WHERE ARE ALL THE TREES?

An analysis of tree canopy cover in urban Australia

20/20/2020™ VISION
20% MORE GREEN SPACES IN URBAN AREAS BY 2020

WHY IS THIS REPORT IMPORTANT?

Romilly Madew
Green Building Council of Australia

The Green Building Council of Australia welcomes this report as an important step in expanding our understanding of how urban greening strategies can help with climate change adaptation, reduce the urban heat island effect, improve biodiversity and storm water management, and provide healthier spaces for active living.

As high-density local governments adopt strategies that minimise the heat island effect, green infrastructure–such as green walls, roofs and vertical gardens–will play an ever-increasing role.

Our Green Star rating tools recognise and reward buildings and communities that provide more efficient, healthy, productive and resilient places for people, and this report demonstrates the importance of embedding best practice principles at the heart of what we do.

Vanessa Trowell
Australian Institute of Landscape Architects (AILA)

AILA fully supports the 202020 Vision in achieving 20% more urban green space across Australia. This report prepared by ISF provides a valuable first step in the process of qualifying the existing extent of urban green cover.

Providing a rapid, low cost land cover estimate will allow dialogue and collaboration to occur between both neighbouring LGAs and LGAs nationwide. This provides a valuable common starting point for more detailed planning and decision-making in growing the green life support for our cities.

Cross sector collaboration will be key to the success of the 202020 Vision.

Yvonne Lynch
Urban Landscapes, City of Melbourne

This report represents Australia's first comprehensive assessment of urban forest canopy cover. Understanding canopy cover level at a local government scale is critical for effective urban forest management. The canopy mapping undertaken for this report provides an essential indicator with which to benchmark the urban forest, set future targets and measure change.

The ability to benchmark in this manner will allow us to evaluate the urban greening strategies of the assessed LGAs over time. For example, the report shows that Melbourne has one of the highest proportions of hard surfaces in comparison to other LGAs. The City is addressing this reality through the Open Space Strategy which aims to increase green space by 7.6%.

Josh Byrne
Byrne and Associates

A wealth of research now exists on the benefits of urban forests.

It's time to turn our attention to how we can most effectively increase the number of tree plantings where they are needed most.

Institute for Sustainable Futures' report, *Benchmarking Australia's Urban Tree Canopy*, is an excellent resource for those tasked with improving the state of green space in Australia. It provides a reference point against which targets can be measured and allows for goals to be substantiated.

A review of the data presented confirms trends that many of us have observed anecdotally, which is that by and large, the wealthier suburbs have more trees than their lower socio-economic equivalents, and that we are going to have to work very hard to find room for urban greening opportunities in the higher density inner city suburbs where urban heat island effects are most pronounced.

The metrics described in this report represent a great starting point. The really exciting work is still to come. The report outlines a three-staged approach for maximising research opportunities, with the aim of providing the most relevant information to decision makers on how best to allocate resources for urban greening programs for greatest effect. Let's hope the good work continues.

Credit photography cover: Nearmap

Crosbie Lorimer
CLOUSTON Associates,
Landscape Architects

It is inspiring to see a non-government organisation taking up such an important initiative. I am delighted to see a common sense approach to gathering this data, based not just on economy, but as this report rightly points out, the need to collate data swiftly across the country given the pace of development and change in land uses.

While some local government authorities may have gathered and documented data on vegetation cover and/or public open space in their Council area, the patchiness of that data across the nation and the complexities of differing definitions preclude ready comparative analysis at a national scale and lend further credibility to a swift, coarse-grained desktop methodology like this.

So this simpler approach is sensible and, while it will be important that the data is interpreted with care by those to whom it is targeted, it's a great initiative and a good way of quickly drawing attention to some of the raw evidence and in reinforcing the laudable message behind the 202020 Vision.

Dr Anthony Kachenko
Nursery & Garden Industry Australia

This report depicts with clarity and accuracy the quantum of tree canopy cover in 139 local government areas across Australia. Measuring tree canopy coverage is fundamental to assessing the scale of our urban forests and this report provides much needed guidance to the practitioners who manage this 'living asset'.

It is well documented that tree canopy cover offers a multitude of benefits to the environment, economy and community. However, it is often overlooked. In Western Sydney, for example, the region suffers from the build-up of urban heat and this report supports this by illustrating that these areas are comparatively low in tree canopy cover.

This should be non-negotiable as these areas will experience significant population growth in the years ahead and it is imperative that these areas remain habitable and are designed in the best interests of the local communities. Urban forest practitioners have a key role to play in engineering cities with liveable green assets to future proof cities and create enticing places to work, rest and play. This report helps them respond to this challenge.

Dr Thomas Astell-Burt
School of Science and Health,
University of Western Sydney

Dr Xiaoqi Feng
School of Medicine,
University of Western Sydney

Debate over urbanisation, density and the diminishing possibilities for contact with nature in cities has spurred interest in the potential impacts of the natural environment on health.[1] Field experiments and epidemiological studies, including those which we have conducted in NSW,[2-5] have tended to report health benefits linked with increasing proximity to green spaces. As such, there is increasing belief that green spaces do more than 'pretty up' neighbourhoods; they may also be important resources for supporting health. A vital piece of information in order for the 202020 Vision to implement and evaluate its success is to know how much green space is already available, what epidemiologists typically refer to as a 'baseline'. The work by Jacobs and his colleagues is a positive step in that direction, making use of satellite imagery to map tree canopy across Australia's urban areas. It is important to note that while the LGA is a useful unit for reporting purposes, replicating this work for smaller geographical boundaries is an area for future improvement. The necessity of taking into account small-scale distributions is apparent from another recent study of Australia's five largest cities,[6] in which we showed that lower income neighbourhoods tended to have less green space. Affirmative action is, therefore, important to ensure all Australians have access to this important public health resource regardless of their socioeconomic circumstances.

1. Hartig T, Mitchell R, de Vries S, Frumkin H. Nature and Health. Annual Review of Public Health 2014;35:207-28.
2. Astell-Burt T, Feng X, Kolt GS. Greener neighborhoods, slimmer people? Evidence from 246,920 Australians. International Journal of Obesity 2014;38(1):156-59.
3. Astell-Burt T, Feng X, Kolt GS. Neighbourhood green space is associated with more frequent walking and moderate to vigorous physical activity (MVPA) in middle-to-older aged adults. Findings from 203,883 Australians in The 45 and Up Study. British Journal of Sports Medicine 2014;48(5):404-06.
4. Astell-Burt T, Feng X, Kolt GS. Is Neighborhood Green Space Associated With a Lower Risk of Type 2 Diabetes? Evidence From 267,072 Australians. Diabetes Care 2014;37(1):197-201.
5. Astell-Burt T, Feng X, Kolt GS. Does access to neighborhood green space promote a healthy duration of sleep? Novel findings from 259,319 Australians. BMJ Open 2013;3:e003094.

WHAT IS THIS REPORT ALL ABOUT?

This report summarises the findings contained in *Benchmarking Australia's Urban Tree Canopy*, a study we conducted in partnership with the Institute for Sustainable Futures (ISF) at the University of Technology, Sydney (UTS).

Inside you will find information on the importance of getting more trees and plants into our cities and urban areas, where we are at the moment in terms of tree canopy–a key indicator of green space–and what you can do to help increase it.

What this report provides is a starting point for councils, developers and decision makers to better understand the existing tree canopy in their local areas and guidance on how to measure it.

Hopefully, it will also serve as a conversation starter that will encourage dialogue and collaboration among government, industry, developers, academia and non-government organisations nationwide.

THE REPORT UNDER DISCUSSION

Unless otherwise stated, all figures cited in this paper may be found in the original ISF report available for download at **202020vision.com.au/research**

WHAT IS THE 202020 VISION?

The 202020 Vision is a collaborative plan to increase the amount of green space in our urban areas by 20% by 2020.

To achieve this we are bringing industry, government and individuals together and providing them with the tools, resources and networks necessary to meeting our shared goal.

The initiative was started in 2013 by Nursery & Garden Industry Australia and Horticulture Australia Ltd and has since grown to include 153 partners and 28 strategic experts. Even the United Nations Global Compact Cities Programme has come on board as a partner.

153 *partners*

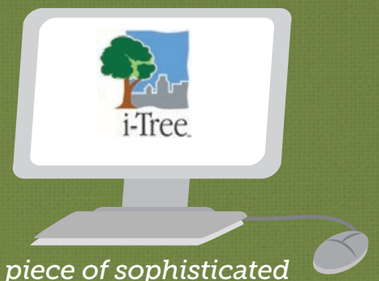
28 *strategic experts*

Everyone is welcome to get involved.

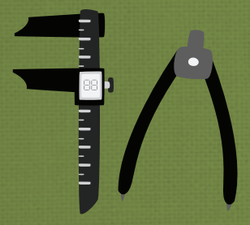
Find out more at 202020vision.com.au or contact us via hello@202020vision.com.au

THE REPORT AT A GLANCE

3 *researchers from the Institute for Sustainable Futures, University of Technology, Sydney*



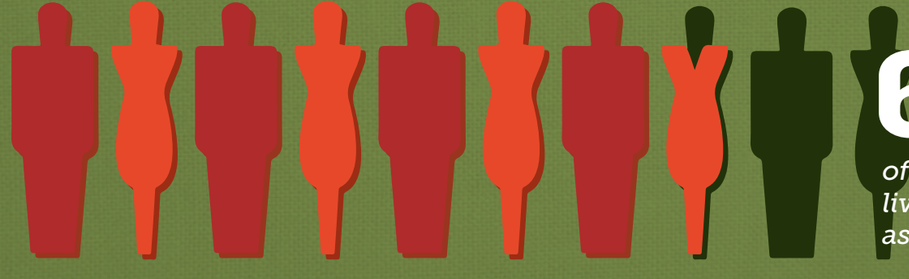
1 *piece of sophisticated software developed by the US Department of Agriculture Forest Service*



