Dispelling Myths about Trees

Ann Doolette – Conservation SA

Trees on public and private land provide enormous benefits to people and the environment, yet pervading myths about trees–that have little substance–are leading to their demise and to the great detriment of liveable climate change-resistant city.

In 2020, *What's Happening to Adelaide's Trees?* revealed the following:

> 'Adelaide is seeing a reduction in tree numbers across every suburb. The rapid expansion of our city has put Adelaide's urban tree canopy under great pressure. Adelaide is losing unprecedented amounts of tree canopy cover from both public and private land, resulting in a hotter, less liveable city.
>
> Backyards contain significantly higher tree canopy than open spaces and parks. But this won't last: most tree loss is occurring on private land as a consequence of development policies. Poorly planned development is increasing urban infill and reducing block sizes, resulting in less space for trees on private land. Although local and state governments are planting new trees, there is simply not sufficient public space available to plant enough trees to compensate for the loss of trees from private land.'[1]

A Call to Action: Protecting Adelaide's Tree Canopy followed up in 2021 estimating that:

> Trees are under threat in our city–Greater Adelaide is losing a phenomenal number of trees–about 75,000 trees per annum. If this continues, there is no hope of reaching Adelaide's goal of becoming 'a green liveable city'.

A Call to Action called for–among other things:

- Support for retaining tree canopy on private land that accounts for 80% of metropolitan Adelaide
- Help for tree owners who, as custodians, currently bear all the cost and risk while nearby properties share in the aesthetic and cooling benefits
- Developing awareness that when a large mature tree is removed, its benefits are gone forever.[2]

The benefit of trees in our home gardens and public spaces are immense, yet we are removing trees at an alarming rate and resisting replanting. Many of the reasons given for tree removal have no substance and are perpetuated as 'urban myths.'

Some of the more common myths about trees are dispelled below–all based on scientific evidence–to encourage homeowners and government agencies to preserve our trees.

Compiled by Ann Doolette, 2021

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[1] *What's Happening to Adelaide's Trees?*, Conservation Council of South Australia, June 2020, accessed at https://www.conservationsa.org.au/trees

[2] *A Call to Action: Protecting Adelaide's Tree Canopy*, Conservation Council of South Australia, 2021, accessed at https://www.conservationsa.org.au/trees

Myth 1: Trees have no place in cities or on roadsides because they can injure and kill people.

Summary

People can be injured or die from falling trees and tree branches, but the number of injuries is small and the number of accidental deaths related to trees is even smaller. Research has found that accidents from trees mostly occurs in wet stormy conditions. Changing people's behaviour to avoid or limit being outdoors or driving during storm events is the best way to reduce the risk from tree failure. Maintaining the health of trees and protecting them from root damage helps prevent tree falls and limb shedding at other times. Given that trees are so important to the health of our planet and all its inhabitants, we must learn to live within our natural environment.

Myth-busting

People can be injured or die from falling trees and tree limbs, but the number of injuries is small and the number of accidental deaths is even smaller. Death cause by trees, such as a falling branch, needs to be considered in context.

The total number of deaths in South Australia in the decade 2010-2019 was 133,390 according to the Australian Bureau of Statistics (ABS).[3] The ABS lists approximately 1,900 causes of deaths and death caused by trees is not one of them.

While it is not clear if cause of death by tree failure is collected in the ABS data, if it is, deaths caused by trees would be included in the category 'Other external causes of accidental injury'. In this category, the sub-categories of 'Exposure to other and unspecified inanimate mechanical forces' and 'Exposure to other and unspecified animate mechanical forces' record 2 deaths in this 10 year period, that is, 2 out of 133,390 deaths may possibly be attributed to tree failure, but the data does not specify that these were deaths caused by trees.

In comparison, during the same period, the ABS reported that 178 pedestrians and 626 car occupants died from transport accidents. In total, 1,135 people died from transport (land and water transport) accidents.

The same sort of adverse media attention that surrounds accidental death by trees has also occurred over the years with shark attacks. Australia has experienced periods of calls for shark culls, just as we are currently experiencing calls for removing large mature trees from public and private spaces. Sharks are terrifying species to many but we are learning to respect their place in healthy oceans. Like accidental death by trees, accidental death by sharks in South Australia is miniscule. In the decade from 2000 to 2019, the Australian Bureau of Statistics recorded 4 accidental deaths in its sub-category 'Contact with marine animal'.[4]

A 2019 study, *A review of deaths in Australia from accidental tree failures*[5], examined the risks from accidental tree failure. The study compiled the "Database of Australian Fatalities associated with Tree Failures" based on data from the recorded deaths listed in the National Coroners Information Service (NCIS) between 2000 and mid 2012 (12 ½ years). The study found that 51

