100	57	1101	34	594	0.0	3	4	5	3	5	4	2	1	1
Stonnington	117768	1.5	4591	100	44	1120	34	614	0.0	3	3	5	3	5	4	2	2	1
Whitehorse	178739	1.1	2781	100	7	1063	44	756	0.0	4	3	4	3	3	3	4	3	1
Whittlesea	230238	3.8	470	23	3	982	46	715	0.5	5	5	2	1	2	1	4	2	2
Wyndham	270487	6.5	499	26	2	1002	46	491	0.0	5	5	2	1	1	2	4	1	1
Yarra	101495	2.2	5194	100	41	1081	32	600	0.0	3	4	5	3	5	3	2	2	1
Yarra Ranges	159462	0.7	65	10	0	1017	21	1221	4.7	4	1	1	1	1	2	1	5	3
Brisbane	1253982	1.9	934	61	20	1060	33	1089	8.3	5	4	2	2	4	3	2	4	3
Cairns	166862	2.1	99	13	15	971	25	3003	3.5	4	4	1	1	4	1	1	5	2
Gold Coast	620518	2.8	465	44	18	1009	30	1423	2.5	5	5	2	1	4	2	2	5	2
Ipswich	222307	3.3	203	24	1	948	23	814	5.1	5	5	1	1	1	1	1	3	3
Logan	334358	2.0	349	46	3	946	32	952	5.5	5	4	2	1	2	1	2	4	3
Moreton Bay	469465	2.9	230	28	5	982	21	1269	4.3	5	5	1	1	2	1	1	5	3
Redland	158815	1.8	296	29	4	1015	25	1367	25.0	4	4	1	1	2	2	1	5	3
Sunshine Coast	328428	2.8	146	14	11	999	20	1544	3.3	5	5	1	1	3	2	1	5	2
Toowoomba	169008	1.3	13	2	4	974	13	662	3.6	4	3	1	1	2	1	1	2	2
Townsville	195032	1.8	52	7	7	976	16	1127	31.8	4	4	1	1	3	1	1	4	3
Adelaide	25456	3.7	1635	100	43	1058	43	491	0.0	1	5	3	3	5	3	4	1	1
Adelaide Hills	39977	0.2	50	9	1	1072	22	788	7.3	1	1	1	1	1	3	1	3	3
Burnside	45816	0.4	1665	100	9	1100	37	603	0.4	2	1	3	3	3	4	3	2	1
Campbelltown (SA)	52192	0.6	2144	97	7	1003	47	569	0.5	2	1	4	2	3	2	5	1	1
Charles Sturt	118943	0.8	2171	100	8	980	38	442	0.0	3	2	4	3	3	1	3	1	1
Gawler	24416	1.6	594	53	1	936	22	429	0.0	1	4	2	2	1	1	1	1	1
Holdfast Bay	37435	0.6	2722	100	16	1042	26	452	0.0	1	1	4	3	4	3	2	1	1
Marion	93448	1.0	1680	100	6	991	33	562	0.0	2	2	3	3	2	2	2	1	1
Mitcham	67474	0.5	893	68	9	1070	28	668	1.3	2	1	2	2	3	3	2	2	2
Norwood Payneham	37056	0.6	2454	100	15	1043	38	512	0.0	1	1	4	3	4	3	3	1	1
Onkaparinga	172938	0.8	334	29	2	960	26	648	0.5	4	2	2	1	1	1	2	2	2
Playford	94848	1.8	275	16	1	853	28	478	3.7	2	4	1	1	1	1	2	1	2
Port Adelaide Enfield	127740	1.3	1392	100	7	940	42	451	0.0	3	3	3	3	3	1	4	1	1
Prospect	21520	0.7	2762	100	11	1052	37	491	0.0	1	1	4	3	3	3	3	1	1
Salisbury	143560	1.3	898	93	4	908	41	435	0.0	3	3	2	2	2	1	4	1	1
Tea Tree Gully	100261	0.1	1053	66	2	1004	32	600	0.7	3	1	3	2	1	2	2	1	2
Unley	39208	0.4	2748	100	20	1082	31	498	0.0	1	1	4	3	4	3	2	1	1
Walkerville	8000	0.7	2266	100	12	1093	34	491	0.0	1	2	4	3	3	4	3	1	1
West Torrens	60842	0.9	1643	100	12	998	39	455	0.0	2	2	3	3	3	2	3	1	1
Armadale	90797	3.1	162	22	1	985	39	931	15.1	2	5	1	1	1	1	3	4	3
Bassendean	15823	0.7	1530	100	4	1008	36	756	0.0	1	1	3	3	2	2	3	3	1
Bayswater	68362	0.9	1975	100	8	1024	48	768	0.0	2	2	4	3	3	2	5	3	1
Belmont	42078	1.9	1057	100	9	987	47	774	0.0	2	4	3	3	3	2	5	3	1
Cambridge	28867	0.9	1315	100	11	1153	34	734	0.3	1	2	3	3	3	4	2	2	1
Canning	92888	1.0	1432	100	3	1031	59	787	0.7	2	2	3	3	2	2	5	3	2
Claremont	10712	0.9	2162	100	21	1133	32	734	0.0	1	2	4	3	4	4	2	2	1

LGAName2	Tree2013	Shrub2013	Grass/bare-ground2013	Hard surface2013	CanopyCover2013	UrbanForestCover2013	GreenSpaceCover2013	Tree2016	Shrub2016	Grass/bare-ground2016	HardSurface2016	CanopyCover2016	UrbanForestCover2016	GreenSpaceCover2016
Maroondah	32.5%	5.6%	21.7%	40.2%	32.5%	38.1%	59.8%	27.8%	7.7%	22.3%	42.2%	27.8%	35.5%	57.8%
Melbourne	12.9%	1.8%	22.3%	63.0%	12.9%	14.7%	37.0%	12.5%	2.8%	19.2%	65.5%	12.5%	15.3%	34.5%
Melton	6.3%	2.7%	85.0%	6.0%	6.3%	9.0%	94.0%	4.3%	2.4%	83.0%	10.3%	4.3%	6.7%	89.7%
Monash	19.4%	6.3%	25.0%	49.3%	19.4%	25.7%	50.7%	17.3%	5.4%	23.7%	53.6%	17.3%	22.7%	46.4%
Moonee Valley	11.9%	4.3%	31.0%	52.8%	11.9%	16.2%	47.2%	11.5%	4.8%	26.6%	57.1%	11.5%	16.3%	42.9%
Moreland	13.3%	6.3%	26.7%	53.7%	13.3%	19.6%	46.3%	12.5%	6.2%	23.5%	57.8%	12.5%	18.7%	42.2%
Mornington Peninsul	28.1%	6.9%	55.3%	9.7%	28.1%	35.0%	90.3%	23.4%	6.8%	57.4%	12.4%	23.4%	30.2%	87.6%
Nillumbik	49.1%	5.5%	38.9%	6.5%	49.1%	54.6%	93.5%	36.3%	11.6%	46.0%	6.1%	36.3%	47.9%	93.9%
Port Phillip	16.2%	2.5%	16.1%	65.2%	16.2%	18.7%	34.8%	16.0%	2.7%	13.4%	67.9%	16.0%	18.7%	32.1%
Stonnington	25.0%	6.8%	11.0%	57.2%	25.0%	31.8%	42.8%	20.9%	6.2%	10.7%	62.2%	20.9%	27.1%	37.8%
Whitehorse	22.9%	7.5%	21.9%	47.8%	22.9%	30.4%	52.3%	21.7%	5.9%	16.8%	55.6%	21.7%	27.6%	44.4%
Whittlesea	18.8%	6.1%	66.1%	9.0%	18.8%	24.9%	91.0%	21.2%	3.0%	62.4%	13.4%	21.2%	24.2%	86.6%
Wyndham	3.1%	2.7%	81.3%	12.9%	3.1%	5.8%	87.1%	3.2%	2.0%	78.5%	16.3%	3.2%	5.2%	83.7%
Yarra	18.5%	3.6%	15.3%	62.6%	18.5%	22.1%	37.4%	22.8%	1.6%	13.6%	62.0%	22.8%	24.4%	38.0%
Yarra Ranges	77.2%	1.8%	19.3%	1.7%	77.2%	79.0%	98.3%	76.9%	2.5%	17.6%	3.0%	76.9%	79.4%	97.0%
Brisbane	49.1%	5.4%	24.2%	21.3%	49.1%	54.5%	78.7%	46.6%	8.7%	18.1%	26.6%	46.6%	55.3%	73.4%
Cairns	78.9%	3.3%	15.5%	2.3%	78.9%	82.2%	97.7%	79.1%	4.6%	13.5%	2.8%	79.1%	83.7%	97.2%
Gold Coast	54.3%	8.6%	21.6%	15.5%	54.3%	62.9%	84.5%	47.6%	9.1%	24.4%	18.9%	47.6%	56.7%	81.1%
Ipswich	36.2%	3.7%	54.9%	5.2%	36.2%	39.9%	94.8%	35.5%	10.3%	46.9%	7.3%	35.5%	45.8%	92.7%
Logan	49.1%	6.1%	34.9%	9.9%	49.1%	55.2%	90.1%	40.9%	9.0%	40.6%	9.5%	40.9%	49.9%	90.5%
Moreton Bay	51.7%	6.1%	33.0%	9.2%	51.7%	57.8%	90.8%	44.9%	9.2%	35.9%	10.0%	44.9%	54.1%	90.0%
Redland	57.2%	17.1%	18.1%	7.6%	57.2%	74.3%	92.4%	48.3%	18.5%	22.1%	11.1%	48.3%	66.8%	88.9%
Sunshine Coast	57.4%	5.1%	31.3%	6.2%	57.4%	62.5%	93.8%	49.1%	8.4%	35.4%	7.1%	49.1%	57.5%	92.9%
Toowoomba	23.8%	4.2%	71.0%	1.0%	23.8%	28.0%	99.0%	24.0%	4.6%	70.6%	0.8%	24.0%	28.6%	99.2%
Townsville	44.3%	7.3%	45.5%	2.9%	44.3%	51.6%	97.1%	54.5%	5.0%	36.1%	4.4%	54.5%	59.5%	95.6%
Adelaide	43.7%	11.7%	39.5%	5.1%	43.7%	55.4%	94.9%	21.4%	2.3%	31.5%	44.8%	21.4%	23.7%	55.2%
Adelaide Hills	20.3%	1.3%	31.9%	46.5%	20.3%	21.6%	53.5%	42.0%	7.6%	44.0%	6.4%	42.0%	49.6%	93.6%
Burnside	30.2%	7.3%	28.3%	34.2%	30.2%	37.5%	65.8%	33.7%	10.3%	17.4%	38.6%	33.7%	44.0%	61.4%
Campbelltown (SA)	19.4%	8.1%	26.2%	46.3%	19.4%	27.5%	53.7%	19.4%	5.1%	24.3%	51.2%	19.4%	24.5%	48.8%
Charles Sturt	13.2%	4.5%	27.5%	54.8%	13.2%	17.7%	45.2%	8.2%	4.6%	25.1%	62.1%	8.2%	12.8%	37.9%
Gawler	14.6%	4.2%	62.8%	18.4%	14.6%	18.8%	81.6%	10.0%	3.7%	63.6%	22.7%	10.0%	13.7%	77.3%
Holdfast Bay	13.4%	3.5%	17.3%	65.8%	13.4%	16.9%	34.2%	11.6%	3.4%	17.1%	67.9%	11.6%	15.0%	32.1%
Marion	15.3%	5.1%	39.0%	40.6%	15.3%	20.4%	59.4%	11.1%	5.1%	38.2%	45.6%	11.1%	16.2%	54.4%
Mitcham	42.4%	7.1%	26.8%	23.6%	42.4%	49.5%	76.3%	44.9%	7.2%	22.9%	25.0%	44.9%	52.1%	75.0%
Norwood Payneham	19.9%	5.3%	13.5%	61.3%	19.9%	25.2%	38.7%	20.6%	2.8%	15.6%	61.0%	20.6%	23.4%	39.0%
Onkaparinga	18.9%	15.2%	54.7%	11.2%	18.9%	34.1%	88.8%	18.5%	10.5%	59.7%	11.3%	18.5%	29.0%	88.7%
Playford	14.8%	7.7%	61.0%	16.5%	14.8%	22.5%	83.5%	9.4%	6.0%	63.6%	21.0%	9.4%	15.4%	79.0%
Port Adelaide Enfield	11.9%	2.6%	30.4%	55.1%	11.9%	14.5%	44.9%	7.8%	4.8%	28.5%	58.9%	7.8%	12.6%	41.1%
Prospect	18.4%	3.7%	16.8%	61.1%	18.4%	22.1%	38.9%	17.0%	4.4%	16.5%	62.1%	17.0%	21.4%	37.9%
Salisbury	20.8%	3.5%	38.7%	37.0%	20.8%	24.3%	63.0%	17.3%	3.4%	41.0%	38.3%	17.3%	20.7%	61.7%
Tea Tree Gully	23.5%	6.5%	40.5%	29.5%	23.5%	30.0%	70.5%	22.5%	5.7%	41.9%	29.9%	22.5%	28.2%	70.1%
Unley	26.1%	5.8%	11.1%	57.0%	26.1%	31.9%	43.0%	22.1%	4.7%	13.8%	59.4%	22.1%	26.8%	40.6%
Walkerville	25.0%	5.6%	12.1%	57.3%	25.0%	30.6%	42.7%	21.8%	4.4%	14.0%	59.8%	21.8%	26.2%	40.2%
West Torrens	14.2%	3.7%	31.5%	50.6%	14.2%	17.9%	49.4%	10.3%	3.4%	31.3%	55.0%	10.3%	13.7%	45.0%
Armadale	32.8%	36.2%	24.7%	6.3%	32.8%	69.0%	93.7%	46.0%	17.8%	30.7%	5.5%	46.0%	63.8%	94.5%
Bassendean	15.7%	5.2%	33.3%	45.8%	15.7%	20.9%	54.2%	14.7%	4.8%	32.3%	48.2%	14.7%	19.5%	51.8%
Bayswater	13.2%	8.0%	25.3%	53.5%	13.2%	21.2%	46.5%	12.9%	4.2%	29.9%	53.0%	12.9%	17.1%	47.0%
Belmont	9.1%	9.5%	30.8%	50.6%	9.1%	18.6%	49.4%	12.2%	5.4%	27.8%	54.6%	12.2%	17.6%	45.4%
Cambridge	23.6%	9.6%	30.9%	35.9%	23.6%	33.2%	64.1%	13.7%	10.0%	36.6%	39.7%	13.7%	23.7%	60.3%
Canning	13.1%	7.2%	26.6%	53.1%	13.1%	20.3%	46.9%	13.3%	5.6%	27.8%	53.3%	13.3%	18.9%	46.7%
Claremont	20.9%	4.6%	20.3%	54.2%	20.9%	25.5%	45.8%	21.0%	3.7%	20.9%	54.4%	21.0%	24.7%	45.6%