62,185 km²
measured

=

0.8%
of Australia's land mass



68%
of the population live within the 139 assessed LGAs

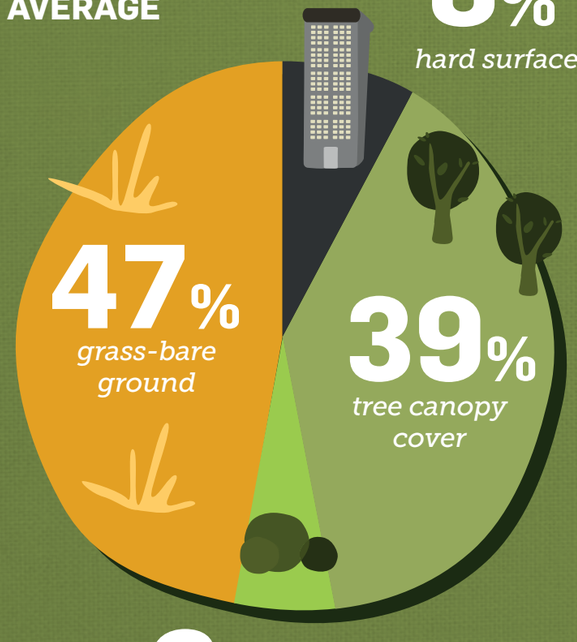
TOTAL LGAs ASSESSED

139
local government areas assessed

LGAs PER STATE

02 *NT*	**10** *QLD*
29 *WA*	**39** *NSW*
19 *SA*	**01** *ACT*
34 *VIC*	**05** *TAS*

NATIONAL URBAN AVERAGE



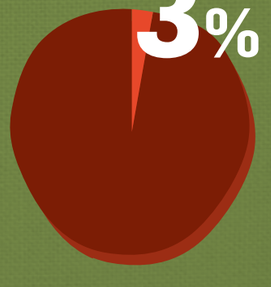
8% *hard surface*

47% *grass-bare ground*

39% *tree canopy cover*

6% *shrub*

79%
highest recorded tree canopy cover



3%
lowest recorded tree canopy cover

TREES AND PLANTS MAKE A GOOD CITY GREAT

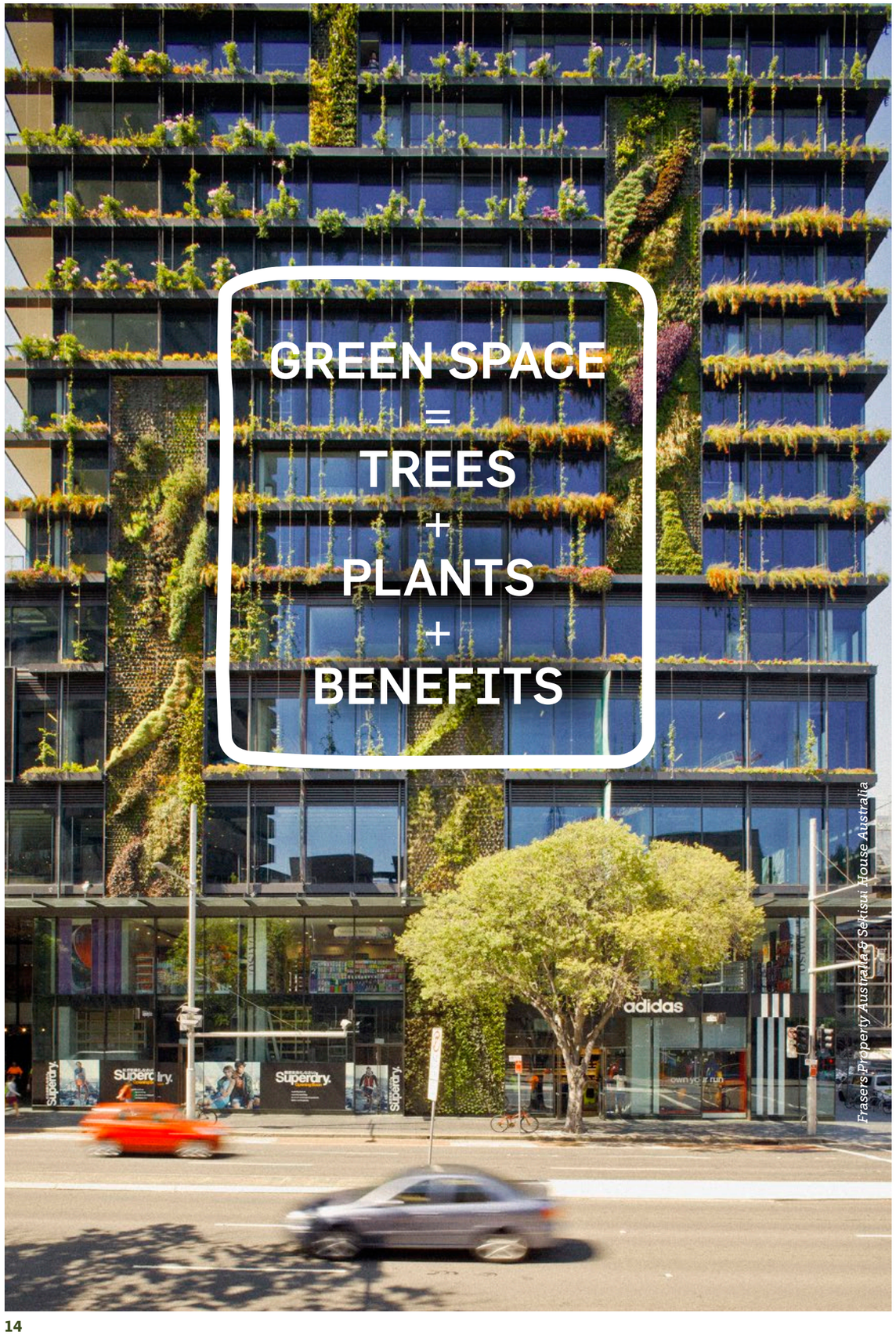
They keep our urban areas cool and make us healthier, happier, safer and more productive. They improve the air we breathe, reduce stress, help to minimise the incidence of extreme weather and mitigate the impacts of climate change. They can even boost the economy. These are just some of the reasons why green space is so important.

Aspect Studios. Photographer Florian Groehn.

BUT HOW DO YOU INCREASE THE AMOUNT OF GREEN SPACE IN URBAN AREAS IF YOU CAN'T MEASURE IT?

That's why we conducted this study. Nobody really knew how much tree canopy cover – a key indicator of green space – there was in our urban areas so we set out to measure it. Now that we have a benchmark to measure by, we can set about helping increase the amount of green space in our urban areas.

Scott Burrows Photographer



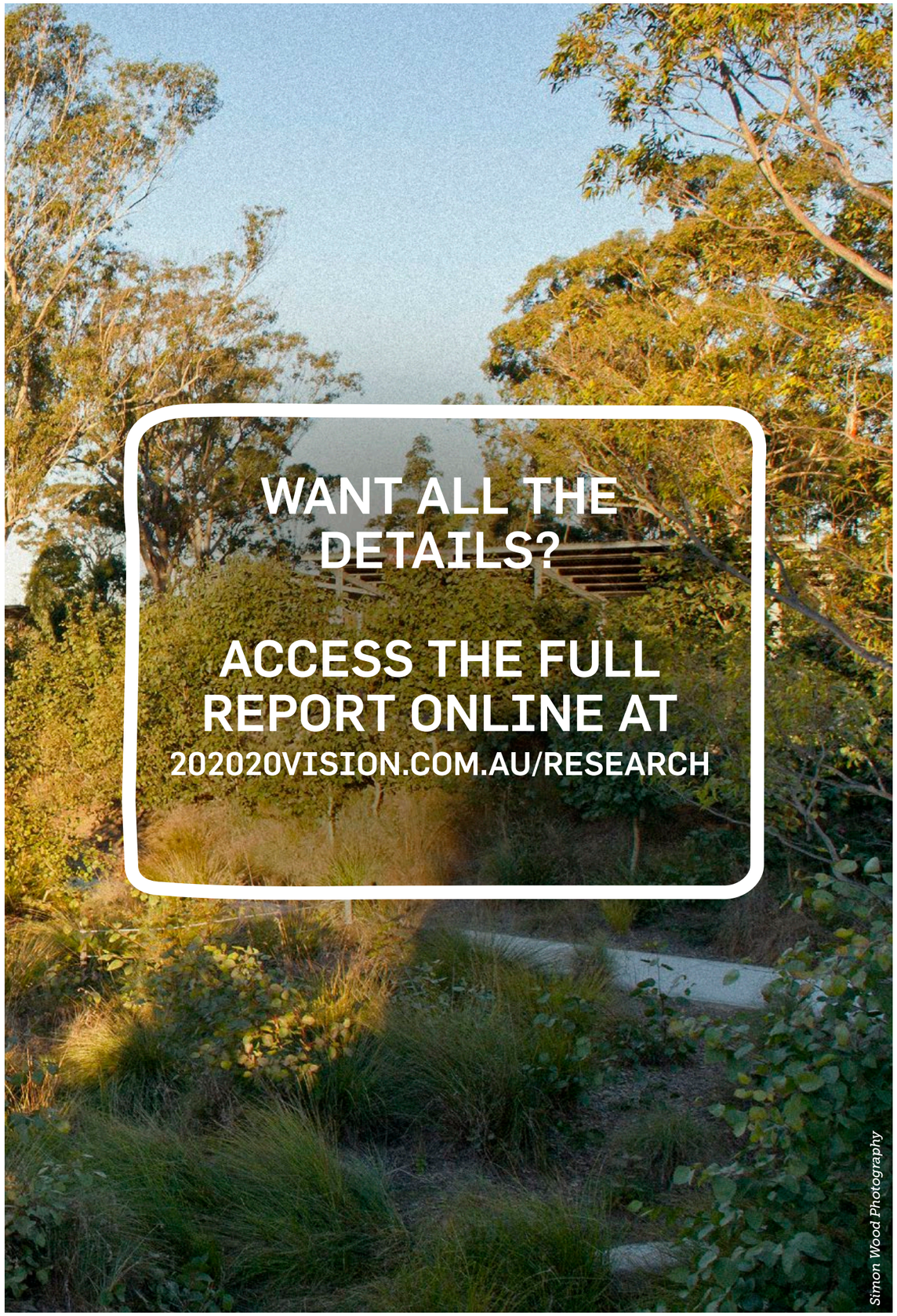
Frasers Property Australia's Sekisui House Australia

SO WHAT IS GREEN SPACE?

That's a good question. And it's one that people seem to answer in lots of different ways. For us, it comes down to three things: trees, plants and benefits. When we talk about 'green space' we're talking about an urban area that features trees and plants and delivers real benefits to the people that use it.

Basically, we are interested in increasing the amount of green space in our urban areas in a way that delivers some kind of utility to people and communities. And why wouldn't we be? Trees and plants have been shown to make us healthier, happier and more productive, reduce flooding, clean the air and cool our cities.

EXAMPLES OF GREEN SPACE



METHODOLOGY

Measuring green space isn't easy. It can be expensive and often requires a specialist skill set. i-Tree helps overcome these issues. i-Tree is free, easy-to-use software that allows users to rapidly measure the tree canopy in a given area. Deeper analysis in i-Tree can also provide a range of data that shows the carbon sequestration of trees, rainwater catchment and cost to replace. Visit itreetools.org for more information.

Using i-Tree Canopy, the ISF at UTS analysed 139 Local Government Areas (LGAs) lying within the most densely populated areas of Australia. The selected areas are home to 68% of the Australian population.

The study was based on a 1000-point random sample method, which was used to classify landscape features in the LGAs. Areas were generally located in and around greater capital city regions, but some additional areas were added as high-density urban areas also exist outside of capital regions.