[3] Australian Bureau of Statistics, "Table 5.2 Underlying cause of death, All causes, South Australia, 2010-2019", *3030.0 Causes of Death, South Australia, 2019*, released 23 October 2020, accessed at https://www.abs.gov.au/statistics/health/causes-death/causes-death-australia/latest-release

[4] Australian Bureau of Statistics, ibid

[5] Hartley, Mark A and Chalk, Jessica J, *A review of deaths in Australia from accidental tree failures*, Arborist Network, Sydney, May 2019, accessed at https://arboriculture.org.au/getassets/a2bd3064-7acd-ea11-90fb-00505687f2af/A%20Review%20of%20Deaths%20in%20Australia%20from%20Accidental%20Tree%20Failures.pdf

deaths were directly linked to trees, that is, "…an annual mortality rate from tree failure during this period [was] in the order of 1 in 5 million…"[6]

The study found that accidents from tree failure mostly occurs in wet stormy conditions. The report states: "… storms or strong winds were associated with 68% of the fatalities that recorded weather and a further 18% involved saturated soils or severe wind on the day of the failure or the immediately preceding day. This results in a total of 86% of occasions where the weather was a significant contributing factor."[7]

The study concluded: "Without question, the most significant impact on reducing the risk from tree failure will come from broad spread public education. Changing people's behaviour so that they avoid or limit being outdoors or driving during storm events has the potential to make significant improvements in reducing the risk from tree failure. Likewise communicating the message that when you are driving or recreating, and there is a severe storm warning you should not seek shelter under trees but should find an opening, stay alert and be ready to move until the storm subsides."[8]

While storms are the most common time that trees can lose limbs, trees can shed their limbs are other times. Caring for trees goes a long way towards preventing this. Gregory Moore, a Doctor of Botany at the University of Melbourne writes: "Make sure your trees are healthy, and their root systems are not disturbed when utility services such as plumbing, gas supplies and communication cables are installed".[9]

Given that trees are so important to the health of our planet and all its inhabitants, we must learn to live within our natural environment.

We don't need trees in the city; if you love trees so much, move to the country.

Summary

The evidence is increasingly abundant that trees are essential to the health of our cities and their inhabitants. One of the most significant reasons for well-treed cities is that they keep our cities cooler. Australian cities are facing more frequent and longer heatwaves and climate change is increasing global temperatures. North-situated, medium-sized trees in house gardens help cool homes in summer and street tree canopy cools surrounding air and reduces the impact of heat on public infrastructure.

Myth-busting

The evidence is increasingly abundant that trees are essential to the health of our cities and their inhabitants. Trees have many benefits in the city, but one of the most significant reasons for well-treed cities is that they keep our cities cooler.

In early 2021, Maund et al reported on the Bureau of Metereology's *Annual Climate Statement 2020*[10]. They reported that 2019 was the hottest and driest year on record for Australia and that "…the average national temperature for 2020 was 1.15°C higher than normal". They referred to a 2020 study that "…found we're increasingly facing more frequent and prolonged heatwaves

[6] Hartley and Chalk, ibid
[7] Hartley and Chalk, ibid
[8] Hartley and Chalk, ibid
[9] Moore, Gregory, "Here are 5 practical ways trees can help us survive climate change", *The Conversation*, February 19, 2020, accessed at https://theconversation.com/here-are-5-practical-ways-trees-can-help-us-survive-climate-change-129753
[10] Bureau of Meteorology, *Annual Climate Statement 2020*, Australian Government, 8 January 2021, accessed at http://www.bom.gov.au/climate/current/annual/aus/

that intensify urban heat islands in places such as Sydney, by raising inland temperatures by as much as 10°C more than in coastal zones." They noted that these figures cover all of Australia but that the data is important for cities because "…around 80% of the Australian population growth occurs in capital cities". They concluded: "The best way to ensure our cities are kept cool is through greening urban spaces. Green spaces can be developed by planting trees in streets, yards and parks for shade, recreation and relief from the heat."[11]

Heat-related deaths are on the rise which makes cooling our cities an imperative. According to the *Australia State of the Environment 2016* report, there were 200 heat-related deaths in Adelaide in 2007. By 2020, deaths by this cause had nearly doubled. By 2050, the number of heat-related deaths would rise to close to 600 per annum.[12]

Gregory Moore from the University of Melbourne states: "Trees can help cool your home. Two medium-sized trees (8-10 m tall) to the north or northwest of a house can lower the temperature inside by several degrees, saving you hundreds of dollars in power costs each year". He also states: "Adequate tree canopy cover is the least costly, most sustainable way of cooling our cities. Trees cool the surrounding air when their leaves transpire and the water evaporates. Shade from trees can also triple the lifespan of bitumen, which can save governments millions each year in road resurfacing".[13]

Data available in the South Australian Government report, *Urban Heat and Tree Mapping of Adelaide Metropolitan Area*[14], provides South Australian examples of the cooling impact of tree canopy. The report provides a digital tool[15] to interrogate the temperature differences between a tree-canopied street and one without trees and this illustrates the reality of the Bureau of Metereology's statistics in your own street.