LGAName2	Tree2020	Shrub2020	Grass/bare-ground2020	HardSurface2020	CanopyCover2020	UrbanForestCover2020	GreenSpaceCover2020	Cluster_Mean_UF2020	Cluster_SD_UF2020	Cluster_Mean_DiffUF2016-2020	Cluster_SD_DiffUF2016-2020	UF_cover_class	UF_Change_class_2016-2020	Outlook_class_num	Challenge_rating_num
Maroondah	28.2%	4.1%	23.2%	44.5%	28.2%	32.3%	55.5%	34.8%	14.9%	0.2%	3.5%	2	1	8	4
Melbourne	14.4%	1.3%	16.2%	68.1%	14.4%	15.7%	31.9%	22.5%	6.9%	-0.2%	1.8%	2	3	6	3
Melton	5.8%	2.2%	81.5%	10.5%	5.8%	8.0%	89.5%	23.5%	12.1%	2.1%	1.9%	1	3	2	3
Monash	18.8%	4.6%	22.2%	54.4%	18.8%	23.4%	45.6%	26.1%	8.4%	-0.1%	2.1%	2	3	6	3
Moonee Valley	11.7%	4.6%	25.0%	58.7%	11.7%	16.3%	41.3%	22.5%	6.9%	-0.2%	1.8%	2	3	6	3
Moreland	11.1%	4.2%	23.3%	61.4%	11.1%	15.3%	38.6%	22.5%	6.9%	-0.2%	1.8%	1	1	4	4
Mornington Peninsul	24.2%	7.3%	56.9%	11.6%	24.2%	31.5%	88.4%	57.8%	15.3%	2.5%	3.5%	1	3	2	3
Nillumbik	44.6%	8.4%	41.0%	6.0%	44.6%	53.0%	94.0%	57.8%	15.3%	2.5%	3.5%	2	4	5	2
Port Phillip	15.1%	1.8%	13.5%	69.6%	15.1%	16.9%	30.4%	22.5%	6.9%	-0.2%	1.8%	2	1	8	4
Stonnington	21.9%	3.4%	10.2%	64.5%	21.9%	25.3%	35.5%	22.5%	6.9%	-0.2%	1.8%	3	1	12	3
Whitehorse	23.4%	4.8%	15.9%	55.9%	23.4%	28.2%	44.1%	26.1%	8.4%	-0.1%	2.1%	3	3	10	1
Whittlesea	21.2%	6.0%	58.6%	14.2%	21.2%	27.2%	85.8%	23.5%	12.1%	2.1%	1.9%	3	4	9	1
Wyndham	3.0%	2.4%	75.9%	18.7%	3.0%	5.4%	81.3%	23.5%	12.1%	2.1%	1.9%	1	3	2	3
Yarra	23.0%	1.1%	13.5%	62.4%	23.0%	24.1%	37.6%	22.5%	6.9%	-0.2%	1.8%	3	2	11	2
Yarra Ranges	76.4%	2.2%	18.7%	2.7%	76.4%	78.6%	97.3%	57.8%	15.3%	2.5%	3.5%	4	2	15	1
Brisbane	49.0%	4.9%	19.7%	26.4%	49.0%	53.9%	73.6%	34.8%	14.9%	0.2%	3.5%	4	1	16	3
Cairns	80.2%	2.7%	14.5%	2.6%	80.2%	82.9%	97.4%	57.8%	15.3%	2.5%	3.5%	4	2	15	1
Gold Coast	51.9%	4.2%	24.4%	19.5%	51.9%	56.1%	80.5%	57.8%	15.3%	2.5%	3.5%	2	2	7	3
Ipswich	41.4%	3.2%	47.8%	7.6%	41.4%	44.6%	92.4%	57.8%	15.3%	2.5%	3.5%	2	1	8	4
Logan	52.7%	2.2%	35.1%	10.0%	52.7%	54.9%	90.0%	57.8%	15.3%	2.5%	3.5%	2	4	5	2
Moreton Bay	53.6%	4.1%	32.1%	10.2%	53.6%	57.7%	89.8%	57.8%	15.3%	2.5%	3.5%	2	4	5	2
Redland	58.8%	9.5%	19.7%	12.0%	58.8%	68.3%	88.0%	57.8%	15.3%	2.5%	3.5%	3	3	10	1
Sunshine Coast	60.3%	5.6%	27.7%	6.4%	60.3%	65.9%	93.6%	57.8%	15.3%	2.5%	3.5%	3	4	9	1
Toowoomba	27.6%	2.2%	68.9%	1.3%	27.6%	29.8%	98.7%	23.5%	12.1%	2.1%	1.9%	3	3	10	1
Townsville	55.9%	5.6%	33.3%	5.2%	55.9%	61.5%	94.8%	57.8%	15.3%	2.5%	3.5%	3	4	9	1
Adelaide	23.0%	4.3%	26.7%	46.0%	23.0%	27.3%	54.0%	22.7%	10.5%	0.6%	2.1%	3	4	9	1
Adelaide Hills	37.9%	12.2%	43.7%	6.2%	37.9%	50.1%	93.8%	57.8%	15.3%	2.5%	3.5%	2	3	6	3
Burnside	33.4%	8.8%	14.0%	43.8%	33.4%	42.2%	56.2%	22.7%	10.5%	0.6%	2.1%	4	1	16	3
Campbelltown (SA)	18.4%	6.2%	22.6%	52.8%	18.4%	24.6%	47.2%	22.5%	6.9%	-0.2%	1.8%	3	3	10	1
Charles Sturt	9.0%	4.3%	23.8%	62.9%	9.0%	13.3%	37.1%	22.5%	6.9%	-0.2%	1.8%	1	3	2	3
Gawler	10.4%	4.0%	62.8%	22.8%	10.4%	14.4%	77.2%	22.7%	10.5%	0.6%	2.1%	2	3	6	3
Holdfast Bay	12.1%	3.5%	17.2%	67.2%	12.1%	15.6%	32.8%	22.5%	6.9%	-0.2%	1.8%	1	3	2	3
Marion	10.8%	6.2%	36.3%	46.7%	10.8%	17.0%	53.3%	22.7%	10.5%	0.6%	2.1%	2	3	6	3
Mitcham	44.2%	6.1%	23.8%	25.9%	44.2%	50.3%	74.1%	22.7%	10.5%	0.6%	2.1%	4	1	16	3
Norwood Payneham	20.4%	3.3%	14.9%	61.4%	20.4%	23.7%	38.6%	22.5%	6.9%	-0.2%	1.8%	3	3	10	1
Onkaparinga	20.8%	10.4%	56.7%	12.1%	20.8%	31.2%	87.9%	23.5%	12.1%	2.1%	1.9%	3	4	9	1
Playford	12.0%	4.8%	63.3%	19.9%	12.0%	16.8%	80.1%	23.5%	12.1%	2.1%	1.9%	2	3	6	3
Port Adelaide Enfield	7.1%	4.1%	29.0%	59.8%	7.1%	11.2%	40.2%	22.7%	10.5%	0.6%	2.1%	1	1	4	4
Prospect	16.8%	3.1%	16.6%	63.5%	16.8%	19.9%	36.5%	22.5%	6.9%	-0.2%	1.8%	2	1	8	4
Salisbury	18.7%	3.4%	42.3%	35.6%	18.7%	22.1%	64.4%	22.7%	10.5%	0.6%	2.1%	2	3	6	3
Tea Tree Gully	25.3%	5.7%	39.7%	29.3%	25.3%	31.0%	70.7%	22.7%	10.5%	0.6%	2.1%	3	4	9	1
Unley	24.8%	5.0%	12.5%	57.7%	24.8%	29.8%	42.3%	22.5%	6.9%	-0.2%	1.8%	4	4	13	1
Walkerville	18.3%	4.3%	18.3%	59.1%	18.3%	22.6%	40.9%	22.5%	6.9%	-0.2%	1.8%	3	1	12	3
West Torrens	10.8%	2.8%	30.1%	56.3%	10.8%	13.6%	43.7%	22.7%	10.5%	0.6%	2.1%	2	2	7	3
Armadale	52.2%	10.2%	31.6%	6.0%	52.2%	62.4%	94.0%	57.8%	15.3%	2.5%	3.5%	3	1	12	3
Bassendean	18.0%	4.6%	28.2%	49.2%	18.0%	22.6%	50.8%	34.8%	14.9%	0.2%	3.5%	2	4	5	2
Bayswater	10.9%	3.5%	25.7%	59.9%	10.9%	14.4%	40.1%	26.1%	8.4%	-0.1%	2.1%	1	1	4	4
Belmont	11.6%	5.9%	27.0%	55.5%	11.6%	17.5%	44.5%	34.8%	14.9%	0.2%	3.5%	1	2	3	3
Cambridge	16.1%	9.2%	32.3%	42.4%	16.1%	25.3%	57.6%	22.7%	10.5%	0.6%	2.1%	3	3	10	1
Canning	12.6%	5.9%	25.7%	55.8%	12.6%	18.5%	44.2%	34.8%	14.9%	0.2%	3.5%	1	2	3	3
Claremont	19.4%	4.6%	19.8%	56.2%	19.4%	24.0%	43.8%	22.5%	6.9%	-0.2%	1.8%	3	2	11	2