Dr Jacobs and Mr Mikhailovich conducted a brief scoping study on i-Tree Canopy which determined that logging 1000 points gave estimates that stabilised between 600-1000 points.

It is worth noting that in the cases of Queensland and the ACT analysis was completed at the statistical subdivision (SSD) level.

THE AUTHORS

Research Director
Dr Brent Jacobs
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Candice Delaney
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Research Assistant
Nicholas Mikhailovich
BDes (Industrial), MEnv

"WE BELIEVE THAT I-TREE CANOPY IS A LOW COST, RAPID METHOD TO PROVIDE AN ESTIMATE OF TREE COVER AS A BASE-LINE FOR THE 202020 VISION PROJECT AND TO CATALYSE SOCIAL CHANGE IN AUSTRALIA'S URBAN AREAS."

- Institute for Sustainable Futures, UTS

WHAT TYPES OF SURFACE AREAS WERE MEASURED?

GRASS-BARE GROUND
Cleared road sides, industrial estates, lawns, pasture, sites cleared for development and sporting grounds.

TREES
Anything that looks like a tree from above; distinguished from shrubs by the shadows cast.

HARD SURFACES
Asphalt, buildings, car parks, footpaths, sandy beaches, train lines, rocky coastlines and water.

SHRUB
Landscaped vegetation as well as bushland shrubs, crops and grape vines.

AUSTRALIA

KEY NATIONAL FINDINGS FROM BENCHMARKING AUSTRALIA'S URBAN TREE CANOPY

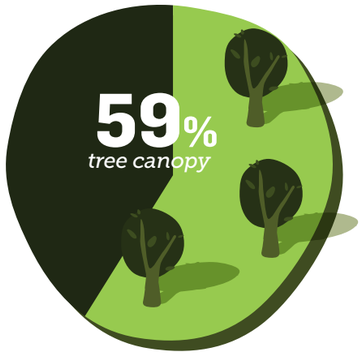
Our report both confirmed that Australia boasts areas of impressive tree canopy cover and revealed exciting opportunities for achieving our shared goal of increasing green space in urban Australia.

Hobart is the highest ranking capital city in terms of the proportion of tree canopy to other kinds of ground cover. Hobart boasts 56% tree canopy cover. By comparison, Adelaide has the lowest proportion of tree canopy among Australia's capitals with 27%.

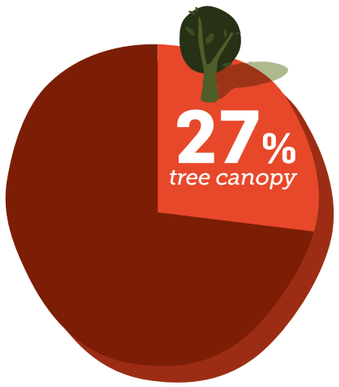
When we broadened the parameters to include a selection of regional cities, Cairns (QLD) was found to have the highest percentage of tree canopy followed by Launceston (TAS) and Townsville (QLD).

LGAs with sizeable grass-bare ground and hard surface areas may have a unique opportunity to increase their respective tree canopy rates. Meanwhile, areas boasting high ratios of grass-bare ground to tree canopy—Wyndham (VIC), Wanneroo (WA), Gawler (SA) and Camden (NSW)—could benefit from looking to their urban greening strategies, and knowledge of the local geography, and increase their green space by planting on vacant land.

In areas with high hard surface to tree canopy ratios—Maribyrnong (VIC), Fremantle (WA), Holdfast Bay (SA) and Rockdale (NSW)—tree canopy rates could be increased through urban regeneration projects.



HOBART
#1 capital city in Australia



ADELAIDE
endowed with opportunities

"AS HIGH-DENSITY LOCAL GOVERNMENTS ADOPT STRATEGIES THAT MINIMISE THE HEAT ISLAND EFFECT, GREEN INFRASTRUCTURE –SUCH AS GREEN WALLS, ROOFS AND VERTICAL GARDENS– WILL PLAY AN EVER-INCREASING ROLE."

Romilly Madew
-Green Building Council of Australia

OUR CAPITAL CITIES AT A GLANCE

TREE CANOPY: HOW OUR CITIES* COMPARE

1. HOBART **59%**
2. BRISBANE **49%**
3. DARWIN **28%**
4. PERTH **26%**
5. ADELAIDE **20%**
6. SYDNEY **15%**
7. MELBOURNE **13%**

*There are vast differences in tree canopy cover rates across Australia's capital cities. These variations may be attributed to any number of factors—geography, population and climate, to cite a few—and should not be seen as a comment on any particular council's attitudes towards green space projects.***

However, these figures will serve as a useful reference point for evaluating the amount of green space as we march toward the year 2020.

IMPRESSIVE TREE CANOPY COVER

Most urban LGAs will struggle to achieve tree canopy rates like those found in this selection due to their urban density, among other factors.

1. *Cairns Regional Council (QLD)*
2. *City of Launceston (TAS)*
3. *Townsville City Council (QLD)*
4. *Shire of Kalamunda (WA)*

OPPORTUNITIES DUE TO GRASS-BARE GROUND

Golf courses and sports grounds are not plantable, but there is nothing to stop you planting between fairways, or around an oval.

1. *City of Wyndham (VIC)*
2. *City of Wanneroo (WA)*
3. *Town of Gawler (SA)*
4. *Camden Council (NSW)*

HARD SURFACE HEAVY

Lots of concrete demands creative approaches to urban greening. Think roof and wall gardens for a start.

1. *City of Maribyrnong (VIC)*
2. *City of Fremantle (WA)*
3. *City of Holdfast Bay (SA)*
4. *City of Rockdale (NSW)*

* Due to the fact that there is only one LGA within the greater ACT, we do not have a figure for Canberra alone hence it does not feature here.
** These figures are not normalised to land area, population, etc.

AUSTRALIAN CAPITAL TERRITORY

THE ACT LEADS THE NATION IN METROPOLITAN TREE CANOPY RATES

At 56% coverage, the Australian Capital Territory has the highest proportion of urban tree canopy in the country. Yet the ACT also boasts sizeable tracts of grass-bare ground that could potentially accommodate new plantings.

THE ACT IS A LAND OF OPPOSITES WITH TREE CANOPY RATES RANGING FROM A LOW OF 10% TO A HIGH OF 76%.

Of these areas, Weston Creek-Stromlo has the greatest proportion of grass-bare ground (73%) as well as the lowest percentage of tree canopy in the territory (10%).

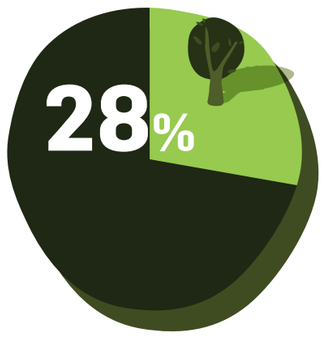
In terms of hard surface land, Woden Valley in the Territory's south recorded 31%, while the remaining seven of the eight statistical subdivisions (SSDs) analysed featured proportions of less than 20%.

