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Your vegetation – what you need to know

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Chair

I'd like to welcome Justin Leonard, Justin has had some fantastic feedback for his presentations and I'm sure this will be equally as good. Thanks Justin.

Justin Leonard

Thanks Malcolm. I've got the job of following the very articulate Kevin Tolhurst and to reinforce some of those ideas and learnings through an approach of exploring some of those myths and misconceptions around bushfire vegetation. Let's run through a small set of those myths and misconceptions so we can re-explore and reinforce those ideas about the role of vegetation in the bushfire events that really threaten us.

The first myth - the speed of a fire is best slowed by reducing tall vegetation like trees.

The reverse is actually true in this case. Trees offer quite a lot of wind attenuation and reducing the wind attenuation on those surface and near-surface fuels that Kevin was describing in detail, actually slow the fire through those surface and near-surface fuels. Fires will actually travel slower through the surface fuels of a heavily wooded forest than they would through an open grassland. You actually see higher speed fires through open areas - open grassland areas, than we would in forests. And I guess woodlands are in the middle.

Trees certainly help to actually slow the fire rather than how it could otherwise go in the same weather conditions. And I guess slowing and abating or blocking those fire actions as they emerge from large areas of fuel is certainly highly beneficial. It's great to use the idea of strategic trees and planting around houses, those winds that drive the fires are also winds that can act on your house and weaken the house or increase its likelihood of being ignited or lost.

Myth number two - buildings not directly near bushfires are relatively safe.

This certainly isn't the case. And what we find is houses are readily lost many hundreds of metres from where you would call the perimeter of a formal bushfire. And that's because of those actions that Kevin described like embers reaching into those urban areas. And they can reach in hundreds of metres. But it's also surface fires or those surface fuels where fires track through the urban environments finding those surface fuels and those surface fuels then interacting with the structures themselves. Now we don't call that a bushfire front. The bushfire front finishes in the continuous vegetation but it's actions play out in urban environments in really interesting ways.

Houses many hundreds of metres from where you would say is a defined bushfire prone area are certainly at risk because of the ember and surface fire actions. And of course the drier and drier the landscape becomes the more potentially active those surface fuels and the continuity of those surface fuels in those urban environments become. As we prime the environment to be really suitable for carrying significant fires through it, those same actions prime the urban interface to be able to carry those low-level surface fires through and around them. Which means it's down to the detailing immediately around the house. They are only small fires but when those small fires can get close to and contact those combustible elements around your house you've got problems. And then of course houses burn other houses down. And I guess typically the statistics are showing that loss up around the 500-700m in the upper limits is the distances we find loss tapering off as a function of distance from bushfires.

Myth number three - leaves are the main source of embers.

I guess Kevin pretty much articulated the right answer to this myth. Leaves can play a small role in being an ember or an ember source, but in fact, the vast majority of embers are generated by bark and that bark could be still attached to the trees themselves. That might be bark that's also fallen on the ground and been reactivated. And it could be even bark there's been deliberately brought in and used as ground mulch, they're great ways of sourcing embers. But I guess the bark on the trees is particularly problematic because it's up in the wind fields where they're relatively easy to pick up and carry. And of course, those embers can reach out to other bark on other trees and embers play obviously a key role in both direct ignition of elements in an urban environment and in helping propagate the fire over those gaps that Kevin described.

It is worth pointing out that as this bark burns you might notice that after a fire a lot of this bark is burnt off many of the trees. And the picture on the front of the fire hazard guide shows all of the trees where all the bark is burning on those trees. Now the intensity of flame from just that bark continuity isn't enough to activate the crowns in the trees. You need much more continuity, shrubs and elevated fuels to do that. The bark itself doesn't carry flames into the canopy and activate the canopy. But as I said bark is a fantastic source of embers and quite a persistent one both during the fire front event and for many minutes and possibly hours after the fires passed. The winds continue to carry and activate those bark and the ember storms can be very persistent long after the fire front’s passed.

Myth number four - embers only arrived from the direction of the prevailing winds.

If anyone's had to endure a real ember storm in one of these worst scenario days they would describe many wind directions and even multiple fire fronts events arriving and that's because the winds, both the prevailing winds can involve wind changes and wind shifts, but the fire front itself also is a strong interactor with those winds and the complex of vegetation and building terrain that the wind’s flowing over and swirling around, really trains the wind into really complex directions. And I guess the endless track through all those swirls can blow in so many different and complex ways and find really interesting places to land and find lots of nooks and crannies to activate into small flames and they act on your house.