LGAName2	State	LGACode	LGA_Cluster	StratPublic	StratPrivate	ResourcePublic	ResourcePrivate	OrgSupPublic	OrgSupPrivate	ComSupPublic	ComSupPrivate	StateFramework
Cockburn	WA	51820	3	fair	weak	fair	weak	weak	weak	fair	weak	weak
Cottesloe	WA	52170	5	fair	weak	weak	weak	strong	weak	fair	weak	weak
East Fremantle	WA	53150	5	fair	fair	fair	weak	strong	fair	fair	fair	weak
Fremantle	WA	53430	3	strong	fair	fair	weak	strong	strong	strong	fair	weak
Gosnells	WA	53780	4	strong	weak	fair	fair	strong	weak	fair	weak	weak
Joondalup	WA	54170	3	strong	fair	strong	fair	strong	fair	weak	weak	fair
Kalamunda	WA	54200	2	weak	weak	fair	weak	strong	weak	fair	weak	weak
Kwinana	WA	54830	4	strong	strong	fair	fair	strong	strong	strong	strong	fair
Melville	WA	55320	4	strong	weak	fair	weak	fair	weak	fair	fair	weak
Mosman Park	WA	55740	5	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Mundaring	WA	56090	2	weak	fair	weak	fair	fair	fair	fair	fair	weak
Nedlands	WA	56580	3	strong	weak	strong	weak	strong	weak	fair	weak	fair
Peppermint Grove	WA	56930	3	strong	weak	strong	fair	strong	strong	fair	weak	weak
Perth	WA	57080	6	strong	weak	strong	fair	strong	fair	fair	fair	strong
Rockingham	WA	57490	4	strong	strong	fair	strong	strong	strong	strong	fair	weak
South Perth	WA	57840	6	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Stirling	WA	57910	6	strong	fair	fair	fair	strong	fair	fair	strong	weak
Subiaco	WA	57980	6	strong	fair	strong	fair	strong	fair	strong	fair	weak
Swan	WA	58050	1	strong	weak	weak	weak	strong	weak	fair	weak	weak
Victoria Park	WA	58510	6	strong	weak	fair	weak	strong	weak	fair	weak	weak
Vincent	WA	58570	6	strong	fair	fair	fair	strong	strong	fair	weak	fair
Wanneroo	WA	58760	1	fair	fair	fair	fair	fair	fair	weak	weak	weak
Clarence	TAS	61410	1	fair	weak	weak	weak	strong	weak	fair	weak	weak
Glenorchy	TAS	62610	2	fair	fair	weak	weak	weak	weak	weak	weak	fair
Hobart	TAS	62810	4	strong	fair	fair	weak	strong	weak	fair	fair	fair
Kingborough	TAS	63610	2	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
Launceston	TAS	64010	2	strong	weak	fair	weak	fair	weak	weak	weak	weak
Darwin	NT	71000	4	fair	weak	fair	weak	strong	weak	fair	fair	weak
Palmerston	NT	72800	4	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons	no respons
ACT	ACT	89399	2	fair	fair	fair	weak	fair	weak	fair	fair	fair

LGAName2	ERP_2019	PopGrowth2001_2019	PopDens	%Urban	%Apartments	IRSAD	%ParentsOS	MeanRainfall	%FireAffected	ERP_2019_q5	PopGrowth2001_2019_q5	PopDens_q5	%Urban_class	%Apartments_q5	IRSAD_q5	%ParentsOS_q5	MeanRainfall_q5	%FireAffected_class
Cockburn	114320	2.8	681	80	4	1033	41	745	2.8	3	5	2	2	2	3	4	2	2
Cottesloe	8251	0.6	2140	100	15	1163	26	713	0.0	1	1	4	3	4	4	2	2	1
East Fremantle	7837	0.8	2497	100	12	1119	29	716	0.0	1	2	4	3	3	4	2	2	1
Fremantle	31084	1.0	1635	100	10	1047	35	716	0.0	1	3	3	3	3	3	3	2	1
Gosnells	124081	2.2	975	74	1	981	52	833	3.1	3	4	3	2	1	1	5	3	2
Joondalup	159806	0.1	1615	100	2	1079	45	725	0.2	4	1	3	3	1	3	4	2	1
Kalamunda	58954	1.1	182	22	0	1027	37	895	32.9	2	3	1	1	1	2	3	4	3
Kwinana	45092	4.1	376	73	3	960	37	761	3.2	2	5	2	2	2	1	3	3	2
Melville	102307	0.3	1936	100	3	1089	42	757	0.0	3	1	3	3	2	3	4	3	1
Mosman Park	9111	0.5	2096	100	20	1114	35	713	0.0	1	1	4	3	4	4	3	2	1
Mundaring	39100	0.6	61	12	0	1036	29	805	16.0	1	1	1	1	1	3	2	3	3
Nedlands	22599	0.3	1150	100	5	1161	36	745	0.0	1	1	3	3	2	4	3	2	1
Peppermint Grove	1732	0.3	1622	100	11	1162	25	713	0.0	1	1	3	3	3	4	1	2	1
Perth	28832	5.8	2102	100	72	1087	45	765	0.4	1	5	4	3	5	3	4	3	1
Rockingham	135943	3.4	528	54	2	986	36	758	0.4	3	5	2	2	1	1	3	3	1
South Perth	43773	0.8	2210	100	12	1089	42	750	0.0	2	2	4	3	3	3	4	3	1
Stirling	221040	1.3	2111	100	8	1040	47	752	0.0	5	3	4	3	3	3	5	3	1
Subiaco	17251	1.6	3071	100	31	1112	52	753	0.0	1	4	5	3	5	4	5	3	1
Swan	147353	3.2	141	14	1	994	40	730	8.9	3	5	1	1	1	2	3	2	3
Victoria Park	36962	1.6	2060	100	16	1037	45	775	0.0	1	4	4	3	4	3	4	3	1
Vincent	36561	1.7	3214	100	23	1098	40	765	0.0	1	4	5	3	4	4	4	3	1
Wanneroo	208237	5.2	305	27	0	1010	47	692	23.3	5	5	1	1	1	2	5	2	3
Clarence	57807	0.9	153	27	2	983	12	560	3.8	2	2	1	1	1	1	1	1	3
Glenorchy	47969	0.5	396	29	11	890	15	780	1.0	2	1	2	1	3	1	1	3	2
Hobart	54649	0.8	701	51	18	1054	25	1022	3.9	2	2	2	2	4	3	1	4	3
Kingborough	38310	1.5	53	4	2	1021	20	900	0.5	1	3	1	1	1	2	1	4	1
Launceston	68007	0.4	48	5	8	926	14	1051	2.5	2	1	1	1	3	1	1	4	2
Darwin	82886	1.0	745	79	28	1057	36	1736	11.3	2	2	2	2	5	3	3	5	3
Palmerston	38270	3.0	727	67	13	1033	22	1756	17.2	1	5	2	2	4	3	1	5	3
ACT	426704	1.6	181	16	14	1089	31	839	7.3	5	4	1	1	4	3	2	3	3

LGAName2	Tree2013	Shrub2013	Grass/bare-ground2013	Hard surface2013	CanopyCover2013	UrbanForestCover2013	GreenSpaceCover2013	Tree2016	Shrub2016	Grass/bare-ground2016	HardSurface2016	CanopyCover2016	UrbanForestCover2016	GreenSpaceCover2016
Cockburn	15.7%	23.4%	34.4%	26.5%	15.7%	39.1%	73.5%	10.5%	6.9%	51.2%	31.4%	10.5%	17.4%	68.6%
Cottesloe	19.2%	4.9%	26.0%	49.9%	19.2%	24.1%	50.1%	20.2%	7.9%	23.2%	48.7%	20.2%	28.1%	51.3%
East Fremantle	18.9%	4.6%	19.6%	56.9%	18.9%	23.5%	43.1%	15.9%	4.5%	18.4%	61.2%	15.9%	20.4%	38.8%
Fremantle	10.4%	6.1%	18.4%	65.1%	10.4%	16.5%	34.9%	12.4%	5.1%	16.8%	65.7%	12.4%	17.5%	34.3%
Gosnells	19.7%	15.3%	40.8%	24.2%	19.7%	35.0%	75.8%	22.1%	10.9%	38.2%	28.8%	22.1%	33.0%	71.2%
Joondalup	18.5%	5.5%	25.2%	50.8%	18.5%	24.0%	49.2%	13.7%	5.4%	26.5%	54.4%	13.7%	19.1%	45.6%
Kalamunda	62.8%	4.8%	25.7%	6.7%	62.8%	67.6%	93.3%	59.5%	4.2%	28.5%	7.8%	59.5%	63.7%	92.2%
Kwinana	22.2%	16.7%	42.2%	18.8%	22.2%	38.9%	81.1%	18.5%	8.7%	50.3%	22.5%	18.5%	27.2%	77.5%
Melville	18.8%	5.1%	27.0%	49.1%	18.8%	23.9%	50.9%	16.5%	5.0%	23.9%	54.6%	16.5%	21.5%	45.4%
Mosman Park	20.7%	6.9%	23.7%	48.7%	20.7%	27.6%	51.3%	20.3%	8.4%	27.3%	44.0%	20.3%	28.7%	56.0%
Mundaring	54.4%	3.1%	38.9%	3.6%	54.4%	57.5%	96.4%	51.2%	4.5%	40.1%	4.2%	51.2%	55.7%	95.8%
Nedlands	27.6%	5.9%	32.2%	34.3%	27.6%	33.5%	65.7%	22.1%	6.8%	35.7%	35.4%	22.1%	28.9%	64.6%
Peppermint Grove	28.6%	5.2%	18.0%	48.2%	28.6%	33.8%	51.8%	25.4%	5.8%	16.9%	51.9%	25.4%	31.2%	48.1%
Perth	26.1%	3.3%	23.8%	46.8%	26.1%	29.4%	53.2%	23.2%	6.3%	21.4%	49.1%	23.2%	29.5%	50.9%
Rockingham	16.6%	17.7%	48.0%	17.7%	16.6%	34.3%	82.3%	16.3%	12.7%	49.6%	21.4%	16.3%	29.0%	78.6%
South Perth	17.7%	4.8%	27.9%	49.6%	17.7%	22.5%	50.4%	14.2%	4.1%	29.9%	51.8%	14.2%	18.3%	48.2%
Stirling	15.2%	4.8%	27.1%	52.9%	15.2%	20.0%	47.1%	11.9%	4.5%	29.7%	53.9%	11.9%	16.4%	46.1%
Subiaco	26.5%	3.5%	13.6%	56.4%	26.5%	30.0%	43.6%	21.8%	6.7%	15.4%	56.1%	21.8%	28.5%	43.9%
Swan	33.5%	10.6%	51.5%	4.4%	33.5%	44.1%	95.6%	25.4%	12.5%	54.1%	8.0%	25.4%	37.9%	92.0%
Victoria Park	15.8%	4.2%	29.0%	51.0%	15.8%	20.0%	49.0%	16.4%	2.8%	25.8%	55.0%	16.4%	19.2%	45.0%
Vincent	13.4%	4.1%	16.6%	65.9%	13.4%	17.5%	34.1%	15.6%	2.4%	18.9%	63.1%	15.6%	18.0%	36.9%
Wanneroo	15.0%	12.3%	64.8%	7.9%	15.0%	27.3%	92.1%	14.9%	18.8%	55.2%	11.1%	14.9%	33.7%	88.9%
Clarence	31.4%	10.0%	50.1%	8.5%	31.4%	41.4%	91.5%	28.8%	8.1%	55.1%	8.0%	28.8%	36.9%	92.0%
Glenorchy	58.5%	4.1%	23.6%	13.8%	58.5%	62.6%	86.2%	41.5%	16.5%	27.1%	14.9%	41.5%	58.0%	85.1%
Hobart	58.6%	8.5%	14.2%	18.7%	58.6%	67.1%	81.3%	49.7%	11.2%	17.4%	21.6%	49.7%	61.0%	78.4%
Kingborough	65.7%	9.4%	22.9%	2.0%	65.7%	75.1%	98.0%	59.0%	12.0%	26.9%	2.1%	59.0%	71.0%	97.9%
Launceston	54.8%	11.3%	31.2%	2.7%	54.8%	66.1%	97.3%	44.5%	11.7%	40.6%	3.2%	44.5%	56.2%	96.8%
Darwin	27.7%	6.3%	45.9%	20.0%	27.7%	34.0%	79.9%	23.9%	12.0%	36.8%	27.3%	23.9%	35.9%	72.7%
Palmerston	28.4%	11.5%	44.0%	16.1%	28.4%	39.9%	83.9%	33.9%	9.8%	34.6%	21.7%	33.9%	43.7%	78.3%
ACT	56.3%	5.4%	33.1%	5.2%	56.3%	61.7%	94.8%	24.5%	8.1%	43.4%	23.9%	24.5%	32.7%	76.1%