TOP STATISTICAL SUBDIVISIONS BY TREE CANOPY IN AUSTRALIAN CAPITAL TERRITORY

1 *Australian Capital Territory - Bal*

2 *North Canberra*

3 *Woden Valley*

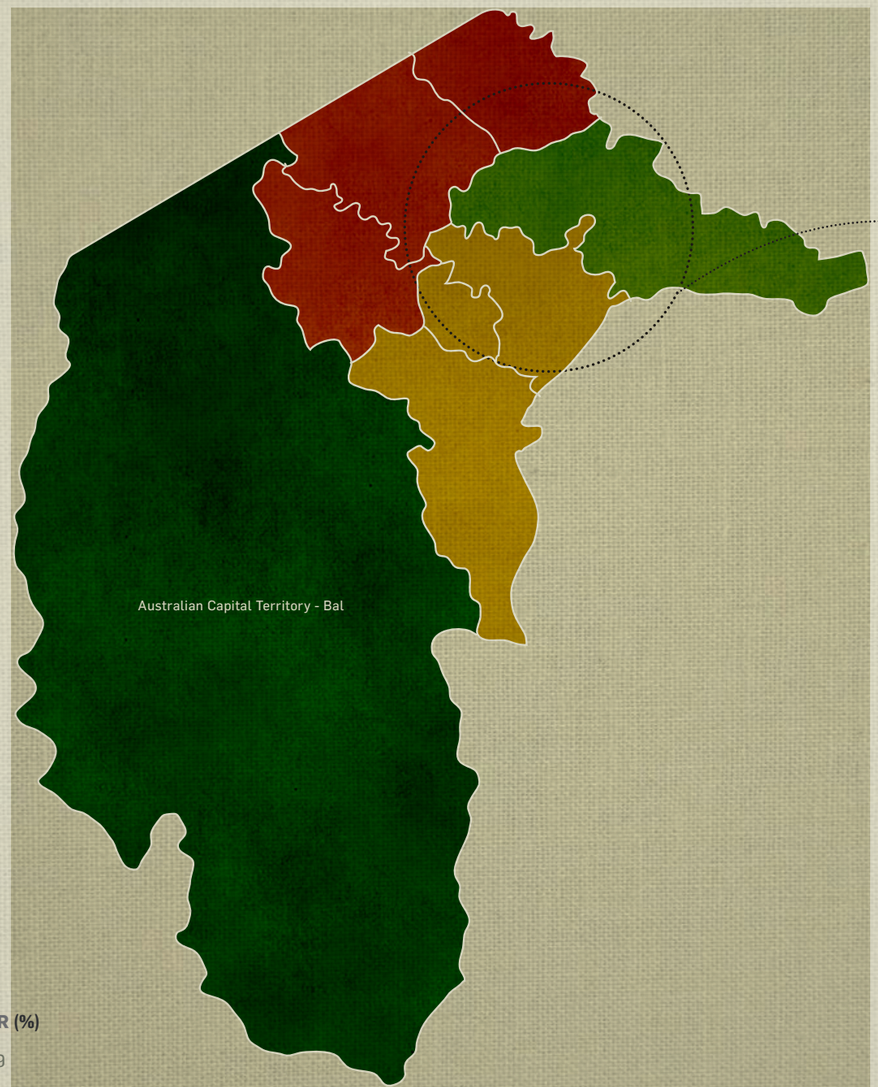


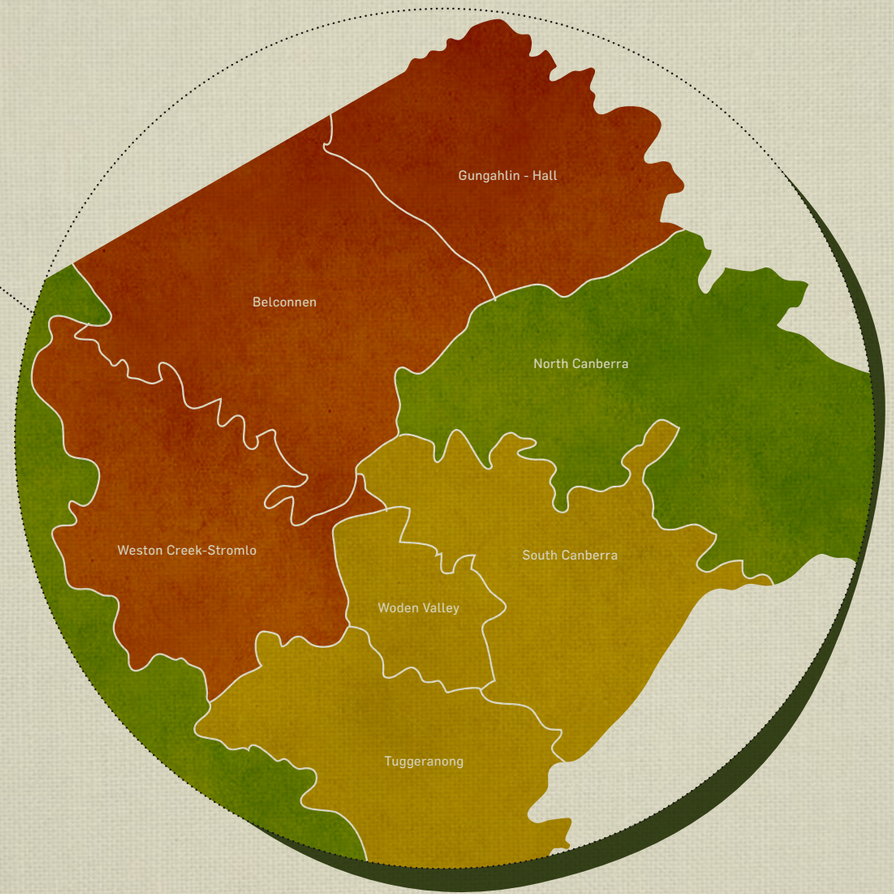
> “AFFIRMATIVE ACTION IS IMPORTANT TO ENSURING ALL AUSTRALIANS HAVE ACCESS TO THIS IMPORTANT PUBLIC HEALTH RESOURCE REGARDLESS OF THEIR SOCIOECONOMIC CIRCUMSTANCES.”

Dr Thomas Astell-Burt & Dr Xiaoqi Feng
-University of Western Sydney

AUSTRALIAN CAPITAL TERRITORY

TREE CANOPY COVERAGE





CANOPY COVER (%)

- 0.0 - 9. 9
- 10.0 - 19. 9
- 20.0 - 29. 9
- 30 - 39. 9
- 40.0 - 49. 9
- 50+

NEW SOUTH WALES

THE LAND OF OPPORTUNITY

Challenges and opportunities abound in NSW when it comes to increasing green space in urban areas by 20%.

The City of Sydney, for example, is characterised by the highest proportion of hard surface (69%) of all NSW LGAs and low levels of grass-bare ground (13%). Therefore, incorporating green space within the existing built environment will be key to contributing to an increase in canopy cover. However, it should be noted that the City is making good progress and evidence for Sydney's commitment to urban greening may be found in the Green Roofs and Walls Program.

INCREASING THE AMOUNT OF GREEN SPACE IN THE CITY CAN MITIGATE THE HEAT ISLAND EFFECT IN SYDNEY.

—

Conversely, Western Sydney was found to have the highest proportion of potentially plantable spaces with Blacktown, Camden, Fairfield, Liverpool and Penrith all boasting significant areas of grass-bare ground that could potentially be planted.

There is also an opportunity to manage urban heat in Sydney by increasing the tree canopy along a low-coverage corridor stretching from the city's eastern suburbs to Parramatta. The corridor is home to established, high-density LGAs of varying socio-economic groups and improving green spaces along it will require a coordinated approach.

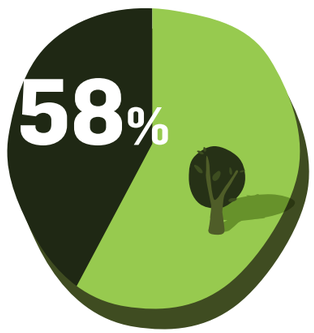
Currently, tree canopy across NSW ranges from a high of 59% at Pittwater to 12% in Botany. Improving on these figures by 2020 will require the respective LGAs to continue to progress their urban greening strategies.

THE TOP LGAs BY TREE CANOPY IN NEW SOUTH WALES

1 *Pittwater Council*

2 *Hornsby Shire*

3 *Warringah Council*



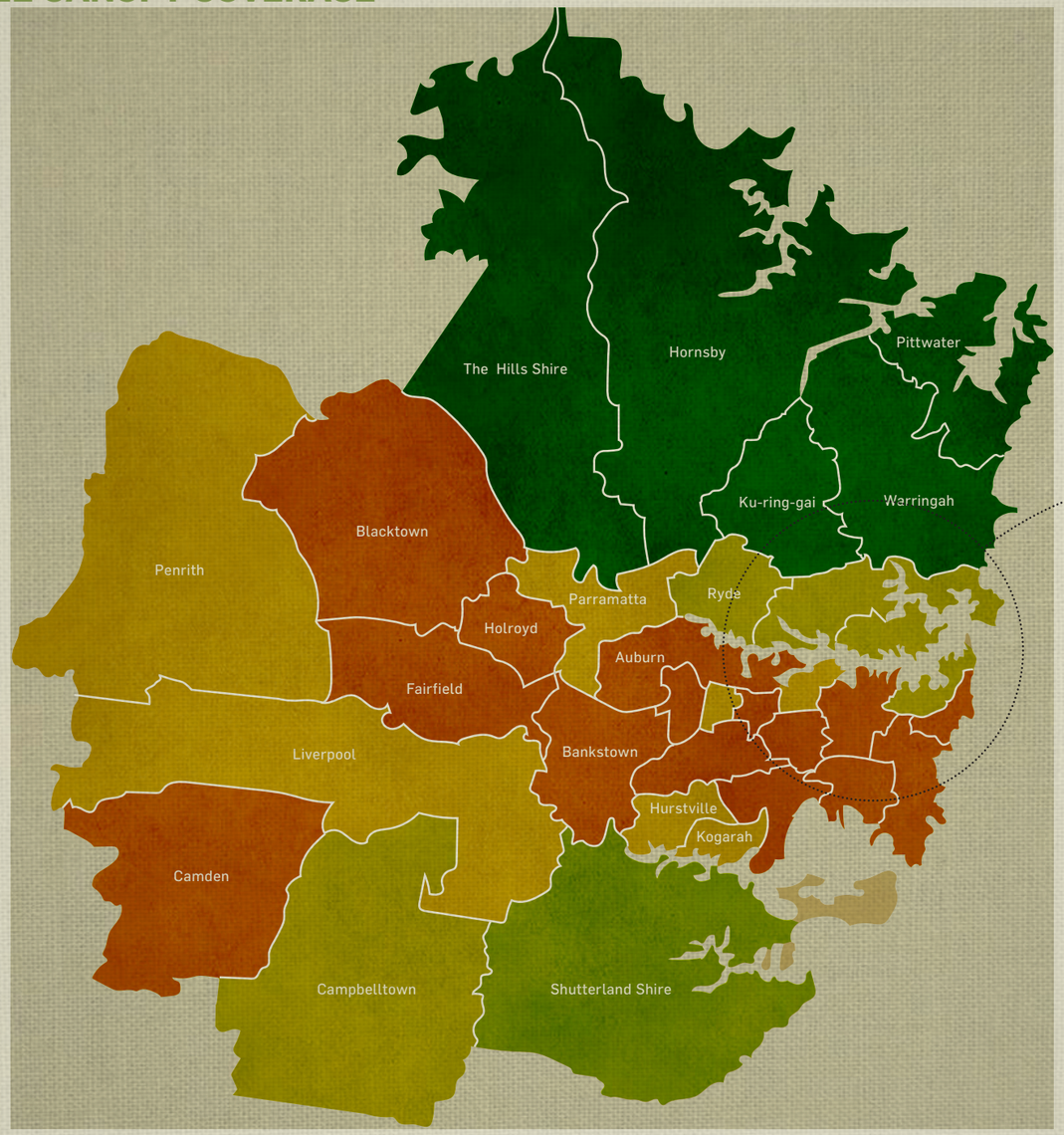
“CROSS SECTOR COLLABORATION WILL BE KEY TO THE SUCCESS OF THE 202020 VISION.”

Vanessa Trowell

- Australian Institute of Landscape Architects

NEW SOUTH WALES

TREE CANOPY COVERAGE



CANOPY COVER (%)

- 0.0 - 9. 9
- 10.0 - 19. 9
- 20.0 - 29. 9
- 30 - 39. 9
- 40.0 - 49. 9
- 50+

NORTHERN TERRITORY

THE TOP END OFFERS SIGNIFICANT GREENING OPPORTUNITIES

The two LGAs assessed in the Northern Territory—the Cities of Darwin and Palmerston—together account for just 45% of the Top End's population.

However, the comparatively low-density composition of the two cities does not correspond with considerable tree canopy. Tree canopy in Darwin and Palmerston is in the 20-30% range.

The two LGAs are characterised by high proportions of grass-bare ground and comparatively low proportions of non-plantable ground.

BUT A FAVOURABLE MIX OF GRASS-BARE AND HARD SURFACE GROUND SUGGESTS THAT THERE IS AMPLE OPPORTUNITY FOR URBAN GREENING PROJECTS IN THE TERRITORY.

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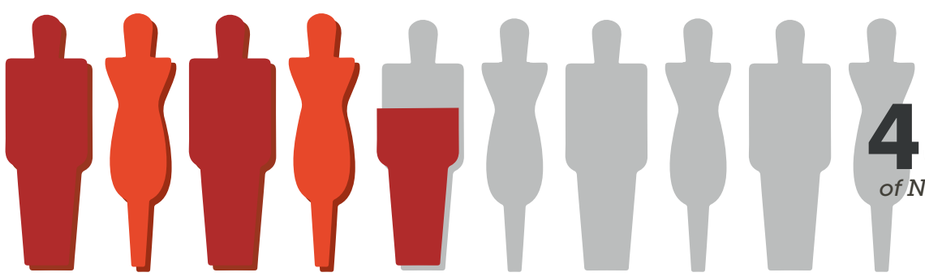
CITY OF DARWIN & CITY OF PALMERSON ACCOUNT FOR



45%
*of NT population**

TREE CANOPY COVERAGE

QUEENSLAND

IMPRESSIVE TREE CANOPY UP NORTH

Queensland has some of the highest proportions of tree canopy in the country. Cairns tops the list of LGAs with the greatest tree canopy (79%) with Townsville also featuring among the front-runners.

