

Scorching Hot!

Working together to make our community safer

**ARE YOU
BUSHFIRE
READY?**

Bushfire Articles – ‘It starts with a spark’

Starting with a spark, bushfires can grow into deadly infernos in a matter of minutes. While they are a natural part of the Australian landscape, and have been for tens of thousands of years, their complex nature is at times astounding. Scorching hot, fast spreading, and able to kill you in many ways, fire is formidable and difficult to predict under all circumstances due to their chaotic nature. Dr Andrew Sullivan has over 25 years’ experience in bushfire research and said in the most basic sense bushfires are just science. “A bushfire is really a complex combination of highly chaotic chemical reactions,” Dr Sullivan said. Add to this factors like wind speed, type of vegetation and temperature and you’ve got yourself a violent and deadly cocktail called a bushfire.

‘Fire is no slow coach’

SPEED Fire is no slow coach. Dr Andrew Sullivan, Leader of the CSIRO Bushfire Behaviour and Risks team, said the maximum reliably recorded speed of a bushfire is 27 kilometres per hour burning in grass, recorded by a farmer in the Riverina in New South Wales in 1987. “But there have been undocumented reports of grass fires travelling in excess of 30 kilometres per hour.” Vegetation, whether it is eucalyptus forest or grassland, also plays a role in how fast a fire will move.

‘Fire travels faster in grass’

“Fire travels faster in grass because the fuel is [thermally] thin, burns rapidly and responds very quickly to wind in the open,” Dr Sullivan said. “This means you can get a very fast spread of fire, fanned by wind, that changes direction quickly.” By contrast, coarser fuels burn with less intensity meaning forest fires tend to be slower, with a maximum speed of around 10 kilometres per hour. This is because leaf litter and other matter on the forest floor, being thicker than grass, takes longer to heat up and ignite and does not respond as quickly to changes in weather conditions.

‘Fire moves faster uphill’

Other important factors are wind speed and topography. Fire moves faster uphill because there is less space between the flames and the new fuel to burn - for every ten degree increase in angle up a slope, a bushfire can potentially double its rate of spread. Similarly, higher wind speeds tilt flames forward, pushing the fire along at an increased rate as flames can more readily reach unburnt fuel.

HEAT Fire is so hot that it can melt metal, vaporise vegetation instantly and scorch the earth, consuming all organic matter in the soil. Inside the fire zone temperatures can reach 1600 degrees and the temperature at the base of the flames can be in the order of 1100 degrees with the tips around 600. But often it is not the flames that will kill you, it is the radiant heat coming off the fire. “Many fatalities happen well before the flames get there, it’s quite horrifying really,” Dr Sullivan said. “If you’re in an environment that’s as hot as you or hotter there’s no way for your body get rid of that excess heat.

“All it takes is for your core body temperature to increase by two degrees for heat exhaustion and heat stroke to set in, leading to unconsciousness and death.”

‘Radiant heat can Kill’

So can radiant heat kill you from two football fields away? “Most bushfires aren’t consistent in how much heat they release. But the radiant heat flux emitted from a thick bushfire flame can reach 100 kilowatts per square metre, and even 150 kilowatts from big flames” Dr Sullivan said. To give perspective, the sun at midday in summer in Australia is about one kilowatt per square metre, while glass windows will shatter at 10 and wood can ignite after a long exposure at 25. The pain threshold for most people is around two kilowatts of long exposure, and at this rate bare skin will receive second degree burns in about 40 seconds. Dr Sullivan emphasised that shielding yourself by wearing protective clothing and shoes helps, but distancing yourself from a fire is your safest bet. “When you’re close to a fire everything around you is hot, the ground smoulders and smoke and gases released by the fire can make breathing very difficult.”

'Embers can travel for miles'

FLIGHT Fires also spread by ember attack - fragments of burning tree bark or other small fuel material called firebrands that are carried by the wind ahead of the fire and spark spot fires. Relentlessly raining down like a fiery blizzard, embers are often as hot as the fire which created them and are a serious issue during bushfires. Embers can also enter through small openings, such as gaps between roof tiles, and set buildings on fire even if they are well ahead of the firefront. "During a bushfire, firebrands can get trapped in the plume of the fire, get lofted to a significant height and then fall out," Dr Sullivan said. "With the right firebrand and wind conditions they can travel astonishing distances - some of the evidence we've collected from large bushfires has shown they can travel up to 30-40 kilometres." "Gum bark for instance rolls up and forms long streamers that ignite at one end, is lofted to a very great height and travel a long way downwind. Because it's long and thin it takes a long time to burn out." Many other types of bark and twigs can travel up to five kilometres, but any type of ember can set homes on fire. In fact, ember attack is the most common cause of homes catching alight during a bushfire. "Even after fire front has passed you still have these embers flying around. A lot of the time you need to protect your house all night, even after the fire has passed, until all embers are finally extinguished," Dr Sullivan said.

'Have a five minute FIRE CHAT'

Department of Fire and Emergency Services (DFES) Deputy Commissioner Lloyd Bailey said that bushfires could happen anytime in Western Australia and that people should always be prepared. "If you see smoke or flames, act immediately to survive. Don't wait for a text message, a knock at the door or for emergency services to turn up at your house. "Have a five minute **Fire Chat** with your family about what you'll do if a bushfire threatens your life and your home. That way if a fire comes you'll have a plan which will help you take action and avoid making last minute decisions that could prove deadly." Deputy Commissioner Bailey said that people could prepare their property by clearing a 20 metre perimeter around their home, pruning trees, cutting back grass and clearing gutters. "To keep embers out install a mesh guard on your air conditioner and block any gaps under floor spaces, in the roof and under eaves."

'Are you Bushfire Ready?'

GO TO: www.emergency.wa.gov.au/prepare and complete your **Bushfire Plan TODAY**

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