LGAName2	Tree2020	Shrub2020	Grass/bare-ground2020	HardSurface2020	CanopyCover2020	UrbanForestCover2020	GreenSpaceCover2020	Cluster_Mean_UF2020	Cluster_SD_UF2020	Cluster_Mean_DiffUF2016-2020	Cluster_SD_DiffUF2016-2020	UF_cover_class	UF_Change_class_2016-2020	Outlook_class_num	Challenge_rating_num
Cockburn	13.1%	8.7%	44.6%	33.6%	13.1%	21.8%	66.4%	22.7%	10.5%	0.6%	2.1%	2	4	5	2
Cottesloe	19.3%	6.5%	23.0%	51.2%	19.3%	25.8%	48.8%	22.5%	6.9%	-0.2%	1.8%	3	1	12	3
East Fremantle	16.0%	4.5%	18.4%	61.1%	16.0%	20.5%	38.9%	22.5%	6.9%	-0.2%	1.8%	2	3	6	3
Fremantle	13.0%	3.3%	19.8%	63.9%	13.0%	16.3%	36.1%	22.7%	10.5%	0.6%	2.1%	2	1	8	4
Gosnells	22.2%	9.3%	37.6%	30.9%	22.2%	31.5%	69.1%	34.8%	14.9%	0.2%	3.5%	2	1	8	4
Joondalup	12.8%	7.3%	23.3%	56.6%	12.8%	20.1%	43.4%	22.7%	10.5%	0.6%	2.1%	2	3	6	3
Kalamunda	54.6%	5.1%	32.2%	8.1%	54.6%	59.7%	91.9%	57.8%	15.3%	2.5%	3.5%	3	1	12	3
Kwinana	20.6%	14.5%	42.6%	22.3%	20.6%	35.1%	77.7%	34.8%	14.9%	0.2%	3.5%	3	4	9	1
Melville	16.9%	6.0%	25.0%	52.1%	16.9%	22.9%	47.9%	34.8%	14.9%	0.2%	3.5%	2	3	6	3
Mosman Park	19.6%	8.2%	26.2%	46.0%	19.6%	27.8%	54.0%	22.5%	6.9%	-0.2%	1.8%	3	2	11	2
Mundaring	58.2%	3.9%	33.9%	4.0%	58.2%	62.1%	96.0%	57.8%	15.3%	2.5%	3.5%	3	4	9	1
Nedlands	22.7%	7.6%	32.5%	37.2%	22.7%	30.3%	62.8%	22.7%	10.5%	0.6%	2.1%	3	3	10	1
Peppermint Grove	29.0%	5.7%	16.9%	48.4%	29.0%	34.7%	51.6%	22.7%	10.5%	0.6%	2.1%	4	4	13	1
Perth	26.9%	6.2%	18.4%	48.5%	26.9%	33.1%	51.5%	26.1%	8.4%	-0.1%	2.1%	3	4	9	1
Rockingham	19.8%	9.0%	49.7%	21.5%	19.8%	28.8%	78.5%	34.8%	14.9%	0.2%	3.5%	2	2	7	3
South Perth	14.8%	6.1%	25.3%	53.8%	14.8%	20.9%	46.2%	26.1%	8.4%	-0.1%	2.1%	2	4	5	2
Stirling	12.1%	5.1%	25.0%	57.8%	12.1%	17.2%	42.2%	26.1%	8.4%	-0.1%	2.1%	1	3	2	3
Subiaco	21.6%	5.2%	14.6%	58.6%	21.6%	26.8%	41.4%	26.1%	8.4%	-0.1%	2.1%	3	1	12	3
Swan	32.8%	6.6%	53.2%	7.4%	32.8%	39.4%	92.6%	23.5%	12.1%	2.1%	1.9%	4	3	14	1
Victoria Park	16.8%	3.0%	22.6%	57.6%	16.8%	19.8%	42.4%	26.1%	8.4%	-0.1%	2.1%	2	3	6	3
Vincent	16.7%	3.6%	14.5%	65.2%	16.7%	20.3%	34.8%	26.1%	8.4%	-0.1%	2.1%	2	4	5	2
Wanneroo	20.5%	11.8%	54.6%	13.1%	20.5%	32.3%	86.9%	23.5%	12.1%	2.1%	1.9%	3	1	12	3
Clarence	38.9%	2.7%	51.9%	6.5%	38.9%	41.6%	93.5%	23.5%	12.1%	2.1%	1.9%	4	4	13	1
Glenorchy	54.6%	10.5%	21.2%	13.7%	54.6%	65.1%	86.3%	57.8%	15.3%	2.5%	3.5%	3	4	9	1
Hobart	60.3%	7.3%	12.9%	19.5%	60.3%	67.6%	80.5%	34.8%	14.9%	0.2%	3.5%	4	4	13	1
Kingborough	68.5%	5.4%	23.5%	2.6%	68.5%	73.9%	97.4%	57.8%	15.3%	2.5%	3.5%	4	4	13	1
Launceston	58.9%	6.8%	30.8%	3.5%	58.9%	65.7%	96.5%	57.8%	15.3%	2.5%	3.5%	3	4	9	1
Darwin	28.1%	4.7%	36.2%	31.0%	28.1%	32.8%	69.0%	34.8%	14.9%	0.2%	3.5%	2	1	8	4
Palmerston	29.5%	5.7%	39.9%	24.9%	29.5%	35.2%	75.1%	34.8%	14.9%	0.2%	3.5%	3	1	12	3
ACT	28.0%	6.0%	40.7%	25.3%	28.0%	34.0%	74.7%	57.8%	15.3%	2.5%	3.5%	1	3	2	3

Appendix 5 – Example LGA report

Urban Forest Management Assessment

Version: 1.0
Date: 14 October 2020

This data sheet provides an Urban Forest Management assessment for a Local Government Area (LGA). It draws on a survey of local government professionals and an assessment of land cover using the i-tree methodology applied to LGAs containing significant urban areas (131 LGAs across the country). For information on data and method see notes.

LGA: Banyule

State/Territory: Victoria

Contextual data:

Key contextual data for the LGA is presented below, with indicator bars comparing the region with other LGAs in the study.

		Low – High
Population	131,631	
Population growth (average annual % of past 20 years)	0.6	
Population Density (ppl/sqkm)	2,105	
Proportion of LGA that is urban (%)	100	
Proportion apartments (%)	6	
Measure of advantage and disadvantage (SEIFA-IRSAD)	1,055	
Parents born overseas (%)	31	
Rainfall (annual average mm)	653	
Bushfire affected (% of LGA area burnt last 5 years)	-	

Urban Forest Management (UFM): survey of local government UFM professionals

A survey to investigate current urban forest management (UFM) practices was sent to all LGAs in the study. There were 168 completed responses covering 118 LGAs. The table below summarises the assessment of current practice by these local government UFM professionals, presenting aggregated responses at the LGA level, the state level, and the national level.

	LGA	VIC	National
Strategy and policy for UFM on **public** land	fair	strong	strong
Strategy and policy for UFM on **private** land	fair	fair	fair
Resourcing for UFM on **public** land	fair	strong	fair
Resourcing for UFM on **private** land	strong	fair	fair
Organisational support for UFM on **public** land	strong	strong	strong
Organisational support for UFM on **private** land	strong	fair	fair
Community support for UFM on **public** land	fair	fair	fair
Community support for UFM on **private** land	fair	fair	fair
Support of state policy and process for local UFM	weak	weak	weak

LGA land cover results

The i-tree methodology was used to assess land cover for each LGA in the study, and builds on assessments conducted on 2013 and 2016. The method estimates land cover based on four classes: tree; shrub, grass/bare-ground; and hard surface. When tracking the urban forest over time, the most valuable measure is combined tree and shrub - defined here as Urban Forest Cover.

Land cover proportion (%) and cover change (% point change) results

	2013	2016	2020	Trend	2013->2020	2016->2020
Tree	29.6%	30.5%	32.0%		↑ 2.4%	↑ 1.5%
Shrub	6.0%	4.3%	4.0%		↘ -2.0%	↘ -0.3%
Grass/bare ground	26.1%	23.8%	22.3%		↓ -3.8%	↓ -1.5%
Hard surface	38.3%	41.4%	41.7%		↑ 3.4%	↗ 0.3%

Urban Forest Cover	2013	2016	2020	Trend	2013->2020	2016->2020
(tree + shrub)	35.6%	34.8%	36.0%		↗ 0.4%	↑ 1.2%

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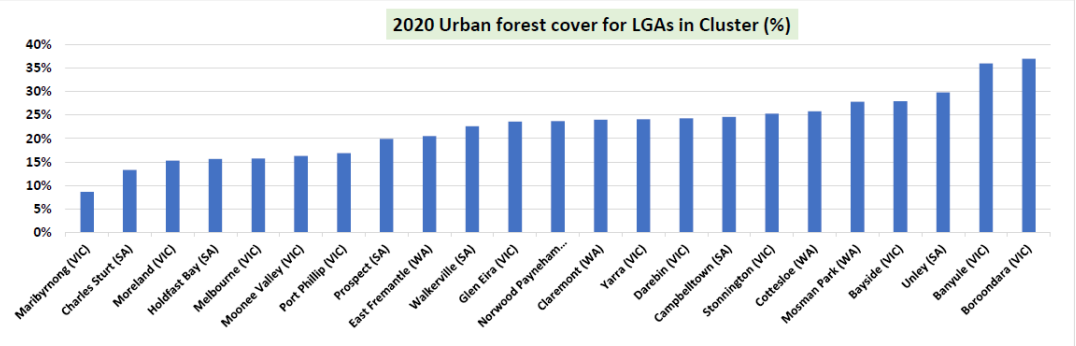
LGA comparison and outlook

Drawing on the i-tree assessment and survey data the following provides an assessment of the LGA's outlook for achieving or maintaining an abundant urban forest. For comparison LGAs are grouped into clusters based on how urban they are, their population density, and annual rainfall. However, comparison is indicative only, and it should be noted that significant differences between LGAs remain within each cluster.