FROM THE BOUNTIFUL TREE CANOPY IN FAR NORTH QUEENSLAND TO THE VAST TRACTS OF GRASS-BARE GROUND IN OTHER PARTS OF THE STATE, QUEENSLAND IS HOME TO VERY DIFFERENT GEOGRAPHIES, EACH REQUIRING A TAILORED APPROACH TO URBAN GREENING.

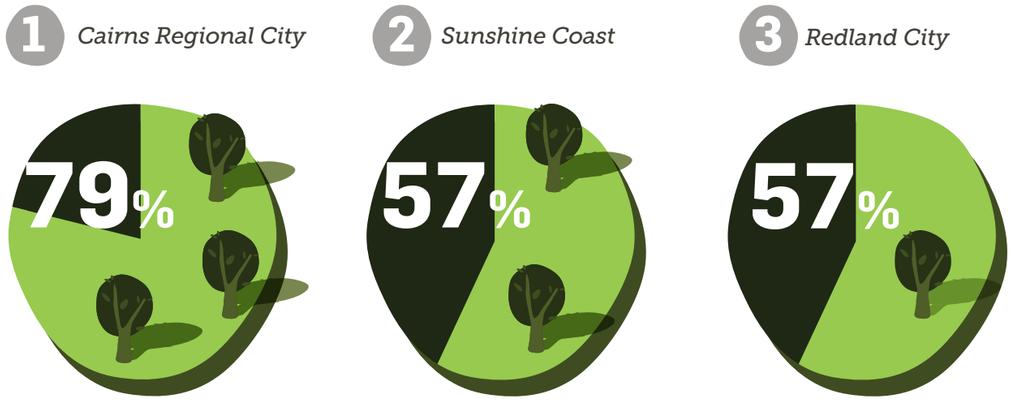
—

But there is always room for improvement. Toowoomba features particularly high concentrations of grass-bare ground (71%) covering a total of 9,235 km^2.

As with the other states surveyed, Queensland's urban areas are home to the majority of the state's population (74%) and the opportunities for urban greening in the built up areas are, naturally, limited.

Beyond the urban centre, however, density levels decrease and the availability of potentially plantable land increases.

THE TOP LGAs BY TREE CANOPY IN QUEENSLAND



> “I-TREE CANOPY IS AN EASY TO USE, COST EFFECTIVE AND, MOST IMPORTANTLY, SCIENCE BASED TOOL WITH WHICH TO UNDERTAKE THIS IMPORTANT ASSESSMENT OF AUSTRALIA'S GREEN SPACE.”

Dr Anthony Kachenko

- Nursery & Garden Industry Australia

QUEENSLAND

TREE CANOPY COVERAGE

CANOPY COVER (%)

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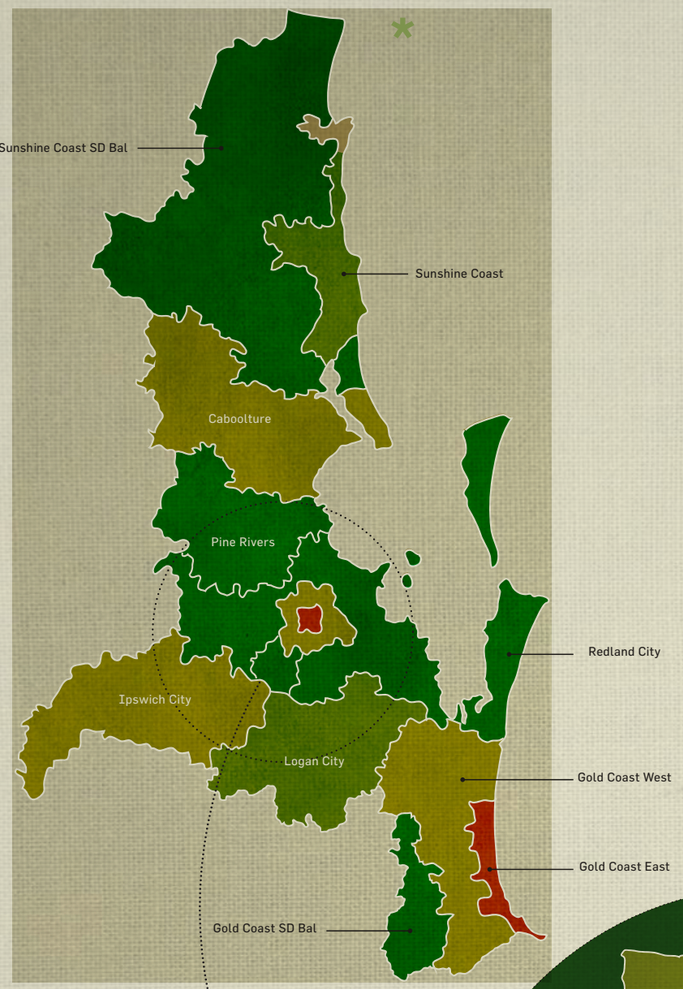
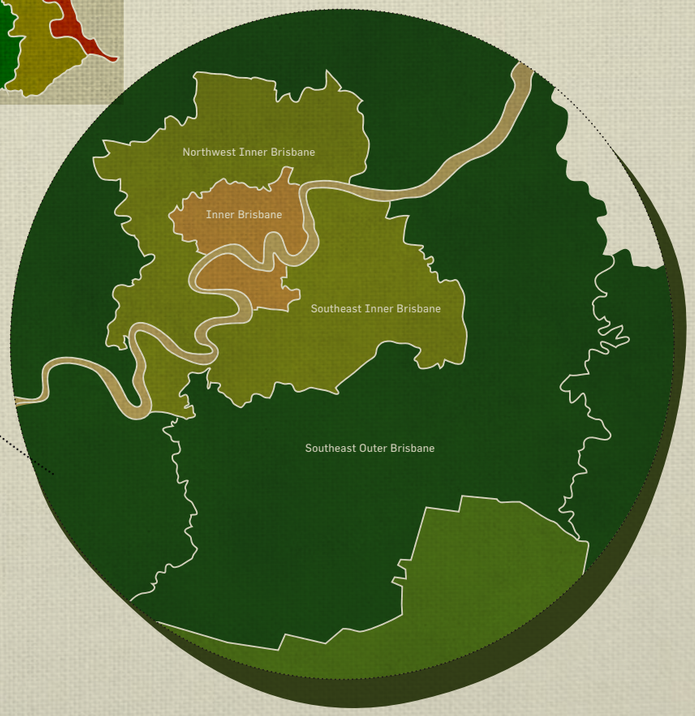
- 50+





* This map show canopy cover for selected SDDs in the greater Brisbane area and beyond.

SOUTH AUSTRALIA

CONSERVATION AREAS SKEW FINDINGS IN SOUTH AUSTRALIA

South Australia's metropolitan areas are marked by relatively low levels of tree canopy when compared to other Australian capitals. Of the assessed LGAs, tree canopy ranges from 44% in the Adelaide Hills to 12% in Port Adelaide Enfield.

However, South Australia does share one thing in common with the rest of the country. The vast majority of South Australia's population live in urban areas. The 19 LGAs assessed in South Australia are home to almost three quarters of the state's population (73%).

HARD SURFACE AREAS WILL PRESENT A CHALLENGE FOR THOSE INVOLVED IN GREENING SOUTH AUSTRALIA.

—

None of the LGAs surveyed have tree canopy of less than 10%, however 11 of the 19 fall within the 10-20% range. And it is important to note that the two LGAs with the highest proportions of tree canopy—Adelaide Hills (44%) and Mitcham (42%)—feature conservation areas within their boundaries.

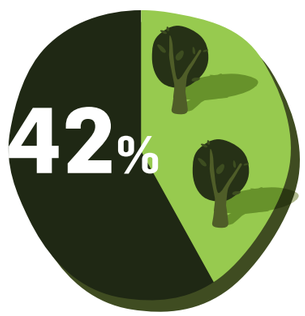
Holdfast, Norwood, Payneham, Prospect and St Peters all feature hard surface proportions in excess of 60%, which—to employ the report's terminology—is to say they feature significant areas that are currently non-plantable.

There are, however, a number of areas that are potentially plantable. Gawler, Onkaparinga and Playford, all have grass-bare ground rates of over 50%.

