

# BUSHFIRES

## 2018 MYTHBUSTING GUIDE

With Australia having just experienced its driest September on record on the back of months of above average temperatures and below average rainfall, the prospect of an active and dangerous bushfire season looms large.

Read this quick guide to make sure you can sort fact from fiction when it comes to bushfires, then get cracking on that bushfire plan.

1

**MYTH:**  
FIRE DANGER IS NOT INCREASING AS BUSHFIRES HAVE ALWAYS OCCURRED IN AUSTRALIA

**FACT:**  
BUSHFIRES HAVE OCCURRED IN THE AUSTRALIAN ENVIRONMENT FOR AT LEAST 65 MILLION YEARS (CARY ET AL. 2012). BUT SINCE ABOUT THE 1970S, BUSHFIRE ACTIVITY HAS BEEN INCREASING ACROSS MOST OF AUSTRALIA, WITH FIRE SEASONS ALSO LENGTHENING.

Climate change is loading the dice towards longer, more frequent and severe hot days and heatwaves across the whole continent, and driving decreased cool season rainfall in the south east and in southwest Western Australia, leading to increased bushfire risk. The extended bushfire season has shrunk the window for planned fuel reduction burns, leading to increased fuel loads.

2

**MYTH:**  
RAIN AND COOLER WEATHER ALWAYS REDUCE THE RISK OF BUSHFIRES

**FACT:**  
ALTHOUGH BUSHFIRES ARE MORE LIKELY TO SPREAD DURING HOT, DRY AND WINDY DAYS, RAIN CAN ENCOURAGE VEGETATION GROWTH IN THE MONTHS OR EVEN YEARS BEFORE A FIRE IS IGNITED, LEADING TO AN INCREASE OF FUEL.

Once a fire has started, a cool change accompanied by strong winds from a different direction can expand the size of a bushfire or quickly change the longer fire flanks into an intense and uncontrollable fire front. If cooler conditions are accompanied by strong rain, bushfire danger may reduce, but light rain after a prolonged period of low rainfall is usually insufficient to increase fuel and soil moisture levels or reduce bushfire risk.



**3****MYTH:  
BUSHFIRES NEVER  
AFFECT CITY-DWELLERS****FACT:  
MANY BUSHFIRES OCCUR IN AND AROUND SUBURBAN AREAS AND CAN  
EASILY CROSS BARRIERS SUCH AS ROADS, SWIMMING POOLS AND BRICK  
WALLS WHEN FIRE DANGER IS RATED AT 'VERY HIGH' OR GREATER.**

Dry housing materials, such as wood piles and gardens, can also act as a fuel source for fires. In 2003, unseasonably high temperatures and below average rainfall around Canberra led to severe bushfires. These fires spread through several suburbs destroying 503 homes, killing four people and injuring a further 490. In 1994 a bushfire tore through Como/Jannali in Sydney's south, claiming a life, while also burning dozens of homes located up to three streets back away from the bush. In the same year, bushfires destroyed 17 homes around Lane Cove National Park, about 10 km from the Sydney Central Business District. People travelling through rural areas can easily be caught in their car during a bush or grass fire, with many people killed as a result.

Bushfire smoke can seriously affect health because it contains respiratory irritants as well as inflammatory and cancer-causing chemicals. Smoke can be transported in the atmosphere many kilometres from the fire front, affecting air quality and exposing large populations to its impacts. The estimated annual health costs of bushfire smoke in Sydney are also high, at \$8.2 million per annum (2011\$) (Deloitte Access Economics 2014).

Figure 1: Thick smoke hangs over Sydney during bushfires.