Eucalyptus trees are prone to dropping branches and don't belong in cities, especially backyards.

Summary

Any tree can drop its branches, but it is not a frequent occurrence. It can happen as trees age and if they are not well tended. There is little evidence that eucalypts are more prone to dropping their branches than other trees. A few of the very large and fast-growing eucalypts are known to drop branches but this is infrequent.

Myth-busting

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[11] Maund, Mark, et al, University of New South Wales, "Cities could get more than 4°C hotter by 2100. To keep cool in Australia, we urgently need a national planning policy", *The Conversation*, 8 January 2021, accessed at https://theconversation.com/cities-could-get-more-than-4-c-hotter-by-2100-to-keep-cool-in-australia-we-urgently-need-a-national-planning-policy-152680?utm_medium=email&utm_campaign=Latest%20from%20The%20Conversation%20for%20January%2011%202021%20-

[12] Jackson, W and Rankin, A, "Estimated annual average number of heat-related deaths, selected capital cities and states, 2007, 2020, 2050", *Australia State of the Environment 2016*, Commonwealth of Australia 2017-2018, accessed at Estimated annual average number of heat-related deaths, selected capital cities and states, 2007, 2020, 2050 | Australia State of the Environment Report

[13] Moore, Gregory, "Here are 5 practical ways trees can help us survive climate change", *The Conversation*, February 19, 2020, accessed at https://theconversation.com/here-are-5-practical-ways-trees-can-help-us-survive-climate-change-129753

[14] Department of Environment and Water, *Urban Heat and Tree Mapping of Adelaide Metropolitan Area*, State of South Australia, accessed at https://data.environment.sa.gov.au/Climate/Data-Systems/Urban-Heat-Mapping/Pages/default.aspx

[15] Access available at http://spatialwebapps.environment.sa.gov.au/urbanheat/?viewer=urbanheat

Any tree can drop its branches but it is not a frequent occurrence. It can happen as trees age and if they are not well-tended. There is little evidence that eucalypts are more prone to dropping their branches than other trees.

Dean Nicolle, a South Australian arborist, writes "... many studies conclude that the risks represented by falling tree branches (whether from a eucalypt or any other tree) is grossly overstated. Under normal weather conditions, you are far more likely to die from melanoma or heat stroke from *not* standing under a tree … than be injured from a falling branch while standing under that same tree. The odds change somewhat in a storm, of course. Keep that in mind, and trees will be your friends, helping you to live longer and healthier!"[16]

He also states: "… a proportion of the 850 eucalypt species do grow into much larger trees and, like large trees of any type, these larger-growing eucalypt species can shed branches. Some fast-growing forest eucalypts – Sugar Gums (*E. cladocalyx)* for example – are more prone to shedding branches than others, especially if the branches are over-extended and heavily end-weighted. But most eucalypts are either too small to be a danger or no more likely to shed branches than any other type of tree."

Large trees should be removed from home gardens because they fall over, especially in storms, and can cause damage to houses and other structures.

Summary

Falling trees are a rare occurrence. If a tree falls, it is mostly likely due to poor management or root disturbance. Most causes are preventable. It's time to start viewing our garden and street trees as assets that need maintenance along with all our other assets and infrastructure.

Myth-busting

Falling trees are a rare occurrence. If a tree does fall, it is mostly likely due to poor management or root disturbance.

Most causes of trees falling over are preventable. Dr Gregory Moore from the University of Melbourne gives a number of reasons why trees fall and each can be remedied. A tree's root system can become waterlogged from changes to landscaping or drainage around a home. Providing adequate drainage as part of the changes is an important consideration. Heavy rain, without adequate drainage, can allow a tree's roots to break free from the soil, but this is preventable. Damage to a tree's root system through activities such as installation of a new road, a driveway or utilities can cause tree failure through root damage; more thoughtful planning can prevent this. Failure to remove dead or dying limbs can be prevented by regular arborist checks.[17]

It's time to start viewing our garden and street trees as assets that need maintenance, along with all other assets and infrastructure.

Large trees on private land need to be pruned heavily to stop branches falling and the leaves making a mess in the garden.