THE TOP LGAs BY TREE CANOPY IN SOUTH AUSTRALIA

1 *Adelaide Hills Council*

2 *City of Mitcham*

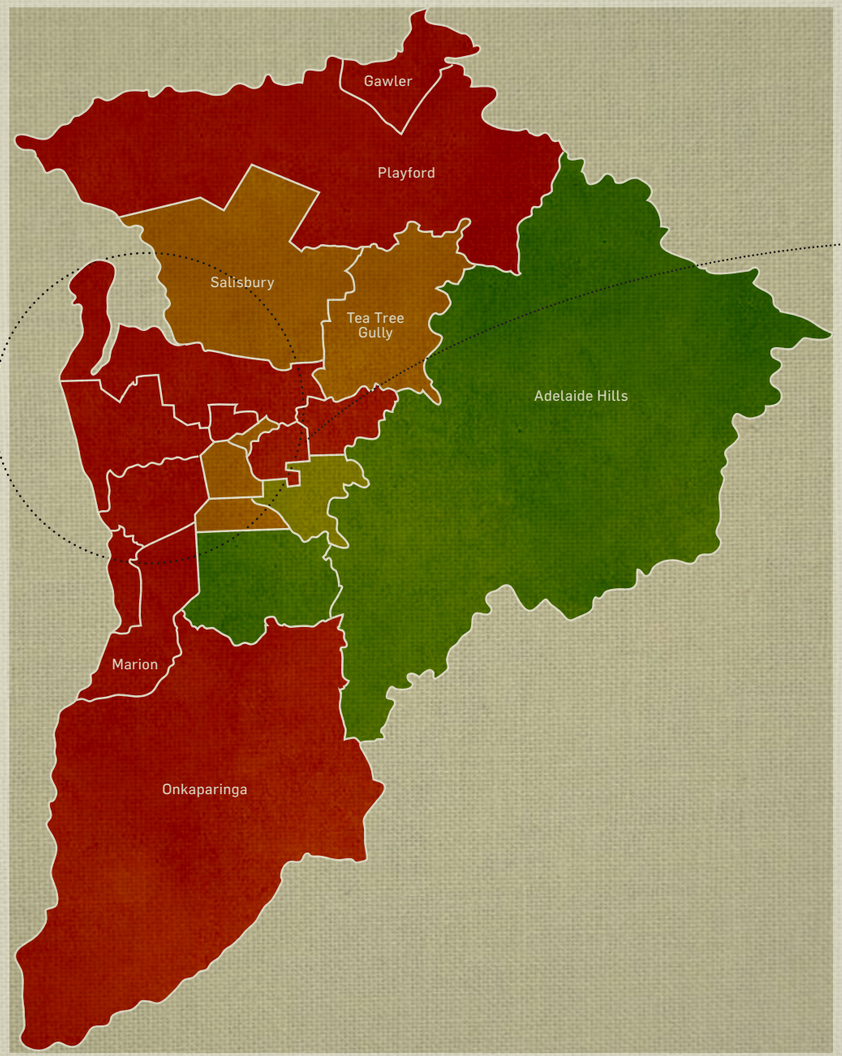


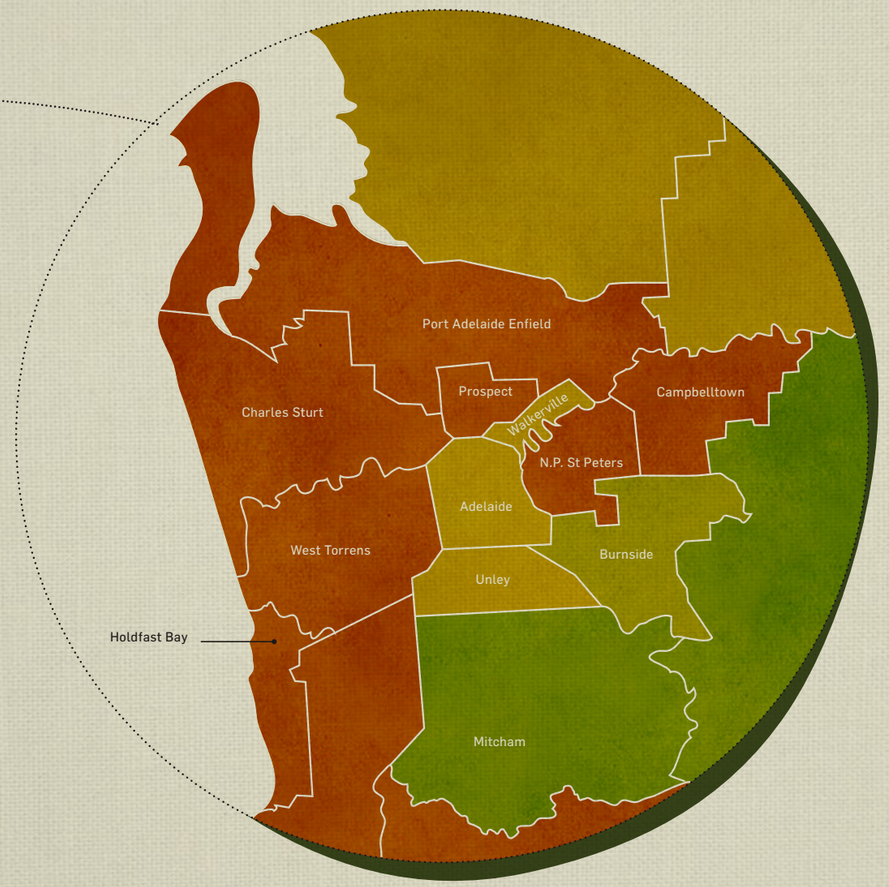
3 *City of Burnside*

> "IT IS INSPIRING TO SEE A NON-GOVERNMENT ORGANISATION TAKING UP SUCH AN IMPORTANT INITIATIVE."
>
> **Crosbie Lorimer**
> - Clouston

SOUTH AUSTRALIA

TREE CANOPY COVERAGE





CANOPY COVER (%)

- 0.0 - 9. 9
- 10.0 - 19. 9
- 20.0 - 29. 9
- 30 - 39. 9
- 40.0 - 49. 9
- 50+

TASMANIA

TASMANIA'S ATYPICAL POPULATION SPREAD IMPACTS FINDINGS

With the possible exception of the Northern Territory, the urban spread in Tasmania is somewhat different to that encountered across the rest of the country, with the five urban LGAs surveyed housing a comparatively low percentage of the state's population (48%).

However, unlike the Top End LGAs—and indeed, most of the country—the LGAs assessed in Tasmania boast comparatively high proportions of tree canopy. Tree canopy percentages range from 66% in Kingborough to 31% in Clarence. And of the five LGAs we looked at, four can claim tree canopy rates of more than 40%.

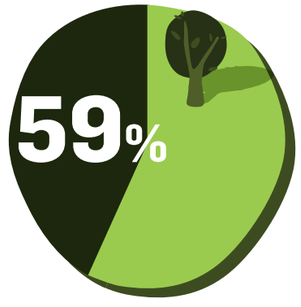
There are also sizeable areas of the state that could benefit from potential planting increases. Of those, the City of Clarence comprises 50% of potentially plantable land. And with hard surface land comprising only 19% of Hobart's total, the Tasmanian capital ranks as one of the nation's greener urban areas.

THE TOP LGAs BY TREE CANOPY IN TASMANIA

1 *Kingborough Council*

2 *City of Hobart*

3 *City of Glenorchy*

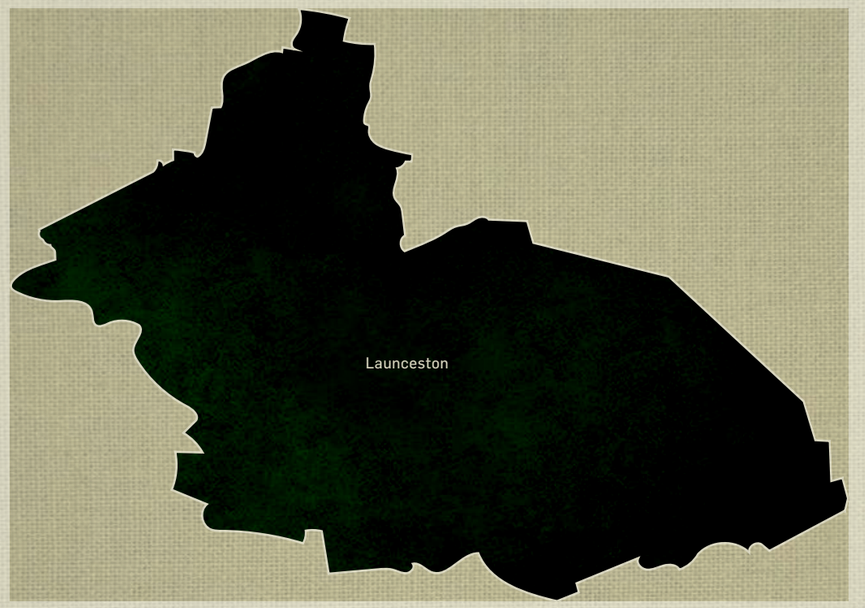


"A VITAL PIECE OF INFORMATION IN ORDER FOR THE 202020 VISION TO IMPLEMENT AND EVALUATE ITS SUCCESS IS TO KNOW HOW MUCH GREEN SPACE IS ALREADY AVAILABLE – WHAT EPIDEMIOLOGISTS TYPICALLY REFER TO AS A 'BASELINE'."

Dr Thomas Astell-Burt & Dr Xiaoqi Feng
-University of Western Sydney

TASMANIA

TREE CANOPY COVERAGE



CANOPY COVER (%)

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- 50+

VICTORIA

TREE CANOPY RATES COULD BE VASTLY IMPROVED IN METROPOLITAN VICTORIA

Almost three quarters of Victorians live in 34 LGAs across the greater Melbourne region. Of those LGAs, 19 of them—situated mainly in the inner city and western regions of the greater metropolitan area—feature tree canopy rates of less than 20%.

THE VAST MAJORITY OF TREE CANOPY IN MELBOURNE IS FOUND ON PUBLIC LAND.

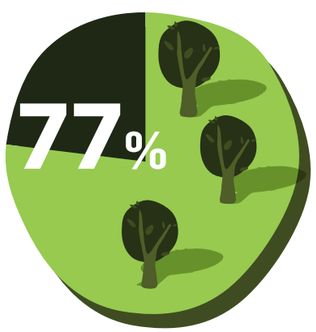
—

Given the population concentrations found in many Victorian LGAs, the challenge faced by partners of the 202020 Vision will be incorporating green space in what are typically high-to-medium density urban environments.

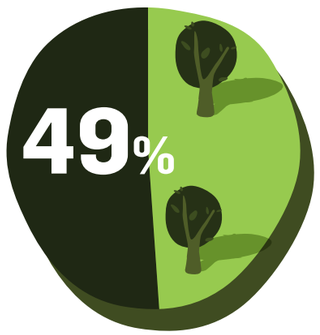
Within the City of Melbourne alone tree canopy was calculated at 13%. The City of Melbourne has provided information that shows that the private realm accounts for approximately 31% of municipal canopy cover with the public realm accounting for the remaining 69%. This highlights the importance of protecting tree canopy in public spaces and suggests an opportunity to increase greening in private spaces, possibly through the planting of wall and roof gardens.

THE TOP LGAs BY TREE CANOPY IN VICTORIA

1 *Shire of Yarra Ranges*



2 *Shire of Nillumbik*



3 *City of Manningham*

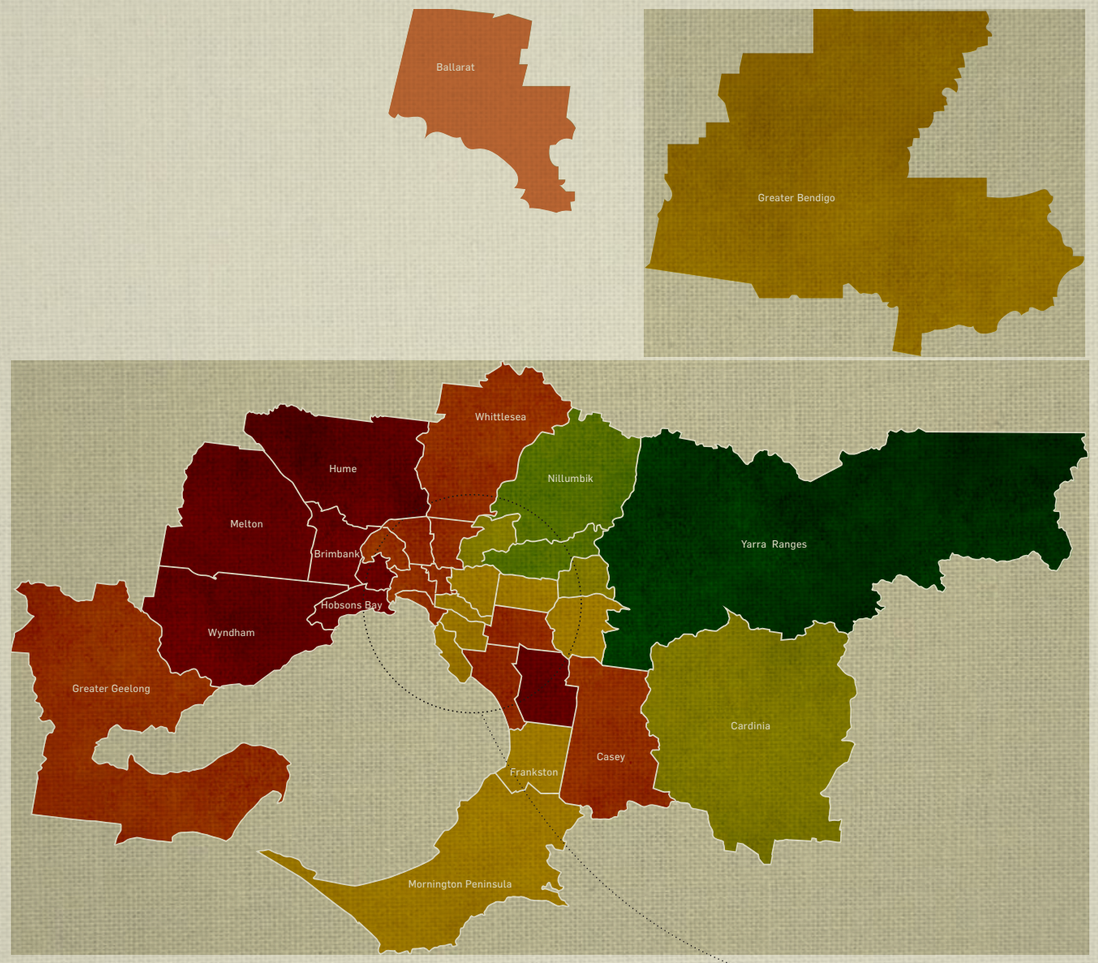
“THE OPEN SPACE STRATEGY AIMS TO INCREASE GREEN SPACE BY 7.6%.”