LGA: **Banyule**

Mostly non-urban; low density; low rainfall	Mostly non-urban; low density; average-high rainfall	Urban or mostly urban; average-low density; low rainfall	Urban or mostly urban; average-low density; average-high rainfall	Urban; high density; low rainfall	Urban; high density; average-high rainfall

Your urban forest cover in 2020 is:	36.0%	
Your comparator urban forest cover average is:	23%	Your urban forest cover is significantly above the average of comparator LGAs
Your comparator high performer range is above:	29%	
Your comparator low performer range is below:	16%	
Your change in urban forest from 2016 to 2020 is:	1.2%	
Your comparator urban forest change average is:	0%	This represents stability (minor gain) in urban forest cover between 2016 and 2020
Your comparator high performer range is above:	2%	
Your comparator low performer range is below:	-2%	



Outlook: Challenge Rating: Low | Moderate | High | Very high

You have abundant urban forest cover, with minor recent increases (based on 2016-2020 change). Ensure current cover is protected so that urban forest benefits can continue to be realised in the future.

Challenge Factors:
High density urban environment
Low rainfall area
State policy/support very limiting of achievement

Areas for attention:
Strengthen policy/strategy to manage public land
Strengthen policy/strategy to manage private land
Improve resourcing to manage public land
Improve community support for public land urban forest management
Improve community support for private land urban forest management

Notes and disclaimer

- This assessment sheet is based on research conducted by RMIT University for Hort Innovation Australia and supported by the Clean Air and Urban Landscapes Hub, funded by the Australian Government's National Environmental Science Program. Additional resources based on this research are available via the Greener Spaces Better Places network (https://www.greenerspacesbetterplaces.com.au/). The Full research report is available via Hort Innovation (https://www.horticulture.com.au/).
- Context data is draw from the Australaian Bureau of Statistics (ABS), except rainfall (from Bureau of Meteorology) and bushfire affected area (from the Department of Agriculture, Water and Environment).
- The assessment of urban forest management practice is based on a survey of local government professionals conducted in July and August 2020. The survey was sent to 131 LGAs. We received 168 completed responses covering 118 LGAs. Summary data presented here is based on a combination of relevant survey questions. See full research report for detail.
- The assessment of land cover uses the i-tree method and builds on assessments conducted in 2013 and 2016. For each LGA 1000 randomly selected points are manually categorised into one of four land classes: tree, shrub, grass/bare ground, and hard surface. The accuracy of information can be impacted by: misclassification of points by interpreter, particularly between tree and shrub classes; misclassification due to image quality (atmospheric haze, image darkness); or mis-registration of i-Tree sampling points in Google Earth or other aerial imageries.
- In instances, the Shapefile used to generate the i-Tree sampling points per local government area differs marginally from the official border of that local government area.
- The researchers have made every attempt to ensure the accuracy and reliability of the information. However, this information is provided "as is" without warranty of any kind. By using the information, you accept all the liability for any loss, damage, cost any other consequences directly or indirectly from our information or connected with your use of this information and any data or material available from it.

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Appendix 6 – Summary i-Tree results by state/territory

Descriptive statistics of land cover across States and Territory of Australia (2016 and 2020)
*The entire ACT was considered as a LGA

States/ Territory	Descriptive statistics	Tree2016	Shrub2016	Grass/bare ground2016	Hard surface2016
ACT*	Number of LGAs	1	1	1	1
	Mean	24.54%	8.14%	43.40%	23.91%
	Median	24.54%	8.14%	43.40%	23.91%
	Minimum	24.54%	8.14%	43.40%	23.91%
	Maximum	24.54%	8.14%	43.40%	23.91%
	Range	0.00%	0.00%	0.00%	0.00%
New South Wales	Number of LGAs	31	31	31	31
	Mean	27.51%	6.92%	24.39%	41.18%
	Median	22.50%	5.40%	19.40%	45.10%
	Minimum	13.70%	1.40%	9.00%	8.70%
	Maximum	68.40%	23.00%	63.06%	68.30%
	Range	54.70%	21.60%	54.06%	59.60%
Northern Territory	Number of LGAs	2	2	2	2
	Mean	28.90%	10.90%	35.70%	24.50%
	Median	28.90%	10.90%	35.70%	24.50%
	Minimum	23.90%	9.80%	34.60%	21.70%
	Maximum	33.90%	12.00%	36.80%	27.30%
	Range	10.00%	2.20%	2.20%	5.60%
Queensland	Number of LGAs	10	10	10	10
	Mean	47.05%	8.74%	34.36%	9.85%
	Median	47.10%	8.85%	35.65%	8.40%
	Minimum	24.02%	4.60%	13.50%	0.80%
	Maximum	79.10%	18.50%	70.57%	26.60%
	Range	55.08%	13.90%	57.07%	25.80%
South Australia	Number of LGAs	19	19	19	19
	Mean	19.45%	5.23%	32.11%	43.21%
	Median	18.50%	4.70%	28.50%	45.60%
	Minimum	7.80%	2.30%	13.80%	6.40%
	Maximum	44.90%	10.50%	63.60%	67.90%
	Range	37.10%	8.20%	49.80%	61.50%
Tasmania	Number of LGAs	5	5	5	5
	Mean	44.71%	11.90%	33.42%	9.96%
	Median	44.50%	11.70%	27.10%	8.00%
	Minimum	28.80%	8.10%	17.42%	2.10%

	Maximum	59.00%	16.50%	55.10%	21.62%
	Range	30.20%	8.40%	37.68%	19.52%
Victoria	Number of LGAs	34	34	34	34
	Mean	19.26%	4.65%	38.75%	37.35%
	Median	18.85%	4.35%	29.85%	43.50%
	Minimum	3.20%	1.60%	10.70%	3.00%
	Maximum	76.90%	11.60%	83.00%	67.90%
	Range	73.70%	10.00%	72.30%	64.90%
Western Australia	Number of LGAs	29	29	29	29
	Mean	20.75%	7.12%	31.14%	40.99%
	Median	16.40%	5.60%	28.50%	49.10%
	Minimum	10.50%	2.40%	15.40%	4.20%
	Maximum	59.50%	18.80%	55.20%	65.70%
	Range	49.00%	16.40%	39.80%	61.50%

State	**Descriptive statistics**	**Tree2020**	**Shrub2020**	**Grass/bare ground2020**	**Hard surface2020**
ACT	Number of LGAs	1	1	1	1
	Mean	27.99%	6.01%	40.68%	25.32%
	Median	27.99%	6.01%	40.68%	25.32%
	Minimum	27.99%	6.01%	40.68%	25.32%
	Maximum	27.99%	6.01%	40.68%	25.32%
	Range	0.00%	0.00%	0.00%	0.00%
New South Wales	Number of LGAs	31	31	31	31
	Mean	28.19%	6.48%	22.65%	42.69%
	Median	23.65%	4.80%	17.60%	48.10%
	Minimum	14.35%	1.60%	7.80%	8.80%
	Maximum	71.70%	24.20%	63.06%	68.60%
	Range	57.35%	22.60%	55.26%	59.80%
Northern Territory	Number of LGAs	2	2	2	2
	Mean	28.80%	5.20%	38.05%	27.95%
	Median	28.80%	5.20%	38.05%	27.95%
	Minimum	28.10%	4.70%	36.20%	24.90%
	Maximum	29.50%	5.70%	39.90%	31.00%
	Range	1.40%	1.00%	3.70%	6.10%
Queensland	Number of LGAs	10	10	10	10
	Mean	53.14%	4.42%	32.32%	10.12%
	Median	53.15%	4.15%	29.90%	8.80%
	Minimum	27.63%	2.20%	14.50%	1.30%

	Maximum	80.20%	9.50%	68.87%	26.40%
	Range	52.57%	7.30%	54.37%	25.10%
South Australia	Number of LGAs	19	19	19	19
	Mean	19.69%	5.39%	31.28%	43.63%
	Median	18.40%	4.30%	26.70%	46.70%
	Minimum	7.10%	2.80%	12.50%	6.20%
	Maximum	44.20%	12.20%	63.30%	67.20%
	Range	37.10%	9.40%	50.80%	61.00%
Tasmania	Number of LGAs	5	5	5	5
	Mean	56.23%	6.54%	28.06%	9.16%
	Median	58.90%	6.80%	23.50%	6.50%
	Minimum	38.90%	2.70%	12.91%	2.60%
	Maximum	68.50%	10.50%	51.90%	19.52%
	Range	29.60%	7.80%	38.99%	16.92%
Victoria	Number of LGAs	34	34	34	34
	Mean	20.77%	3.77%	37.25%	38.21%
	Median	20.10%	3.55%	29.70%	45.85%
	Minimum	3.00%	1.10%	10.20%	2.70%
	Maximum	76.40%	8.40%	81.50%	69.60%
	Range	73.40%	7.30%	71.30%	66.90%
Western Australia	Number of LGAs	29	29	29	29
	Mean	22.10%	6.59%	29.11%	42.20%
	Median	19.30%	6.00%	25.70%	49.20%
	Minimum	10.90%	3.00%	14.50%	4.00%
	Maximum	58.20%	14.50%	54.60%	65.20%
	Range	47.30%	11.50%	40.10%	61.20%

Appendix 7 – i-Tree standard error results by LGA

LGAName(abs)	State	LGA Code	Standard Error Tree	*P*-Tree	Significant
Bayside (A)(NSW)	New South Wales	10500	1.55	0.68	0
Blacktown (C)	New South Wales	10750	1.73	0.15	0
Burwood (A)	New South Wales	11300	1.73	0.12	0
Camden (A)	New South Wales	11450	1.66	0.18	0
Campbelltown (C) (NSW)	New South Wales	11500	2.13	0.02	Significant
Canada Bay (A)	New South Wales	11520	1.70	0.91	0
Canterbury-Bankstown (A) (NSW)	New South Wales	11570	1.73	0.16	0
Cumberland (A)	New South Wales	12380	1.64	0.26	0
Fairfield (C)	New South Wales	12850	1.60	0.53	0
George River (A) (NSW)	New South Wales	12930	1.90	0.96	0
Hornsby (A)	New South Wales	14000	2.05	0.11	0
Hunters Hill (A)	New South Wales	14100	2.11	0.60	0
Inner west (A) (NSW)	New South Wales	14170	1.78	0.63	0
Ku-ring-gai (A)	New South Wales	14500	2.24	0.75	0
Lane Cove (A)	New South Wales	14700	2.18	0.34	0
Liverpool (C)	New South Wales	14900	1.80	0.91	0
Mosman (A)	New South Wales	15350	2.11	0.85	0
Newcastle (C)	New South Wales	15900	1.90	0.46	0
North Sydney (A)	New South Wales	15950	2.03	0.10	0
North Beaches (A)	New South Wales	15990	2.21	0.68	0
Parramatta (C)	New South Wales	16260	1.77	0.40	0
Penrith (C)	New South Wales	16350	1.91	0.10	0
Randwick (C)	New South Wales	16550	1.69	1.00	0
Ryde (C)	New South Wales	16700	2.05	0.41	0
Strathfield (A)	New South Wales	17100	1.63	0.71	0
Sutherland Shire (A)	New South Wales	17150	2.22	0.00	Significant
Sydney (C)	New South Wales	17200	1.75	0.86	0
The Hills Shire (A)	New South Wales	17420	2.23	0.06	0
Waverley (A)	New South Wales	18050	1.80	0.91	0
Willoughby (C)	New South Wales	18250	2.11	0.19	0
Woollahra (A)	New South Wales	18500	2.07	0.31	0
Ballarat (C)	Victoria	20570	1.49	0.00	Significant
Banyule (C)	Victoria	20660	2.07	0.47	0
Bayside (C)	Victoria	20910	1.87	0.83	0
Boroondara (C)	Victoria	21110	2.06	0.33	0
Brimbank (C)	Victoria	21180	1.29	0.10	0
Cardinia (S)	Victoria	21450	1.99	0.48	0
Casey (C)	Victoria	21610	1.58	0.61	0
Darebin (C)	Victoria	21890	1.82	0.47	0
Frankston (C)	Victoria	22170	1.86	0.05	Significant
Glen Eira (C)	Victoria	22310	1.73	0.35	0
Greater Bendigo (C)	Victoria	22620	1.98	0.00	Significant

