Bushfire Resilience Inc. Webinar 4 2024. Presentation 1

Understanding our changing bushfire weather

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Malcolm

Welcome to the fourth webinar of our 2024 series. Understanding Our Changing Bushfire Weather.

I know from first hand experience Understand your weather Know your risk. It's a fact.

Tonight we have three expert presenters. Kevin Parkyn, Justin Leonard and Mika Peace. They are industry experts.

Following the presentations we will have a discussion and question answering session with Mika Justin and Kevin.

Our objective is to provide information to help you and explain how you will be affected.

Kevin will now provide his presentation. Thanks Kevin.

Kevin
Basically the outline of this presentation is quite short and sweet. It's about understanding your weather district, because that underpins the Fire Danger Rating, and we'll touch briefly on what that means.

Also when we're thinking about fire in the landscape there's obviously some underpinning weather elements that are really crucial to understand so I'll touch on them. They're pretty self explanatory but I'll also include some that you might not fully be appreciative of and then I'll conclude by looking at some weather information sources.

When you're travelling around the countryside you'll see Fire Danger Rating signs. They're not only representative of the fire danger rating for where you are locally but it's actually a much broader area than you probably think. It's for an entire weather district. You need to get onto the Bureau's website, look for weather districts and see which one you're in because the fire danger rating relates directly to your weather district. You can establish which weather district you're in usually by also going to your state based fire agency website. In Victoria where I'm from that's the CFA. Type in your suburb or location and it'll let you know what weather district you are in.
I've got examples of Queensland, New South Wales, in Northern Territory and South Australia. Quite large districts understandably and they're a lot smaller as you get closer to the higher population centres.

Western Australia is massive. Large weather districts. But as we get closer to the Southwest there are quite a number of weather districts.

And of course Victoria and Tasmania.
The fire danger rating relates to that weather district. I want to spend just a few moments by touching on an example that you can then use for any weather district you're in. For instance if we

think about the Central District in Victoria. It extends from Aireys Inlet in the Otways to the Macedon Ranges in the north, the Mornington Peninsula, down to Wonthaggi all the way up into the Yarra Valley. That entire district is represented by one fire danger rating no matter where you travel in that district.

I want you to take away this message. When a fire danger rating is determined it's usually done in a conservative manner by looking at the most fire prone area in that entire district wherever that is. Often in the Central District it is Western Melbourne where the basalt plains are quite dry. Could be very very different from how things are faring obviously in the Dandenong Ranges. The risk definitely changes across the district. The approach is very conservative looking for anywhere in the district where there's an increased risk of fire and that will determine the rating for the entire district.

Let's look at fire danger ratings. I know you're probably pretty familiar with them. I'm a real supporter of the simplification of the fire danger rating system to four categories. Moderate, High, Extreme and Catastrophic.

It basically gives you a heads up of how dangerous a fire is based on that category.

Of course this is really important. We don't want to over complicate the message to the community.

The fire agency is very clear in the actions you need to take based on that rating. What you need to know is what weather district you're in and you can access that information on the Bureau's website, your fire agency website and through various media outlets.

The beauty is the ratings are the same no matter what jurisdiction you go to across the country so that's quite comforting. A fire danger rating of high is the same whether it's in the Northern Territory or in Western Australia.

The question I often get asked is how is the fire danger rating determined? The fire agencies across the country basically work with the Bureau of Meteorology in determining what's called the underpinning Fire Behaviour Index (FBI) value for each weather district. You can see there the ratings down the bottom and what we call the FBI values at the top which normally the community wouldn't be aware of. These values are really important for the fire agencies to set their resources and their preparedness levels. Gives them a bit of an idea of fire behaviour. As you can see there this information's available on the AFAC website which basically says this FBI value is basically a high level concept that unites a whole heap of potential fire behaviour characteristics from fire behaviour models based on a number of vegetation types.

That's where the real lift has been with the introduction of the Australian Fire Danger Rating System. Instead of just based on grass and forests now it's based on a number of vegetation types that are much more representative of the risk in the landscape.