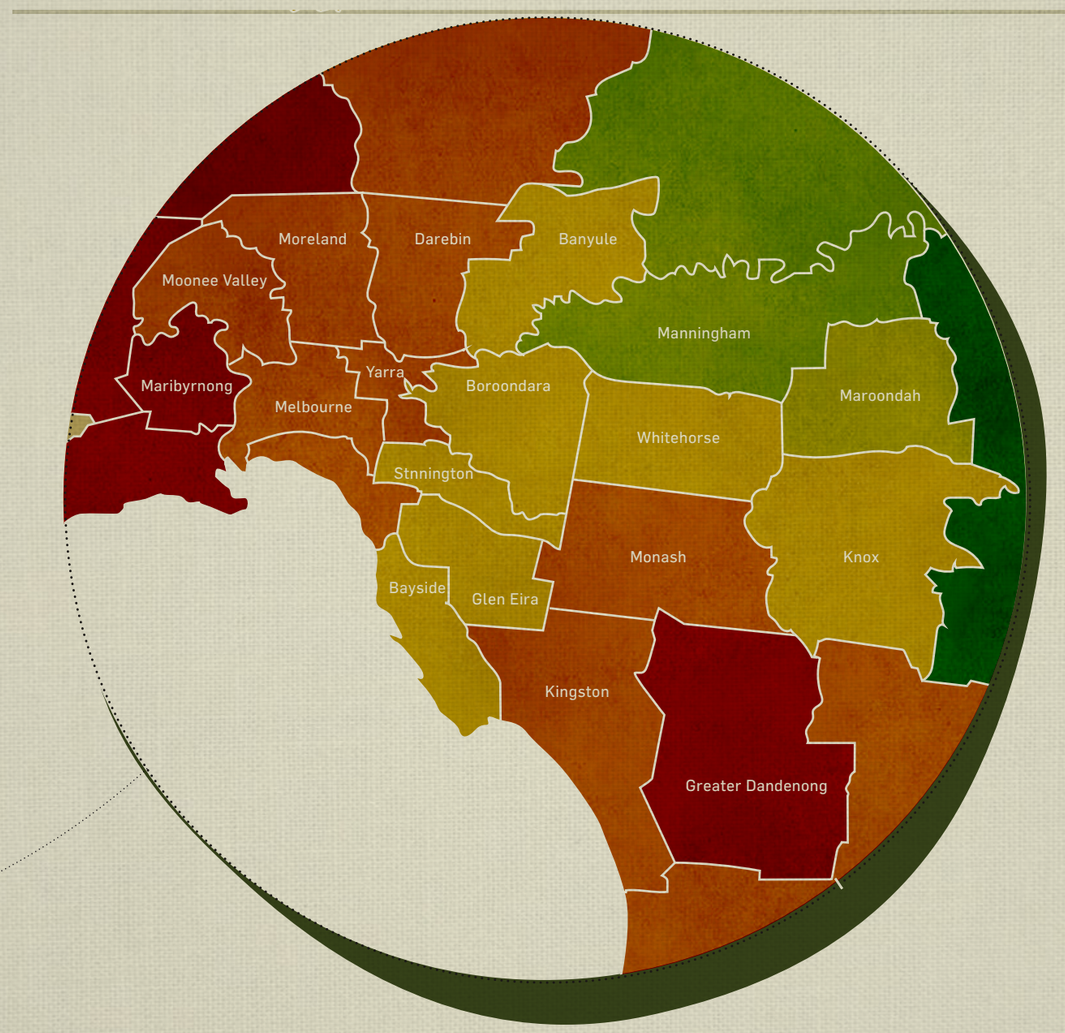
Yvonne Lynch

- Urban Landscapes, City of Melbourne

VICTORIA

TREE CANOPY COVERAGE





CANOPY COVER (%)

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WESTERN AUSTRALIA

A LAND OF EXTREMES

Our i-Tree Canopy analysis of Western Australia's LGAs revealed areas of bountiful tree canopy and other areas, owing to geographical and topographical factors, that could benefit from further urban greening.

HARD SURFACES PREDOMINATE IN THE WEST.

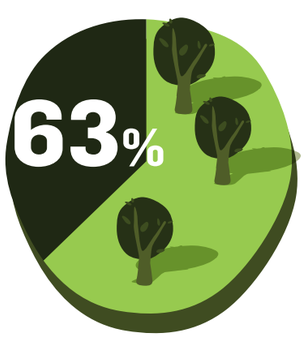
—

For example, Kalamunda features tree canopy rates of 63% but it is only one of the two assessed LGAs in WA—the other being the Shire of Mundaring (54%)—with tree canopy rates of over 50%. Meanwhile, the City of Belmont in the greater Perth region features a tree canopy of only 9%.

Of the urban LGAs, many feature sizeable hard surface areas with comparatively little in the way of grass-bare ground. Bayswater, Belmont, Canning, East Fremantle, Fremantle, Joondalup, Subiaco and Vincent all have hard surface proportions of over 50% with grass-bare ground averages of 20-25%. These environmental characteristics call for innovative approaches to urban greening.

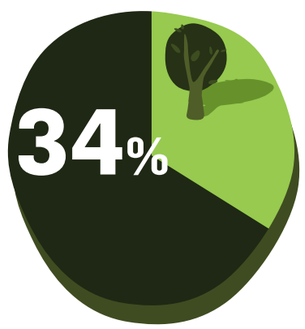
THE TOP LGAs BY TREE CANOPY IN WESTERN AUSTRALIA