Summary

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[16] Nicolle, Dean, *Remember the Wild*, Currency Creek Arboretum South Australia, accessed at https://www.rememberthewild.org.au/eucalypt-mythbusting-a-comprehensive-guide/#sub-head-2

[17] Moore, Gregory, "An act of God, or just bad management? Why trees fall and how to prevent it", *The Conversation*, June 15, 2021, accessed at https://theconversation.com/an-act-of-god-or-just-bad-management-why-trees-fall-and-how-to-prevent-it-162754

Careful pruning of trees by well-trained and experienced arborists is essential maintenance of our trees, both in our yards and public places. Beware of the unskilled tree loppers who indiscriminately hack our trees for short term monetary gain. And remember the benefits that trees bring us when annoyed about cleaning up leaves and other tree droppings.

Myth-busting

Careful pruning of trees by well-trained and experienced arborists is essential maintenance for our trees. Gregory Moore of the University of Melbourne warns against the plethora of "tree loppers" who are all too keen to hack away at our trees as a quick money-making activity, but they do more harm than good.

> "Indiscriminately lopping a tree's canopy — which can leave little or no foliage and greatly reduces branching — may seem like a good way to eliminate the risk of shedding leaves, fruits and dropping limbs. But if it's done to a healthy tree with a sound structure, you can create the very problem you were seeking to avoid: greater shedding and the development of a dangerous canopy. This is because after severe lopping, many trees respond by producing lots of new shoots, called epicormic shoots. You may have seen these growing after fires. Epicormic shoots can be weakly attached to the trunk or larger branches of the tree in their early years and, if they're not managed properly, the heavier shoots can shed substantially."[18]

Trees are valuable infrastructure, both in private yards and public places. The huge benefits that our large trees provide us far outweigh the annoyance of cleaning up leaves and other tree droppings, clearing blocked drains and fixing cracked paths.[19]

Trees are so messy, I don't want them in my garden.

Summary

The benefits of being surrounded by trees at home far outweigh the work required to clean up messy leaves from the garden and the gutters. Local Councils may be able to provide assistance to the home occupier.

Myth-busting

Yes, trees–and all garden plants–can be messy. The home occupier needs to rack leaves, trim and generally keep trees healthy and thriving and this does require some work. But the benefits of trees to the home occupier and home owner are enormous. Some of the health and economic benefits are listed under the "not in my backyard" myth elsewhere in this document.

A Call to Action: Protecting Adelaide's Tree Canopy recognises that trees on private land provide benefits to the local community, yet it is homeowner that bear the responsibility and cost of tree

[18] Moore, Gregory, "Dodgy tree loppers are scamming elderly homeowners and hacking up healthy trees. Here's what you need to know.", *The Conversation*, August 3, 2021, assessed at https://theconversation.com/dodgy-tree-loppers-are-scamming-elderly-homeowners-and-hacking-up-healthy-trees-heres-what-you-need-to-know-164629?utm_medium=email&utm_campaign=Latest%20from%20The%20Conversation%20for%20August%203%202021%20-%202019819851&utm_content=Latest%20from%20The%20Conversation%20for%20August%203%202021%20-%202019819851+CID_0cf0d505711448e47938d61952aed00d&utm_source=campaign_monitor&utm_term=Dodgy%20tree%20loppers%20are%20scamming%20elderly%20homeowners%20and%20hacking%20up%20healthy%20trees%20Heres%20what%20you%20need%20to%20know

[19] Moore, ibid

maintenance. It calls for government financial assistance for homeowners to maintain their trees by spreading the cost across the community.[20]

Most local Councils offer rate payers assistance with basic garden maintenance, such as raking up leaves and cleaning gutters. Councils have recognised the importance of trees on private land and may be able to assist with other tasks, such as pruning, to support home owners in retaining their trees.

Tree roots are invasive, especially eucalyptus trees, and I don't want them to damage my home.

Summary

There is no denying that roots of any trees can get into drains and under buildings in search of water and nutrients, but there are so many mitigations for this that it is an unsustainable argument that trees have no place near dwellings. We know we need trees on private property, so why are we not designing dwellings and other buildings around tree needs?

Myth-busting

There is no denying that roots of any trees can get into drains and under buildings in search of water and nutrients, but there are so many mitigations for this that it is an unsustainable argument that trees have no place near dwellings.

Dean Nicolle, a South Australian arborist, writes: "… the roots of many trees, including many eucalypts, are opportunistic. Opportunistic roots grow along lines of least resistance … A utility trench filled with sand is often the line of less resistance for opportunistic roots. A leaky sewer pipe is a point of concentrated resources (water and nutrients), and thus roots will grow there. If roots are entering a pipe, it means that there is already a fault causing a leak in the pipe.'[21]

PVC pipes are the most common form of sewer pipes in South Australia and they form a physical barrier to tree roots. Similarly, concrete foundations form a physical barrier that protects dwellings. Another mitigation is installing water wells or equivalent around trees so that tree roots seek water from the stored water rather than having to search under buildings. Root barriers, installed at the time of tree planting, have been successful in protecting infrastructure like water and sewer pipes and street gutters.