The Fire Behaviour Index informs us about fire intensity, flame height, rate of spread, and spotting potential. What about weather? Obviously the Fire Behaviour Index value is not only going to be dependent on the vegetation but it's also dependent on weather variables. And some of them you will know quite intimately - temperature, Relative Humidity, wind speed, and recent rainfall. They all get fed into determining the Fire Behaviour Index which then as you saw gets turned into a fire danger rating that everyone can understand.

I often get asked in various weather forums is what sort of numbers should I be paying attention to in the weather forecast? And you may have heard of the 30 30 30 rule. It's universal. Whether you're in Spain or in the United States. It's quite common to just put this in your head and it's a good guide as to whether fire behaviour could be more extreme or difficult to control.

Above a temperature of 30 degrees, wind speeds above 30 km/hr and relative humidity below 30%. Quite often in Australia we think relative humidity below 20%. It's when some of the vegetation can get quite crispy because the atmosphere is quite dry.

Two aspects of fire weather I need to share with you. One relates to obviously the wind but wind changes in particular. Really important to have a full appreciation that the stronger the winds are the greater the risk that fires will spread and not be able to be controlled by the fire agencies. Very large air tankers come to Australia from the USA to help suppress fires. In fact they struggle to get off the ground if the winds are too strong. Once we've got wind in the landscape the fire behaviour escalates significantly and it escalates even more if we have a wind change.

In southern Australia that could be a trough or a cold front. Some of the most devastating fires that have affected Southern and South eastern Australia have been associated with wind changes but that could manifest as a trough for a sea breeze change that occurs along the eastern seaboard that pushes in land and moves across a fire.

Any wind change is likely to exacerbate fire behaviour. There's a nice little graphic available on the Bureau's website. It is a good educational tool that shows how fire can move in one direction quite predictable. But as soon as a wind change comes in and affects that fire the whole flank of a fire can turn into the fire front very rapidly.

The second aspect of weather beyond temperature, relative humidity and wind is something called pyrocumulonimbus. The takeaway message is it's a fire that basically generates its own lightning. I know it's hard to imagine that something so hot and ferocious can actually generate ice crystals in the upper atmosphere but this is exactly what's going on. Incredibly dangerous if they do develop and difficult to get a full appreciation of what might be happening at the surface particularly if you're under the actual pyrocumulonimbus itself.

There's a few things going on in terms of air being sucked into the fire plume generating its own cloud. There's aspects like downbursts and lightning generating further fire activity. Basically pyrocumulonimbus creates very erratic fire behaviour that is difficult to understand and make predictions on. And so the takeaway message there is if a fire generates its own thunderstorm we'll be looking at fire intensity increasing, erratic fire behaviour reducing the predictability of fires in the landscape and how they move.

In terms of where to access weather information for your fire. Obviously the Bureau's website has some useful tools. The MetEye platform which a number of the other weather providers use the same data. **[00:15:30]** Arguably they might even display it a bit better such as Windy and Weatherzone. Very useful websites to get detailed information about the weather.

I wanted to highlight one, the Bureau's beta website, type in beta.bom.gov.au for real time information. This is just being launched after a lot of feedback from people just like you listening to this webinar.

We might search for a location. Let's say Arthur's Creek northeast of Melbourne.

And like the Bureau's weather app it provides hourly information out for several days. If I click Show All not only do you get your temperature you'll also get humidity as well. So a very useful tool where you can get a nice timeline of weather variables out for several days.

What about mobile apps? Yes, brilliant. I love them. When I was in Europe recently I was using a mobile app to keep a check of the weather. Of course it does mean you need to be connected to 4G and you are reliant on that network working if there is a bushfire. My advice is be confident. Know what the weather app is you're using and how to access the information that you need to access and not be scrambling around in the moment when there's fire in the landscape. This presentation will be available following the webinar and the websites I've accessed for most of the information in this presentation.

Malcolm
Thanks Kevin.