1 *Shire of Kalamunda*



2 *Shire of Mundaring*

3 *City of Swan*

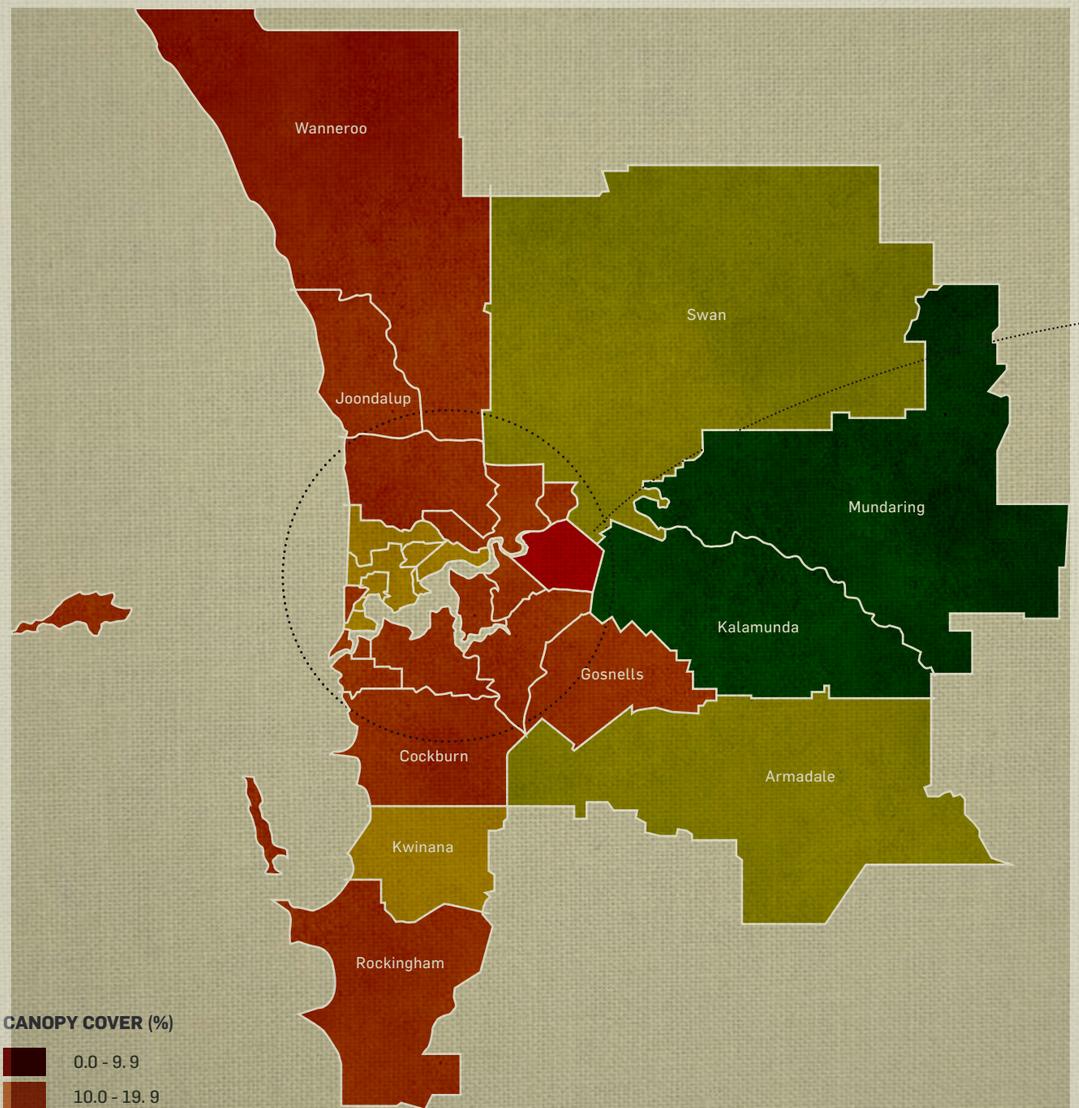


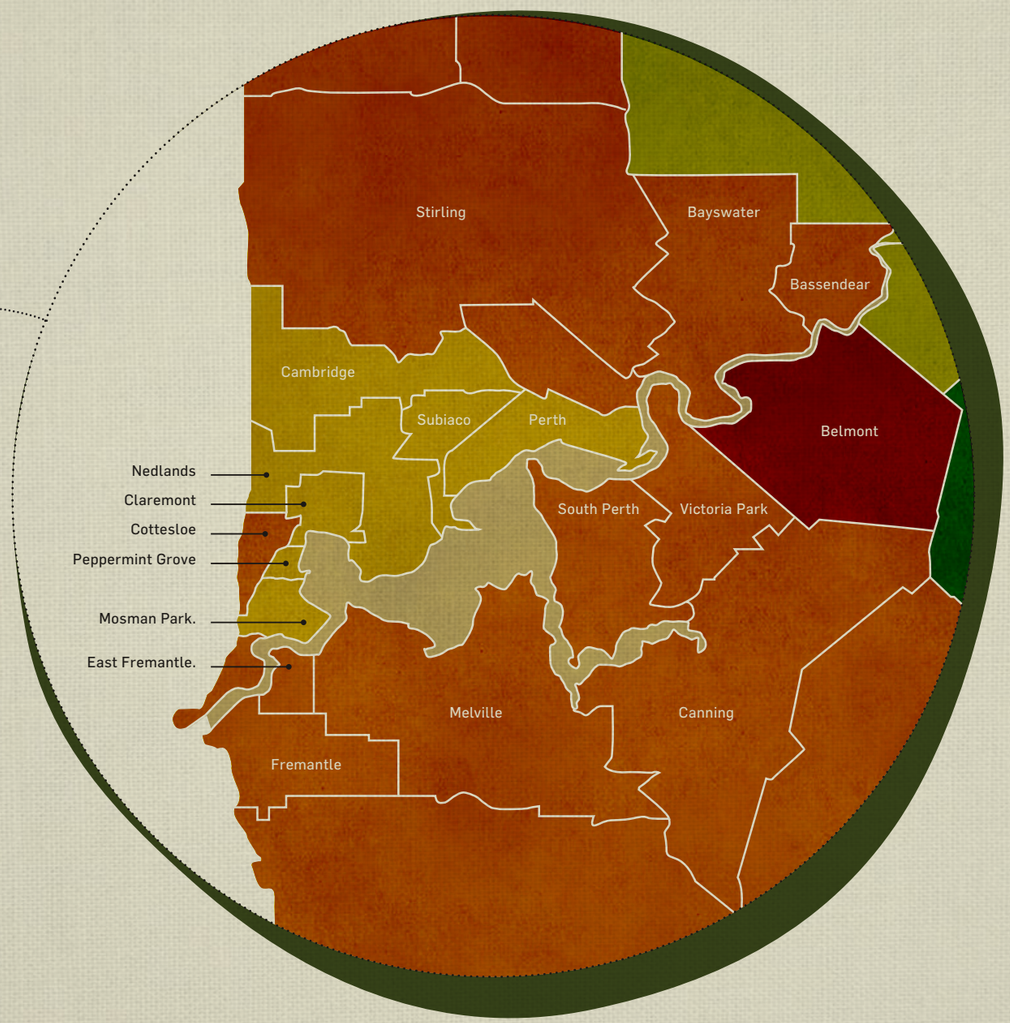
"IT'S TIME TO TURN OUR ATTENTION TO HOW WE CAN MOST EFFECTIVELY INCREASE THE NUMBER OF TREE PLANTINGS WHERE THEY ARE NEEDED MOST."

Josh Byrne
- Byrne and Associates

WESTERN AUSTRALIA

TREE CANOPY COVERAGE





CANOPY COVER (%)

- 0.0 - 9. 9
- 10.0 - 19. 9
- 20.0 - 29. 9
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- 40.0 - 49. 9
- 50+

NOW YOU'VE SEEN THE FINDINGS, WHY NOT GET INVOLVED?

To determine the state of green space in Australia's urban areas we analysed the tree canopy in 139 local government areas (LGAs) across Australia using the open source i-Tree Canopy software. Now it's over to you. Use i-Tree Canopy to measure the tree canopy in your area or compare your progress against the benchmarks established in this study.

City of Vincent

Scott Burrows Photographer

WHY DID WE USE I-TREE CANOPY?

When we partnered with the ISF at UTS, we wanted to find a tried and tested indicator of canopy cover that was easy to use and affordable. i-Tree fit the bill.

Whether you're in government, industry, business, academia or the not-for-profit sector—or you're simply interested in this topic—you can use i-Tree to understand where your canopy cover is at the moment and where the opportunities for urban greening lie.

i-Tree is a sophisticated, peer-reviewed suite of web-based software from the United States Department of Agriculture Forest Service that provides users with an array of forestry analysis and assessment tools. i-Tree helps communities measure the tree canopy in a given area and identify opportunities for future greening projects.

IS THIS THE ONLY WAY?

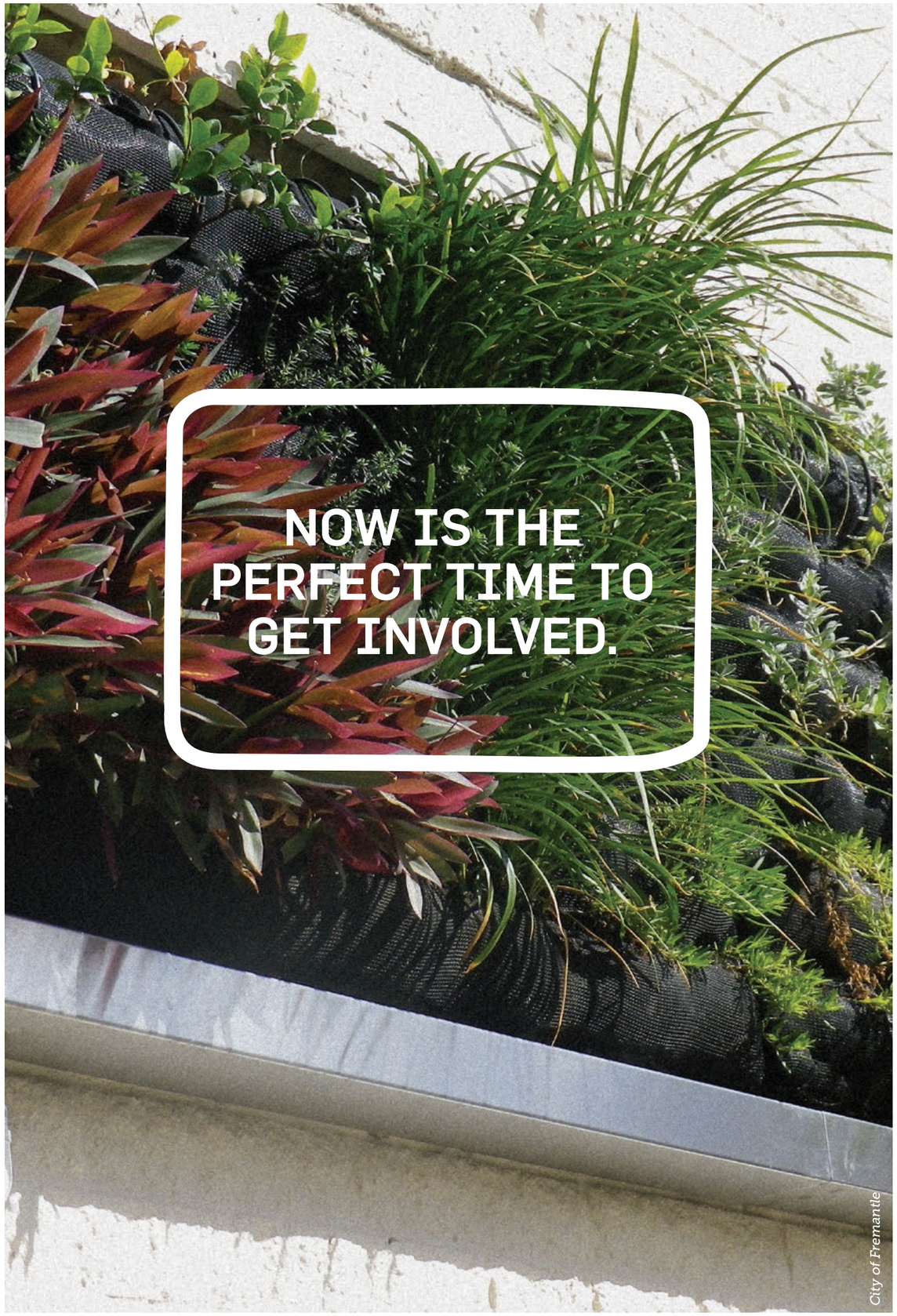
In a word, no.

i-Tree represents but one way of assessing the state of green space in a given area. There are number of advantages associated with i-Tree but this is just the beginning of our march towards a greener Australia and we welcome other studies that shed further light on the greening needs of our urban areas.

For example, this report provides us with one very important piece of the puzzle but we also need to consider a number of other factors, such as geographical, biophysical and planning requirements. It is also important to note that while this report tells us where the trees are, it does not tell us about the quality of these spaces, or how useful they are to urban Australians.

There are a number of alternative measurement tools available but i-Tree is well suited to measuring tree canopy based on inexpensive images readily available through Google Earth*. i-Tree can also provide measurement estimates for air pollution reduction and capturing atmospheric carbon, thereby revealing the 'value' of trees in a given area. Urban forest managers can use it to set canopy goals and monitor canopy change over time.

* Google Earth imagery has significant date variation across Australia. It should be noted that the benchmarking was not carried out using imagery from the same year across all local government areas.



City of Fremantle

WHAT CAN YOU DO?

Whether you are in the public or private sector, town planning, community engagement, healthcare or government there is a role for you to play in increasing the amount of green space in our urban areas.

You can start by looking at the data captured by i-Tree from your local area and consider what might be done to improve the state of canopy cover near you.

If you are an academic or a researcher in the field, there are a range of further recommendations for research that can be looked at, such as:

- Canopy analysis at the suburb level, not just LGA level
- Detailed analysis into land use and ownership to better understand who can implement further or improved greening
- Accessibility and human usage of current green spaces
- Correlations of tree canopy to socio-economic, health, crime and weather data

For more information please visit 202020vision.com.au

WHERE TO FROM HERE?

This report is just the beginning. Now that we have a tool that reliably measures tree canopy, we are going to continue to work with local, state and federal bodies, alongside our other partners, to see these canopies maintained, improved and increased.

In 2014, we will be touring Australia to meet with people just like you. We want to find out what the biggest challenges to urban greening are and work with you to find solutions to any obstacles you might be facing. We hope to see you on the road.