We know we need trees on private property, so why are we not designing dwellings and other buildings around needs of trees?

It's my backyard, so I can remove trees from it if I want to.

Summary

Trees in home gardens directly benefit home owners and those living in the home. Trees on private land contribute to the greater good of the community. Rather than taking steps to remove a tree, calculate the benefits to you and your community of retaining trees on your property.

Myth-busting

[20] *A Call to Action: Protecting Adelaide's Tree Canopy*, Conservation Council of South Australia, 2021, accessed at https://www.conservationsa.org.au/trees

[21] Nicolle, Dean, *Remember the Wild*, Currency Creek Arboretum South Australia, accessed at https://www.rememberthewild.org.au/eucalypt-mythbusting-a-comprehensive-guide/#sub-head-2,

Trees offer so many benefits to the individual home owner. Gregory Moore lists some of the many benefits that trees provide in the home garden including the following[22]

- Shade can reduce roof temperatures by up to 8°C which cools the house in summer and reduces air conditioner use and electricity consumption
- Vegetation cools the area around houses and saves on water and electricity consumption
- A mixed planting of trees and evergreen shrubs with a high leaf area index can reduce noise levels
- Trees can reduce storm wind speeds reducing the damage to roofs and other structures during storms
- Trees humidify air which can help reduce the effects of hayfever and asthma and other respiratory ailments
- The shade from trees protects children and adults from harmful radiation, reducing the risks of sunburn, skin cancer and melanoma
- The shade provided by trees lowers water evaporation from the soil saving water and helping to reduce the urban heat island effect
- Trees remove airborne pollutants which helps keep levels lower and reduces health risks
- Green and leafy suburbs tend to have lower rates of vandalism, violence and graffiti
- Green and leafy suburbs, especially those with tree-lined streets, have a higher property values and so add to a property owners capital value
- Trees contribute to the aesthetics of the landscape, providing screens for unsightly aspects of the urban landscape, adding to real estate value.

As well as direct benefits to the home owner, trees on private land contribute to the greater good of the community. We all have a part to play in this by retaining, maintaining and planting trees.

Local Councils recognise the decline in trees in home gardens and are seeking ways to reverse this. For example, the City of Unley has a strategy to increase the tree canopy in the City of Unley but recognises that it can only achieve this with trees on private land. In its *Tree Strategy*, it states:

> The City of Unley has been losing tree cover across private land at an increasing rate since 1997. Since private land represents 80% of the total area, this is of significant concern to future neighbourhood character and urban heat impact. Overall tree canopy cover is declining, with the removal of trees on private land being a key driver of this trend. If this trend continues, there will be a reduced ability for the Council to build neighbourhood resilience to the effects of climate change, particularly with projected rates of ongoing urban infill.[23]

[22] Moore, GM, "Defending and Expanding the Urban Forest: Opposing Unnecessary Tree Removal Requests", page 74, *The 15th National Street Tree Symposium*, Treenet, 2014, accessed at https://treenet.org/resources/defending-and-expanding-the-urban-forest-opposing-unnecessary-tree-removal-requests/

[23] The City of Unley, *Tree Strategy: Keeping Unley Leafy for Future Generations*, May 2020

Trees need to be removed to prevent bushfires.

Summary

Studies are starting to show that trees are needed as one of the strategies to protect the landscape and homes from bushfires. The *Royal Commission into National Natural Disaster Arrangements* reported a multitude of reasons for the devastating 2019/2020 bushfires, but does not lay the blame on trees. It suggests a range of land management practices and removing trees is not one of them. Scientists are exploring if trees are part of the solution for protecting the landscape and homes from bushfires. These include using "green firebreaks", strips of low-flammable plants, along property boundaries, as well as fire-smart gardens of low-flammable plants in bushfire prone areas. Both are used as screens against embers spreading fire.

Myth-busting

Studies are starting to show that contrary to this view that trees need to be removed to prevent bushfires, trees are needed as one of the strategies to protect the landscape and homes from bushfires.

A devastating 6,336,000 hectares of native forest, or 6.3% of the total of southern and eastern Australia's native forest was affected by the 2019/2020 bushfires.[24]

The Royal Commission into National Natural Disaster Arrangements reported a multitude of reasons for the devastating 2019/2020 bushfires, but did not lay the blame on trees.