Greater Dandenong (C)	Victoria	22670	1.31	0.09	0
Greater Geelong (C)	Victoria	22750	1.31	0.01	Significant
Hobsons Bay (C)	Victoria	23110	1.18	0.55	0
Hume (C)	Victoria	23270	1.09	1.00	0
Kingston (C) (Vic.)	Victoria	23430	1.38	1.00	0
Knox (C)	Victoria	23670	1.92	0.53	0
Manningham (C)	Victoria	24210	2.12	0.54	0
Maribyrnong (C)	Victoria	24330	1.05	0.07	0
Maroondah (C)	Victoria	24410	2.01	0.84	0
Melbourne (C)	Victoria	24600	1.53	0.21	0
Melton (C)	Victoria	24650	0.98	0.13	0
Monash (C)	Victoria	24970	1.72	0.38	0
Moonee Valley (C)	Victoria	25060	1.43	0.89	0
Moreland (C)	Victoria	25250	1.44	0.33	0
Mornington Peninsula (S)	Victoria	25340	1.90	0.67	0
Nillumbik (S)	Victoria	25710	2.19	0.00	Significant
Port Phillip (C)	Victoria	25900	1.62	0.58	0
Stonnington (C)	Victoria	26350	1.83	0.59	0
Whitehorse (C)	Victoria	26980	1.87	0.36	0
Whittlesea (C)	Victoria	27070	1.83	1.00	0
Wyndham (C)	Victoria	27260	0.78	0.80	0
Yarra (C)	Victoria	27350	1.88	0.92	0
Yarra Ranges (S)	Victoria	27450	1.89	0.79	0
Brisbane (C)	Queensland	31000	2.23	0.28	0
Cairns (R)	Queensland	32080	1.80	0.54	0
Gold Coast (C)	Queensland	33430	2.23	0.05	0
Ipswich (C)	Queensland	33960	2.17	0.01	Significant
Logan (C)	Queensland	34590	2.22	0.00	Significant
Moreton Bay (R)	Queensland	35010	2.23	0.00	Significant
Redland (C)	Queensland	36250	2.22	0.00	Significant
Sunshine Coast (R)	Queensland	36720	2.21	0.00	Significant
Toowoomba (R)	Queensland	36910	1.96	0.07	0
Townsville (C)	Queensland	37010	2.22	0.53	0
Adelaide (C)	South Australia	40070	1.86	0.39	0
Adelaide Hills (DC)	South Australia	40120	2.19	0.06	0
Burnside (C)	South Australia	40700	2.11	0.89	0
Campbelltown (C) (SA)	South Australia	40910	1.75	0.57	0
Charles Sturt (C)	South Australia	41060	1.25	0.52	0
Gawler (T)	South Australia	42030	1.35	0.77	0
Holdfast Bay (C)	South Australia	42600	1.45	0.73	0
Marion (C)	South Australia	44060	1.40	0.83	0
Mitcham (C)	South Australia	44340	2.22	0.75	0
Norwood Payneham St Peters (C)	South Australia	45290	1.81	0.91	0
Onkaparinga (C)	South Australia	45340	1.78	0.20	0
Playford (C)	South Australia	45680	1.38	0.06	0
Port Adelaide Enfield (C)	South Australia	45890	1.17	0.55	0

Prospect (C)	South Australia	46510	1.68	0.91	0
Salisbury (C)	South Australia	47140	1.72	0.42	0
Tea Tree Gully (C)	South Australia	47700	1.91	0.14	0
Unley (C)	South Australia	47980	1.89	0.15	0
Walkerville (M)	South Australia	48260	1.79	0.05	0
West Torrens (C)	South Australia	48410	1.37	0.72	0
Armadale (C)	Western Australia	50210	2.23	0.01	Significant
Bassendean (T)	Western Australia	50350	1.65	0.05	Significant
Bayswater (C)	Western Australia	50420	1.45	0.17	0
Belmont (C)	Western Australia	50490	1.45	0.68	0
Cambridge (T)	Western Australia	51310	1.59	0.13	0
Canning (C)	Western Australia	51330	1.50	0.64	0
Claremont (T)	Western Australia	51750	1.80	0.37	0
Cockburn (C)	Western Australia	51820	1.44	0.07	0
Cottesloe (T)	Western Australia	52170	1.78	0.61	0
East Fremantle (T)	Western Australia	53150	1.64	0.95	0
Fremantle (C)	Western Australia	53430	1.49	0.69	0
Gosnells (C)	Western Australia	53780	1.86	0.96	0
Joondalup (C)	Western Australia	54170	1.52	0.55	0
Kalamunda (C)	Western Australia	54200	2.21	0.03	Significant
Kwinana (C)	Western Australia	54830	1.77	0.24	0
Melville (C)	Western Australia	55320	1.67	0.81	0
Mosman Park (T)	Western Australia	55740	1.79	0.70	0
Mundaring (S)	Western Australia	56090	2.22	0.00	Significant
Nedlands (C)	Western Australia	56580	1.86	0.75	0
Peppermint Grove (S)	Western Australia	56930	1.99	0.07	0
Perth (C)	Western Australia	57080	1.94	0.06	0
Rockingham (C)	Western Australia	57490	1.72	0.04	Significant
South Perth (C)	Western Australia	57840	1.57	0.70	0
Stirling (C)	Western Australia	57910	1.45	0.89	0
Subiaco (C)	Western Australia	57980	1.84	0.91	0
Swan (C)	Western Australia	58050	2.02	0.00	Significant
Victoria Park (T)	Western Australia	58510	1.66	0.81	0
Vincent (C)	Western Australia	58570	1.65	0.50	0
Wanneroo (C)	Western Australia	58760	1.70	0.00	Significant
Clarence (C)	Tasmania	61410	2.10	0.00	Significant
Glenorchy (C)	Tasmania	62610	2.22	0.00	Significant
Hobart (C)	Tasmania	62810	2.21	0.00	Significant
Kingborough (M)	Tasmania	63610	2.14	0.00	Significant
Launceston (C)	Tasmania	64010	2.21	0.00	Significant
Darwin (C)	Northern Territory	71000	1.96	0.03	Significant
Palmerston (C)	Northern Territory	72800	2.08	0.03	Significant
ACT	ACT	89399	1.97	0.08	0

LGAName(abs)	State	LGA Code	Standard Error Shrub	P-Shrub	Significant
Bayside (A)(NSW)	New South Wales	10500	0.77	0.65	0
Blacktown (C)	New South Wales	10750	1.00	1.00	0
Burwood (A)	New South Wales	11300	0.85	0.16	0
Camden (A)	New South Wales	11450	0.79	0.61	0
Campbelltown (C) (NSW)	New South Wales	11500	1.58	0.75	0
Canada Bay (A)	New South Wales	11520	0.89	0.03	Significant
Canterbury-Bankstown (A) (NSW)	New South Wales	11570	0.80	0.53	0
Cumberland (A)	New South Wales	12380	0.76	0.84	0
Fairfield (C)	New South Wales	12850	0.93	0.91	0
George River (A) (NSW)	New South Wales	12930	0.92	0.83	0
Hornsby (A)	New South Wales	14000	1.22	0.05	Significant
Hunters Hill (A)	New South Wales	14100	1.00	0.84	0
Inner west (A) (NSW)	New South Wales	14170	0.79	0.40	0
Ku-ring-gai (A)	New South Wales	14500	1.16	0.86	0
Lane Cove (A)	New South Wales	14700	1.01	0.23	0
Liverpool (C)	New South Wales	14900	1.44	0.68	0
Mosman (A)	New South Wales	15350	1.28	0.94	0
Newcastle (C)	New South Wales	15900	1.04	0.25	0
North Sydney (A)	New South Wales	15950	0.93	0.13	0
North Beaches (A)	New South Wales	15990	1.77	0.51	0
Parramatta (C)	New South Wales	16260	0.88	0.14	0
Penrith (C)	New South Wales	16350	1.05	0.05	Significant
Randwick (C)	New South Wales	16550	1.22	0.74	0
Ryde (C)	New South Wales	16700	0.99	0.00	Significant
Strathfield (A)	New South Wales	17100	1.07	0.31	0
Sutherland Shire (A)	New South Wales	17150	1.90	0.53	0
Sydney (C)	New South Wales	17200	0.54	0.71	0
The Hills Shire (A)	New South Wales	17420	1.23	0.75	0
Waverley (A)	New South Wales	18050	0.90	0.10	0
Willoughby (C)	New South Wales	18250	1.11	0.24	0
Woollahra (A)	New South Wales	18500	0.97	0.41	0
Ballarat (C)	Victoria	20570	0.59	0.12	0
Banyule (C)	Victoria	20660	0.89	0.74	0
Bayside (C)	Victoria	20910	0.98	0.47	0
Boroondara (C)	Victoria	21110	0.94	0.07	0
Brimbank (C)	Victoria	21180	0.97	0.00	Significant
Cardinia (S)	Victoria	21450	0.89	0.01	Significant
Casey (C)	Victoria	21610	0.82	0.54	0
Darebin (C)	Victoria	21890	0.75	0.59	0
Frankston (C)	Victoria	22170	0.89	0.02	Significant
Glen Eira (C)	Victoria	22310	0.94	1.00	0
Greater Bendigo (C)	Victoria	22620	0.72	0.00	Significant
Greater Dandenong (C)	Victoria	22670	0.76	0.35	0
Greater Geelong (C)	Victoria	22750	0.82	0.39	0