And in fact, in a lot of our studies we've actually found that ember attack on structures is often more prevalent on the leeward side, the downwind side of houses, than it is on the windward side. The winds are blowing the embers over and they're tracking and being drawn into a vortex on the other side of the house. And it's in that area where they can settle and be quite effective at igniting the house and the house actually burns from the non-fire side back through towards the side that the fire approached which is also the side of the prevailing winds. So please think of embers in the way they might approach or impact your house as multi-directional.

Myth number five - mulch spread under shrubs helps reduce weeds and bushfire risk

Mulch itself represents a very high fuel load in itself and is particularly problematic to houses because it can burn quite aggressively but it also can burn for quite a long time. The total heat load over a timeframe from just a mulch bed on its own is a high risk to even well-designed and built compliant houses.

I guess this picture is a really pertinent example where it was a relatively newly built house up in the Sydney region. It was built to BAL-29, non-combustible wall fascias and it's such a new build that they hadn't even started to plant out the gardens, but they had put down a mulch bark layer to obviously stabilize the soil. That burned in this fire event without any other heat sources on this face of the house and while it wasn't quite enough to break the toughened glass windows. If the these were plain glass windows that would have broken for sure. But they were enough to melt the plastic blinds behind the windows. So, it was one of those preserved examples of where the radiant heat on these windows would have been upwards of15kW/m^2 which is the relative threshold that you would easily break plain glass but somewhere less than 40kW/m^2 that would break the toughened glass windows.

Mulch on its own let alone mulch working with problematic plants is really worth understanding and addressing and certainly something that you shouldn't put up against a building.

Myth number six - Australia's bushfires are so severe that there's not a lot we can do to prepare or respond to.

I guess time and time again I go out and study the context of how things are lost in bushfire events. And probably one of the most profound statistics we keep coming back to is that well over 90% of the houses that we find are lost in bushfires didn't really experience a fire front at all.

A fire front didn't turn up, provide direct flame contact or provide sufficient radiation to have been a direct threat to the house. Which really leaves all these other processes like surface fire attack, ember storms, neighbour's houses burning other houses down, fences burning. It's all these other interactions that are actually the predominant reason why houses burned down.

It's a myth to make a presumption that these fires are in themselves so severe that it's difficult to respond because the severity of the fires aren't really the driver of why so many houses are lost in these events.

This map of Duffy, an outer suburb of Canberra, that was impacted in those iconic fires in 2004 really highlights how a fire certainly turned up and a surface fire turned up too, but the benefit from this large road barrier which was sufficient to prevent any real direct interaction from a fire front from the other side of the road. And in fact, many of the streetscape pictures really showed relatively unaffected plants in the front yards of these houses on the fire side. So they were like an indicator that the radiation and flames weren't really an action that came across these roads. But what did come across was an aggressive ember storm and that created lots of surface fires and the suburbs were in an extreme state of drought when that fire turned up, so the gardens were desiccated. And there was so much available fine surface fuels and some elevated fuels represented by the managed gardens around these houses and lots of combustible elements on the houses and fences etc. They really caused the urban fire processes that led to these losses and I guess the clumping of these losses do highlight how structure and structures do burn each other down as well.

Myth number seven - if you leave early and you're fully insured then there's really no need to tackle this challenge around reducing fuels.

The real take-home for this myth is there's so many people with well-intentioned plans to leave early under all circumstances that a fire might turn up and threaten them or their house, and they are at their house when the fire turns up.

And the people who leave at that time or try to leave in the last moment are a mix of people that had every intention to leave early and also a mix of people that didn't have fire plans and didn't really have an intention.

But the intention doesn't mean that's how it's definitely going to play out and I guess this graph which you may have seen in some of my previous presentations which is really representative of I guess all the fatalities over most of our iconic fires in the past from 0 to 100% of fatalities that have occurred outside. Over 60% of those fatalities that occur outside were less than 100m from their own house. So, it really focuses the context on people that are either fleeing their house, trying to get back to their house, or defending their house.

The actual amount of fuel and fuel continuity and fuel management on their property and in their immediate streetscape is a very real and imminent threat that they may need to face. And I'd strongly encourage people to really think about many layers of risk management and risk treatment and to put the priority of considering fuels on your land, along your driveway, around your house as a really key contingency for not only improving your house's survival whether you're there or not but in the event that your plan A, B and C doesn't play out the way you hoped or aspired to because every fire and every fire circumstance throws a tonne of curveballs and we need these contingencies to ensure we're all safe in future fires.