The Royal Commission report states: "… fire burned through millions of hectares of land, variously reported as between 24 and 40 million hectares …" As well as the devastation to human life, property and livelihood, the Royal Commission reports: "It is estimated that nearly 3 billion animals were killed or displaced by the bushfires, and many threatened species and other ecological communities were extensively damaged."[25] It states that the Australia's 2019/2020 bushfires "… started in Australia's hottest and driest year on record. Much of the country that later burned had been in drought since January 2018. The Forest Fire Danger Index in 2019 was the highest since national records began." and "… [this] season set a new benchmark for an extreme fire season in Australia's temperate forests.'

Three of its observations are pertinent:

- "Land management can reduce some aspects of natural disaster risk (eg, through vegetation fuel management). However, the effectiveness of land management depends in turn on a range of factors, particularly weather. There are also a number of constraints that limit the extent of, and opportunities for, land management, including cost, community awareness, regulatory settings, and the shortening of seasonal windows."
- "There is a strong interest in, and views on, prescribed burning as a bushfire hazard reduction activity. Other activities include mechanical clearing—such as slashing, thinning and mowing—and grazing by animals. All these activities can play an important role in ameliorating bushfire behaviour and increase the potential for suppression. However, these activities will not eliminate bushfire risk."

[24] Department of Agriculture, Water and the Environment (ABARES), *Forest Fire Data: Forest fire area data for the 2019-20 summer bushfire season in southern and eastern Australia*, accessed at https://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/fire-data#area-of-native-forest-in-fire-area-by-forest-tenure-and-jurisdiction December 2020

[25] Royal Commission into National Natural Disaster Arrangements, *Interim Observations*, August 2020, accessed at https://naturaldisaster.royalcommission.gov.au/publications/interim-observations-31-august-2020

- "We have observed the interconnected nature and cultural and environmental significance of Indigenous land management practices in Australia, including traditional fire management. … There is a place for Indigenous land and fire management practices to be integrated into the planning and execution of public land management activities across Australia."

Scientists are exploring if trees are part of the solution to protecting the landscape and homes from bushfires. Curran, Perry and Wyse suggest green firebreaks, particularly in less extreme fire conditions. They state: "One approach to reducing wildfire spread is to plant 'green firebreaks'—strips of vegetation made up of plants with low flammability. Green firebreaks are based on the idea that this less flammable vegetation will extinguish a fire, or embers spotting ahead of a fire front".[26]

Curran et al extend this to home gardens: "The planting of low-flammability species in gardens and on property boundaries has been advocated in many parts of the world, including Australia, New Zealand, the United States and Europe." Low-flammable plants have particular traits such as higher moisture content in leaves so they advocate keeping plants well-watered in bushfire season. These authors also make the point that trees need to be maintained: "Some plants retain dead leaves and branches that provide ready fuel during a fire. Therefore, pruning dead limbs is a good way to reduce fire risk around your home".[27]

Moore, an academic botanist, goes further by advocating for making plants part of individual bushfire plans; low-flammability plants may be a strategy to help homes survive bushfires. He states:

> "It's important to have a fire-smart garden. It might seem counter-intuitive to plant trees around the house to fortify your fire defences, but some plants actually help reduce the spread of fire—through their less flammable leaves and summer green foliage—and screen your house from embers. Depending on where you live, suitable trees to plant include crepe myrtle, the hybrid flame tree, Persian ironwood, some fruit trees and even some native eucalypts.[28]

But he does add some provisos:

> "If you're in a bushfire-prone area, landscape your garden by strategically planting trees, making sure their canopies don't overhang the house. Also ensure shrubs do not grow under trees, as they might feed fire up into the canopy. And in bad fire conditions, rake your garden to put distance between fuel and your home."[29]

Eucalyptus trees are highly flammable and fuel bushfires.

Summary

There is no doubt that dried tree litter provides fuel for fires, but not the trees themselves. The flammability of plants is related to its moisture content, particularly its leaves. Moisture content

[26] Curran, Tim, Perry, George and Wyse, Sarah, "Low flammability plants could help our homes survive bushfires", *The Conversation*, February 26, 2016, accessed at https://theconversation.com/low-flammability-plants-could-help-our-homes-survive-bushfires-53870

[27] Curran, Tim, Perry, George and Wyse, Sarah, ibid

[28] Moore, Gregory, "Here are 5 practical ways trees can help us survive climate change", *The Conversation*, February 19, 2020, accessed at https://theconversation.com/here-are-5-practical-ways-trees-can-help-us-survive-climate-change-129753

[29] Moore, ibid

tends to be lower in the summer heat (a good reason to keep our trees watered). But there is no evidence that eucalypts are more flammable than other trees.