Hobsons Bay (C)	Victoria	23110	0.80	0.26	0
Hume (C)	Victoria	23270	0.84	0.40	0
Kingston (C) (Vic.)	Victoria	23430	1.06	0.26	0
Knox (C)	Victoria	23670	1.05	0.85	0
Manningham (C)	Victoria	24210	1.16	0.04	Significant
Maribyrnong (C)	Victoria	24330	0.77	0.00	Significant
Maroondah (C)	Victoria	24410	1.05	0.00	Significant
Melbourne (C)	Victoria	24600	0.63	0.02	Significant
Melton (C)	Victoria	24650	0.67	0.77	0
Monash (C)	Victoria	24970	0.97	0.41	0
Moonee Valley (C)	Victoria	25060	0.95	0.83	0
Moreland (C)	Victoria	25250	0.99	0.04	Significant
Mornington Peninsula (S)	Victoria	25340	1.14	0.66	0
Nillumbik (S)	Victoria	25710	1.34	0.02	Significant
Port Phillip (C)	Victoria	25900	0.66	0.17	0
Stonnington (C)	Victoria	26350	0.95	0.00	Significant
Whitehorse (C)	Victoria	26980	1.01	0.28	0
Whittlesea (C)	Victoria	27070	0.92	0.00	Significant
Wyndham (C)	Victoria	27260	0.66	0.54	0
Yarra (C)	Victoria	27350	0.52	0.33	0
Yarra Ranges (S)	Victoria	27450	0.68	0.66	0
Brisbane (C)	Queensland	31000	1.12	0.00	Significant
Cairns (R)	Queensland	32080	0.84	0.02	Significant
Gold Coast (C)	Queensland	33430	1.11	0.00	Significant
Ipswich (C)	Queensland	33960	1.11	0.00	Significant
Logan (C)	Queensland	34590	1.02	0.00	Significant
Moreton Bay (R)	Queensland	35010	1.11	0.00	Significant
Redland (C)	Queensland	36250	1.54	0.00	Significant
Sunshine Coast (R)	Queensland	36720	1.14	0.01	Significant
Toowoomba (R)	Queensland	36910	0.81	0.00	Significant
Townsville (C)	Queensland	37010	1.00	0.55	0
Adelaide (C)	South Australia	40070	0.80	0.01	Significant
Adelaide Hills (DC)	South Australia	40120	1.33	0.00	Significant
Burnside (C)	South Australia	40700	1.31	0.25	0
Campbelltown (C) (SA)	South Australia	40910	1.03	0.29	0
Charles Sturt (C)	South Australia	41060	0.92	0.74	0
Gawler (T)	South Australia	42030	0.86	0.73	0
Holdfast Bay (C)	South Australia	42600	0.82	0.90	0
Marion (C)	South Australia	44060	1.03	0.29	0
Mitcham (C)	South Australia	44340	1.11	0.32	0
Norwood Payneham St Peters (C)	South Australia	45290	0.77	0.52	0
Onkaparinga (C)	South Australia	45340	1.37	0.94	0
Playford (C)	South Australia	45680	1.01	0.23	0
Port Adelaide Enfield (C)	South Australia	45890	0.92	0.45	0
Prospect (C)	South Australia	46510	0.85	0.13	0
Salisbury (C)	South Australia	47140	0.81	1.00	0

Tea Tree Gully (C)	South Australia	47700	1.04	1.00	0
Unley (C)	South Australia	47980	0.96	0.75	0
Walkerville (M)	South Australia	48260	0.91	0.91	0
West Torrens (C)	South Australia	48410	0.77	0.44	0
Armadale (C)	Western Australia	50210	1.54	0.00	Significant
Bassendean (T)	Western Australia	50350	0.95	0.83	0
Bayswater (C)	Western Australia	50420	0.86	0.42	0
Belmont (C)	Western Australia	50490	1.03	0.63	0
Cambridge (T)	Western Australia	51310	1.32	0.54	0
Canning (C)	Western Australia	51330	1.04	0.77	0
Claremont (T)	Western Australia	51750	0.89	0.31	0
Cockburn (C)	Western Australia	51820	1.20	0.13	0
Cottesloe (T)	Western Australia	52170	1.16	0.23	0
East Fremantle (T)	Western Australia	53150	0.93	1.00	0
Fremantle (C)	Western Australia	53430	0.90	0.04	Significant
Gosnells (C)	Western Australia	53780	1.35	0.23	0
Joondalup (C)	Western Australia	54170	1.09	0.08	0
Kalamunda (C)	Western Australia	54200	0.94	0.34	0
Kwinana (C)	Western Australia	54830	1.43	0.00	Significant
Melville (C)	Western Australia	55320	1.02	0.33	0
Mosman Park (T)	Western Australia	55740	1.23	0.87	0
Mundaring (S)	Western Australia	56090	0.90	0.50	0
Nedlands (C)	Western Australia	56580	1.16	0.49	0
Peppermint Grove (S)	Western Australia	56930	1.04	0.92	0
Perth (C)	Western Australia	57080	1.08	0.93	0
Rockingham (C)	Western Australia	57490	1.39	0.01	Significant
South Perth (C)	Western Australia	57840	0.98	0.04	Significant
Stirling (C)	Western Australia	57910	0.96	0.53	0
Subiaco (C)	Western Australia	57980	1.06	0.16	0
Swan (C)	Western Australia	58050	1.31	0.00	Significant
Victoria Park (T)	Western Australia	58510	0.75	0.79	0
Vincent (C)	Western Australia	58570	0.76	0.12	0
Wanneroo (C)	Western Australia	58760	1.60	0.00	Significant
Clarence (C)	Tasmania	61410	1.00	0.00	Significant
Glenorchy (C)	Tasmania	62610	1.52	0.00	Significant
Hobart (C)	Tasmania	62810	1.29	0.00	Significant
Kingborough (M)	Tasmania	63610	1.25	0.00	Significant
Launceston (C)	Tasmania	64010	1.29	0.00	Significant
Darwin (C)	Northern Territory	71000	1.23	0.00	Significant
Palmerston (C)	Northern Territory	72800	1.19	0.00	Significant
ACT	ACT	89399	1.15	0.06	0

LGANames(abs)	State	LGA Code	Standard Error Grass/BG	P-G/BG	Significant
Bayside (A)(NSW)	New South Wales	10500	1.93	0.20	0
Blacktown (C)	New South Wales	10750	2.21	0.82	0
Burwood (A)	New South Wales	11300	1.64	0.76	0
Camden (A)	New South Wales	11450	2.16	1.00	0
Campbelltown (C) (NSW)	New South Wales	11500	2.13	0.05	0
Canada Bay (A)	New South Wales	11520	1.84	0.87	0
Canterbury-Bankstown (A) (NSW)	New South Wales	11570	1.82	0.13	0
Cumberland (A)	New South Wales	12380	1.95	0.84	0
Fairfield (C)	New South Wales	12850	2.18	0.09	0
George River (A) (NSW)	New South Wales	12930	1.69	0.64	0
Hornsby (A)	New South Wales	14000	1.51	0.51	0
Hunters Hill (A)	New South Wales	14100	1.79	0.22	0
Inner west (A) (NSW)	New South Wales	14170	1.48	0.62	0
Ku-ring-gai (A)	New South Wales	14500	1.59	0.31	0
Lane Cove (A)	New South Wales	14700	1.55	0.52	0
Liverpool (C)	New South Wales	14900	2.23	0.26	0
Mosman (A)	New South Wales	15350	1.33	0.33	0
Newcastle (C)	New South Wales	15900	2.17	0.93	0
North Sydney (A)	New South Wales	15950	1.24	0.33	0
North Beaches (A)	New South Wales	15990	1.55	0.04	Significant
Parramatta (C)	New South Wales	16260	1.93	0.04	Significant
Penrith (C)	New South Wales	16350	2.24	0.40	0
Randwick (C)	New South Wales	16550	1.96	0.02	Significant
Ryde (C)	New South Wales	16700	1.71	0.77	0
Strathfield (A)	New South Wales	17100	1.71	0.45	0
Sutherland Shire (A)	New South Wales	17150	1.57	0.00	Significant
Sydney (C)	New South Wales	17200	1.40	0.57	0
The Hills Shire (A)	New South Wales	17420	1.91	0.00	Significant
Waverley (A)	New South Wales	18050	1.60	0.49	0
Willoughby (C)	New South Wales	18250	1.56	0.12	0
Woollahra (A)	New South Wales	18500	1.61	0.53	0
Ballarat (C)	Victoria	20570	2.03	0.09	0
Banyule (C)	Victoria	20660	1.88	0.43	0
Bayside (C)	Victoria	20910	1.78	0.08	0
Boroondara (C)	Victoria	21110	1.63	0.90	0
Brimbank (C)	Victoria	21180	2.16	0.75	0
Cardinia (S)	Victoria	21450	2.14	0.54	0
Casey (C)	Victoria	21610	2.20	0.08	0
Darebin (C)	Victoria	21890	1.84	0.91	0
Frankston (C)	Victoria	22170	2.21	0.28	0
Glen Eira (C)	Victoria	22310	1.63	0.24	0
Greater Bendigo (C)	Victoria	22620	2.11	0.04	Significant
Greater Dandenong (C)	Victoria	22670	2.20	0.01	Significant
Greater Geelong (C)	Victoria	22750	1.90	0.21	0

Hobsons Bay (C)	Victoria	23110	2.17	0.68	0
Hume (C)	Victoria	23270	1.92	0.57	0
Kingston (C) (Vic.)	Victoria	23430	2.11	0.74	0
Knox (C)	Victoria	23670	2.03	0.35	0
Manningham (C)	Victoria	24210	2.06	0.44	0
Maribyrnong (C)	Victoria	24330	1.99	0.29	0
Maroondah (C)	Victoria	24410	1.87	0.63	0
Melbourne (C)	Victoria	24600	1.71	0.08	0
Melton (C)	Victoria	24650	1.71	0.38	0
Monash (C)	Victoria	24970	1.88	0.43	0
Moonee Valley (C)	Victoria	25060	1.96	0.41	0
Moreland (C)	Victoria	25250	1.89	0.92	0
Mornington Peninsula (S)	Victoria	25340	2.21	0.82	0
Nillumbik (S)	Victoria	25710	2.21	0.02	Significant
Port Phillip (C)	Victoria	25900	1.53	0.95	0
Stonnington (C)	Victoria	26350	1.37	0.71	0
Whitehorse (C)	Victoria	26980	1.65	0.59	0
Whittlesea (C)	Victoria	27070	2.18	0.08	0
Wyndham (C)	Victoria	27260	1.88	0.17	0
Yarra (C)	Victoria	27350	1.53	0.95	0
Yarra Ranges (S)	Victoria	27450	1.72	0.52	0
Brisbane (C)	Queensland	31000	1.75	0.36	0
Cairns (R)	Queensland	32080	1.55	0.52	0
Gold Coast (C)	Queensland	33430	1.92	1.00	0
Ipswich (C)	Queensland	33960	2.23	0.69	0
Logan (C)	Queensland	34590	2.17	0.01	Significant
Moreton Bay (R)	Queensland	35010	2.12	0.07	0
Redland (C)	Queensland	36250	1.82	0.19	0
Sunshine Coast (R)	Queensland	36720	2.07	0.00	Significant
Toowoomba (R)	Queensland	36910	2.05	0.41	0
Townsville (C)	Queensland	37010	2.13	0.19	0
Adelaide (C)	South Australia	40070	2.03	0.02	Significant
Adelaide Hills (DC)	South Australia	40120	2.22	0.89	0
Burnside (C)	South Australia	40700	1.63	0.04	Significant
Campbelltown (C) (SA)	South Australia	40910	1.89	0.37	0
Charles Sturt (C)	South Australia	41060	1.92	0.50	0
Gawler (T)	South Australia	42030	2.16	0.71	0
Holdfast Bay (C)	South Australia	42600	1.69	0.95	0
Marion (C)	South Australia	44060	2.16	0.38	0
Mitcham (C)	South Australia	44340	1.89	0.63	0
Norwood Payneham St Peters (C)	South Australia	45290	1.61	0.66	0
Onkaparinga (C)	South Australia	45340	2.20	0.17	0
Playford (C)	South Australia	45680	2.15	0.89	0
Port Adelaide Enfield (C)	South Australia	45890	2.02	0.80	0
Prospect (C)	South Australia	46510	1.66	0.95	0
Salisbury (C)	South Australia	47140	2.20	0.56	0