Myth-busting

There is no doubt that dried tree litter provides fuel for fires, but not the trees themselves. The flammability of plants is related to its moisture content, particularly its leaves. Moisture content tends to be lower in the summer heat (a good reason to keep our trees watered). But there is no evidence that eucalypts are more flammable than other trees. The flammability of eucalypts is explained by Dean Nicolle, a South Australian arborist, as follows.

> "More than anything else, the flammability of plant material is correlated to its 'thinness' (surface area to volume ratio) and its moisture content. In the heat of summer under drought conditions, all plant material will be drier than otherwise. In these conditions, the 'thin' parts of eucalypts and other trees, such as the twigs, leaves and loose bark, become more flammable as they dry out. This phenomenon has significantly complicated the research into the flammability of different tree species. … It is worth noting that in the bulk of the areas burnt in the recent eastern Australia bushfires, the eucalypt canopy leaves showed evidence of having browned and died from heat, but not having caught fire when the understorey vegetation burned. Most live foliage of any species can burn when engulfed by a flame from below or exposed to its super-heated gases above 500–600°C. The heat evaporates moisture from the leaf and ignites the foliage. The 1–2% of oil present in the foliage of many eucalypts adds very little to flammability or flame size."[30]

Eucalyptus trees spontaneously combust and fuel bush fires.

Summary

The evidence does not support this myth. Fireballs do occur in bushfires, but this can occur in any type of tree. The eucalyptus is more prevalent in our rural landscape so it is easy to lay the blame on it.

Myth-busting

The evidence does not support this myth. This is explained by Dean Nicolle, a South Australian arborist, as follows.

> "There is no evidence of this ever occurring. Nor is there even any evidence of Eucalyptus oil-filled air exploding on a hot day when exposed to a spark or flame. Within the treetops the fuel-air ratio is only ever a fraction of what is required for the volatile gases to explode. Pyrolysis (the thermal decomposition of plant material into flammable gases) begins at 300°C when volatile gases evaporate and collect in high concentration at the surface of fuel such as leaves or bark. Such a scenario would only occur as a result of a nearby fire."
>
> "'Fire balls' can occur in wildfires, but this is not a phenomenon unique to eucalypt forests. Areas of volatile gases can form above rapidly heated fuel in a wildfire. If these areas of volatile gases become ignited, the flame rises at a few metres per second. Carried by a wind gust, these ignited gases can be seen as a small fire ball through the sky, lasting less than a second and travelling less than a few metres. These fire balls are sometimes seen in intense wildfires burning under optimum fire conditions, with high air flow and high temperatures. In Australia, this is typically vegetation dominated by eucalypts, but

[30] Nicolle, Dean, op cit

elsewhere it is commonly seen in vegetation dominated by pine and cypress species, such as in recent fires in California, Spain and Greece. We also saw this in the 2003 Canberra bushfires, involving pine plantations 'exploding' on the outskirts of the city."[31]

Trees take so long to grow, so why bother.

Summary

Large broad-canopied trees that contribute so much to the environment do take a long time to mature. But we need to invest in our future by planting them, particularly on our streets and other public land. We can get tree canopy much faster by choosing fast-growing trees, but these fast-growing trees also tend to have a shorter life span. Planting them as a pioneer species, interspersed with slower-growing longer-living trees, is a strategy to building our tree canopy. Because our valuable trees take so long to reach maturity, it is one of the reasons why we should be protecting our existing trees from destruction for housing and road development.

Myth-busting

Large broad-canopied trees that contribute so much to the environment do take a long time to mature. But we need to invest in our future by planting them, particularly on our streets and other public land.

Tree canopy can be achieved more quickly by choosing fast growing trees. The Golden Wattle, endemic to the Adelaide Plains, is a great example of this. But fast-growing trees also tend to have a shorter life span. Planting them as a pioneer species, interspersed with slower-growing longer-living trees, is a strategy to build tree canopy. More densely planting trees is another strategy to more quickly green urban spaces, but there needs to be a preparedness to remove some of them as the trees mature. An academic writes: "It may take 50 years or more to reach their mature size and full value. So to get quick benefits, trees are 'over-planted', with many small tree canopies adding together for a significant overall effect. But this eventually leads to competition between the trees, which reduces their value, and so trees are then periodically thinned out. Such thinning is often not appreciated".[32]

Because trees take so long to reach maturity, it is one of the reasons why we should be protecting our existing trees from destruction for housing and road development.

Trees have to be removed to enable generation of electricity from my solar panels.

Summary

Removing trees to expose solar panels to unshaded sunlight with the expectation of increased solar generation is likely to have the unexpected outcome of increasing electricity usage and negate the extra generation. The cooling effect of trees reduces the need for air conditioning and therefore electricity. Furthermore, technological improvements mean that modern solar panels can tolerate some shade.

Myth-busting

Removing trees to expose solar panels to unshaded sunlight with the expectation of increased solar generation is likely to have the unexpected outcome of increasing electricity usage and negating the extra generation. This is because the cooling effect of trees reduces the need for air

[31] Nicolle, Dean, ibid

[32] Black, Cris, Australian National University, "Our cities need more trees, but that means being prepared to cut some down", *The Conversation*, 3 February, 2016, accessed at Our cities need more trees, but that means being prepared to cut some down (theconversation.com)

conditioning and therefore electricity. Furthermore, technological improvements mean that solar panels can tolerate some shade. In countering the demand for unnecessary tree removal, Gregory Moore from the University of Melbourne, states:

> "There are … a growing number of demands for tree removal based upon solar access for solar panels and the assumption that any shade from trees reduces generation capacity and so costs the owner of the solar panels. The Office of the Commissioner for Sustainability and the Environment, Canberra (2011) report on the Canberra urban forest found that there could be some loss of solar efficiency when panels were shaded by trees. However, the situation proved to be somewhat more complex than the simple assumption that shade costs might imply. Modern solar panels are much more efficient than early generation models and so are more efficient with some level of shade. Furthermore, while there may be some loss of electricity generation capacity, this has to be considered in light of the cooling effect of the shade provided by trees in summer with the likelihood of lower electricity use for cooling. In short the loss of generation capacity due to shade may be offset by the cooling effect of shade in summer. The removal of a tree, or trees, to provide solar access for panels could be to the economic detriment of the home owner if they have air conditioning and use it over summer."[33]

Introduced tree species don't make good street trees.

Summary

Some of the introduced species planted as street trees in Adelaide in the 19th and 20th centuries, form so much part of the heritage of our cityscape and have stood the test of time. They are hardy in our climate and provide broad tree canopies for decades. Trees like the Jacaranda, the London Plane and White Cedar, which are starting to fall out of favour with town planners, definitely still have a place on our streets and on public and private land.

Myth-busting

Our heritage trees are falling out of favour but for not good reason. The much-loved Jacaranda in Adelaide is an introduced species and widely planted around the world. Gregory Moore, an academic botanist, writes: "This is because, despite being a little frost sensitive, the tree is quite hardy when it's young and copes with a wide range of soil and climatic conditions. And in hot climates, the trees provide an appealing, dappled shade …" He argues that despite some downsides (such as brittleness that is vulnerable to damage in high winds and a strong root system that outcompetes local species), Jacaranda mimosifolia in urban Australia is one of the species likely to do well under climate change as it grows well in warmer and drier places.'[34]

The white cedar (Melia azedarach*),* also a popular Adelaide street tree, is a winter deciduous native to Queensland and northern New South Wales. Gregory Moore writes: "… under the

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[33] Moore, GM, "Defending and Expanding the Urban Forest: Opposing Unnecessary Tree Removal Requests", page 74, *The 15th National Street Tree Symposium*, Treenet, 2014, accessed at https://treenet.org/resources/defending-and-expanding-the-urban-forest-opposing-unnecessary-tree-removal-requests/

[34] Moore, Gregory, University of Melbourne, "Why there's a lot more to love about jacarandas than just their purple flowers", *The Conversation*, 2 December 2020, accessed at https://theconversation.com/why-theres-a-lot-more-to-love-about-jacarandas-than-just-their-purple-flowers-150851?utm_medium=email&utm_campaign=Latest%20from%20The%20Conversation%20for%20December%202%202020%20-%201800017478&utm_content=Latest%20from%20The%20Conversation%20for%20December%202%202020%20-%201800017478+CID_affbd306ae708ff9c6776c4dbafa44f0&utm_source=campaign_monitor&utm_term=Why%20theres%20a%20lot%20more%20to%20love%20about%20jacarandas%20than%20just%20their%20purple%20flowers

right conditions trees can be more than 20 m tall, with a canopy spread of 10 m or more." "Winter deciduous trees are highly valued in landscape design as they provide all the benefits of summer shade, but allow winter light." … "One of the good things about white cedar is they are easily grown, and cope quite well with the low rainfall in many parts of Australia. They also tolerate a variety of soil types, which is why they have been so widely and successfully spread."[35]

[35] Moore, Gregory, University of Melbourne, "White cedar is a rare bird,: a winter deciduous Australian tree", *The Conversation*, 28 June 2019, accessed at https://theconversation.com/white-cedar-is-a-rare-bird-a-winter-deciduous-australian-tree-118837