Tea Tree Gully (C)	South Australia	47700	2.20	0.32	0
Unley (C)	South Australia	47980	1.51	0.39	0
Walkerville (M)	South Australia	48260	1.64	0.01	Significant
West Torrens (C)	South Australia	48410	2.06	0.56	0
Armadale (C)	Western Australia	50210	2.07	0.66	0
Bassendean (T)	Western Australia	50350	2.05	0.05	Significant
Bayswater (C)	Western Australia	50420	2.00	0.04	Significant
Belmont (C)	Western Australia	50490	1.99	0.69	0
Cambridge (T)	Western Australia	51310	2.12	0.04	Significant
Canning (C)	Western Australia	51330	1.98	0.29	0
Claremont (T)	Western Australia	51750	1.80	0.54	0
Cockburn (C)	Western Australia	51820	2.23	0.00	Significant
Cottesloe (T)	Western Australia	52170	1.88	0.92	0
East Fremantle (T)	Western Australia	53150	1.73	1.00	0
Fremantle (C)	Western Australia	53430	1.73	0.08	0
Gosnells (C)	Western Australia	53780	2.17	0.78	0
Joondalup (C)	Western Australia	54170	1.93	0.10	0
Kalamunda (C)	Western Australia	54200	2.05	0.07	0
Kwinana (C)	Western Australia	54830	2.22	0.00	Significant
Melville (C)	Western Australia	55320	1.92	0.57	0
Mosman Park (T)	Western Australia	55740	1.98	0.58	0
Mundaring (S)	Western Australia	56090	2.15	0.00	Significant
Nedlands (C)	Western Australia	56580	2.12	0.13	0
Peppermint Grove (S)	Western Australia	56930	1.68	1.00	0
Perth (C)	Western Australia	57080	1.78	0.09	0
Rockingham (C)	Western Australia	57490	2.24	0.96	0
South Perth (C)	Western Australia	57840	2.00	0.02	Significant
Stirling (C)	Western Australia	57910	1.99	0.02	Significant
Subiaco (C)	Western Australia	57980	1.60	0.62	0
Swan (C)	Western Australia	58050	2.23	0.69	0
Victoria Park (T)	Western Australia	58510	1.91	0.09	0
Vincent (C)	Western Australia	58570	1.67	0.01	Significant
Wanneroo (C)	Western Australia	58760	2.23	0.79	0
Clarence (C)	Tasmania	61410	2.23	0.15	0
Glenorchy (C)	Tasmania	62610	1.91	0.00	Significant
Hobart (C)	Tasmania	62810	1.60	0.00	Significant
Kingborough (M)	Tasmania	63610	1.94	0.08	0
Launceston (C)	Tasmania	64010	2.13	0.00	Significant
Darwin (C)	Northern Territory	71000	2.15	0.78	0
Palmerston (C)	Northern Territory	72800	2.16	0.01	Significant
ACT	ACT	89399	2.21	0.22	0

LGAName(abs)	State	LGA Code	Standard Error HS	P-HS	Significant
Bayside (A)(NSW)	New South Wales	10500	2.21	0.33	0
Blacktown (C)	New South Wales	10750	2.12	0.35	0
Burwood (A)	New South Wales	11300	2.17	0.04	Significant
Camden (A)	New South Wales	11450	1.69	0.12	0
Campbelltown (C) (NSW)	New South Wales	11500	1.63	0.81	0
Canada Bay (A)	New South Wales	11520	2.22	0.53	0
Canterbury-Bankstown (A) (NSW)	New South Wales	11570	2.21	0.93	0
Cumberland (A)	New South Wales	12380	2.22	0.28	0
Fairfield (C)	New South Wales	12850	2.20	0.04	Significant
George River (A) (NSW)	New South Wales	12930	2.23	0.62	0
Hornsby (A)	New South Wales	14000	1.26	0.94	0
Hunters Hill (A)	New South Wales	14100	2.20	0.68	0
Inner west (A) (NSW)	New South Wales	14170	2.14	0.29	0
Ku-ring-gai (A)	New South Wales	14500	1.98	0.72	0
Lane Cove (A)	New South Wales	14700	2.20	0.96	0
Liverpool (C)	New South Wales	14900	1.81	0.35	0
Mosman (A)	New South Wales	15350	2.23	0.65	0
Newcastle (C)	New South Wales	15900	2.10	0.85	0
North Sydney (A)	New South Wales	15950	2.21	0.75	0
North Beaches (A)	New South Wales	15990	1.92	0.54	0
Parramatta (C)	New South Wales	16260	2.23	0.59	0
Penrith (C)	New South Wales	16350	1.76	0.61	0
Randwick (C)	New South Wales	16550	2.23	0.07	0
Ryde (C)	New South Wales	16700	2.23	0.02	Significant
Strathfield (A)	New South Wales	17100	2.19	0.41	0
Sutherland Shire (A)	New South Wales	17150	1.67	0.55	0
Sydney (C)	New South Wales	17200	2.08	0.89	0
The Hills Shire (A)	New South Wales	17420	1.56	0.08	0
Waverley (A)	New South Wales	18050	2.19	0.27	0
Willoughby (C)	New South Wales	18250	2.23	0.69	0
Woollahra (A)	New South Wales	18500	2.23	0.08	0
Ballarat (C)	Victoria	20570	1.57	0.31	0
Banyule (C)	Victoria	20660	2.20	0.89	0
Bayside (C)	Victoria	20910	2.23	0.21	0
Boroondara (C)	Victoria	21110	2.23	0.08	0
Brimbank (C)	Victoria	21180	2.23	0.21	0
Cardinia (S)	Victoria	21450	0.93	0.59	0
Casey (C)	Victoria	21610	1.88	0.18	0
Darebin (C)	Victoria	21890	2.23	0.75	0
Frankston (C)	Victoria	22170	2.08	0.74	0
Glen Eira (C)	Victoria	22310	2.18	0.89	0
Greater Bendigo (C)	Victoria	22620	0.84	0.91	0
Greater Dandenong (C)	Victoria	22670	2.23	0.15	0
Greater Geelong (C)	Victoria	22750	1.39	0.89	0

Hobsons Bay (C)	Victoria	23110	2.23	0.75	0
Hume (C)	Victoria	23270	1.57	0.80	0
Kingston (C) (Vic.)	Victoria	23430	2.24	0.40	0
Knox (C)	Victoria	23670	2.20	0.82	0
Manningham (C)	Victoria	24210	2.00	0.80	0
Maribyrnong (C)	Victoria	24330	2.15	0.19	0
Maroondah (C)	Victoria	24410	2.22	0.30	0
Melbourne (C)	Victoria	24600	2.11	0.22	0
Melton (C)	Victoria	24650	1.37	0.88	0
Monash (C)	Victoria	24970	2.23	0.72	0
Moonee Valley (C)	Victoria	25060	2.21	0.47	0
Moreland (C)	Victoria	25250	2.19	0.10	0
Mornington Peninsula (S)	Victoria	25340	1.45	0.58	0
Nillumbik (S)	Victoria	25710	1.07	0.93	0
Port Phillip (C)	Victoria	25900	2.07	0.41	0
Stonnington (C)	Victoria	26350	2.15	0.29	0
Whitehorse (C)	Victoria	26980	2.22	0.91	0
Whittlesea (C)	Victoria	27070	1.54	0.60	0
Wyndham (C)	Victoria	27260	1.70	0.16	0
Yarra (C)	Victoria	27350	2.17	0.85	0
Yarra Ranges (S)	Victoria	27450	0.74	0.69	0
Brisbane (C)	Queensland	31000	1.97	0.92	0
Cairns (R)	Queensland	32080	0.72	0.78	0
Gold Coast (C)	Queensland	33430	1.76	0.73	0
Ipswich (C)	Queensland	33960	1.17	0.80	0
Logan (C)	Queensland	34590	1.33	0.71	0
Moreton Bay (R)	Queensland	35010	1.35	0.88	0
Redland (C)	Queensland	36250	1.43	0.53	0
Sunshine Coast (R)	Queensland	36720	1.12	0.53	0
Toowoomba (R)	Queensland	36910	0.46	0.27	0
Townsville (C)	Queensland	37010	0.96	0.40	0
Adelaide (C)	South Australia	40070	2.23	0.59	0
Adelaide Hills (DC)	South Australia	40120	1.09	0.85	0
Burnside (C)	South Australia	40700	2.20	0.02	Significant
Campbelltown (C) (SA)	South Australia	40910	2.23	0.47	0
Charles Sturt (C)	South Australia	41060	2.16	0.71	0
Gawler (T)	South Australia	42030	1.87	0.96	0
Holdfast Bay (C)	South Australia	42600	2.09	0.74	0
Marion (C)	South Australia	44060	2.23	0.62	0
Mitcham (C)	South Australia	44340	1.95	0.64	0
Norwood Payneham St Peters (C)	South Australia	45290	2.18	0.85	0
Onkaparinga (C)	South Australia	45340	1.44	0.58	0
Playford (C)	South Australia	45680	1.80	0.54	0
Port Adelaide Enfield (C)	South Australia	45890	2.20	0.68	0
Prospect (C)	South Australia	46510	2.16	0.52	0
Salisbury (C)	South Australia	47140	2.16	0.21	0

Tea Tree Gully (C)	South Australia	47700	2.04	0.77	0
Unley (C)	South Australia	47980	2.20	0.44	0
Walkerville (M)	South Australia	48260	2.20	0.75	0
West Torrens (C)	South Australia	48410	2.22	0.56	0
Armadale (C)	Western Australia	50210	1.04	0.63	0
Bassendean (T)	Western Australia	50350	2.24	0.65	0
Bayswater (C)	Western Australia	50420	2.21	0.00	Significant
Belmont (C)	Western Australia	50490	2.22	0.69	0
Cambridge (T)	Western Australia	51310	2.20	0.22	0
Canning (C)	Western Australia	51330	2.23	0.26	0
Claremont (T)	Western Australia	51750	2.22	0.42	0
Cockburn (C)	Western Australia	51820	2.09	0.29	0
Cottesloe (T)	Western Australia	52170	2.24	0.26	0
East Fremantle (T)	Western Australia	53150	2.18	0.96	0
Fremantle (C)	Western Australia	53430	2.14	0.40	0
Gosnells (C)	Western Australia	53780	2.05	0.30	0
Joondalup (C)	Western Australia	54170	2.22	0.32	0
Kalamunda (C)	Western Australia	54200	1.21	0.80	0
Kwinana (C)	Western Australia	54830	1.86	0.91	0
Melville (C)	Western Australia	55320	2.23	0.26	0
Mosman Park (T)	Western Australia	55740	2.22	0.37	0
Mundaring (S)	Western Australia	56090	0.89	0.82	0
Nedlands (C)	Western Australia	56580	2.15	0.40	0
Peppermint Grove (S)	Western Australia	56930	2.23	0.12	0
Perth (C)	Western Australia	57080	2.24	0.79	0
Rockingham (C)	Western Australia	57490	1.84	0.96	0
South Perth (C)	Western Australia	57840	2.23	0.37	0
Stirling (C)	Western Australia	57910	2.22	0.08	0
Subiaco (C)	Western Australia	57980	2.21	0.26	0
Swan (C)	Western Australia	58050	1.19	0.61	0
Victoria Park (T)	Western Australia	58510	2.22	0.24	0
Vincent (C)	Western Australia	58570	2.14	0.33	0
Wanneroo (C)	Western Australia	58760	1.46	0.17	0
Clarence (C)	Tasmania	61410	1.16	0.20	0
Glenorchy (C)	Tasmania	62610	1.57	0.44	0
Hobart (C)	Tasmania	62810	1.81	0.24	0
Kingborough (M)	Tasmania	63610	0.68	0.46	0
Launceston (C)	Tasmania	64010	0.80	0.71	0
Darwin (C)	Northern Territory	71000	2.03	0.07	0
Palmerston (C)	Northern Territory	72800	1.89	0.09	0
ACT	ACT	89399	1.93	0.46	0