4

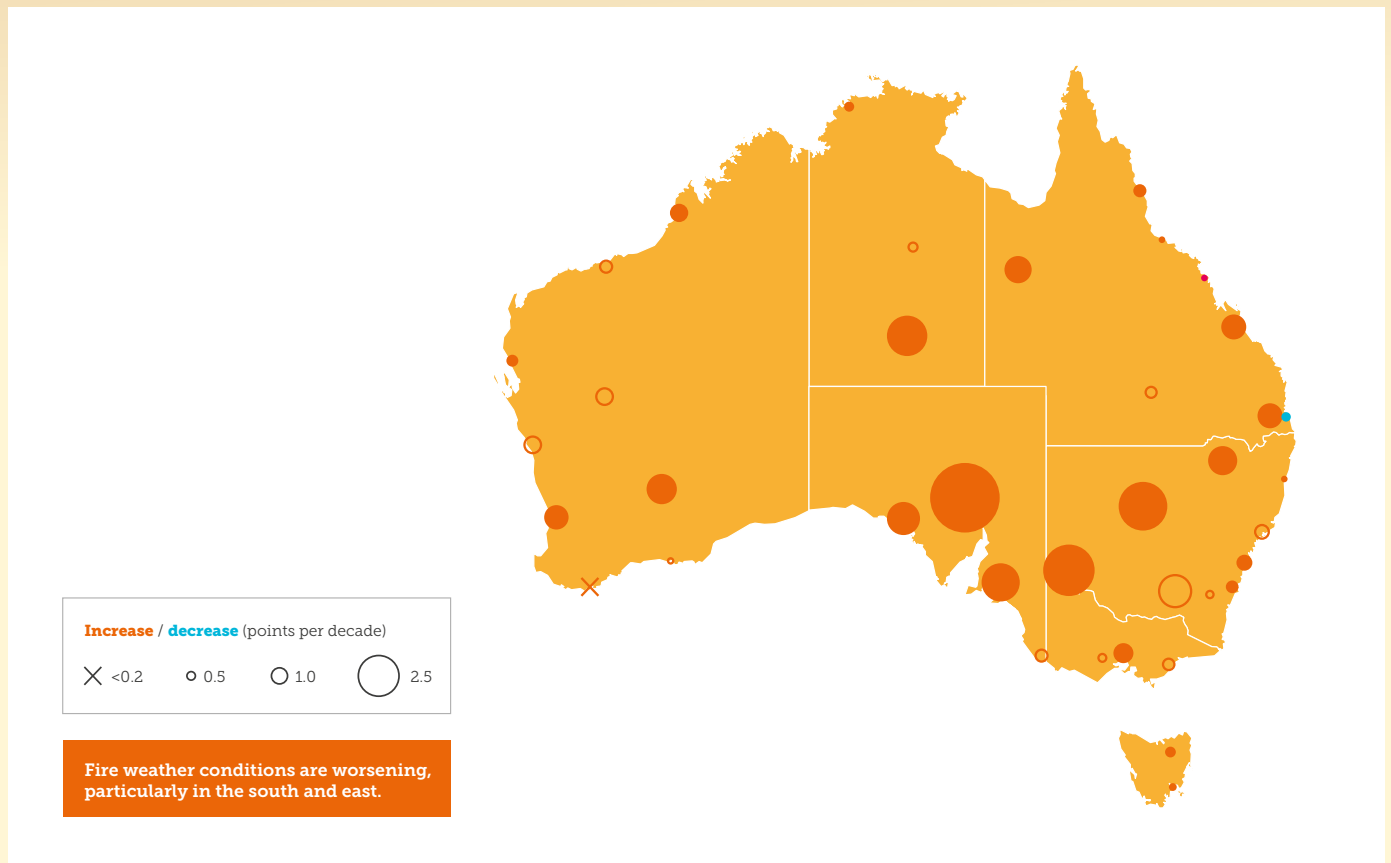
**MYTH:**  
**FIRES ONLY OCCUR  
IN SUMMER**

**FACT:**  
**DURING THE 20TH CENTURY, STATE AND TERRITORY FIRE SERVICES  
IDENTIFIED OFFICIAL "FIRE DANGER SEASONS", SOME OF WHICH ARE TODAY  
ENSHRINED IN LEGISLATION.**

In northern Australia, the typical bushfire season runs through winter and spring, and in southern Australia the season traditionally runs through spring and summer, with the southernmost areas experiencing their bushfire season in summer and autumn.

Since the 1970s it has become clear that the formerly accepted danger periods are extending significantly due to climate change (see Figure 2). Some regions of Australia, especially in the south and southeast, have already experienced a significant increase in extreme fire weather days since the 1970s, as well as longer fire seasons (CSIRO and BoM 2016). In 2018 major bushfires occurred in April, July and August in New South Wales, all of which are outside the traditional bushfire danger season. Southern Queensland experienced over 1,000 bushfires in August 2018 alone. Many local government areas in New South Wales declared early Bushfire Danger Periods in August 2018, at least two months before the commencement of the statutory bushfire season. These are not "outliers" – they are part of a sustained trend in worsening fire weather conditions. The Bushfire & Natural Hazards CRC has recently warned of the very real possibility of a "year-round fire season" (ABC 2018).

**Figure 2:** Trends from 1974 to 2015 in annual 90th percentile (top 10% of observations on record) of daily Forest Fire Danger Index (FFDI) at 38 climate reference locations. Trends are in FFDI points per decade and larger circles represent larger trends. Source: CSIRO and BoM 2016.



**5****MYTH:**  
**THERE'LL BE PLENTY OF  
WARNING BEFORE I'M IN  
DANGER****FACT:**  
**THE RATE OF FIRE SPREAD IS DEPENDENT ON A NUMBER OF FACTORS  
INCLUDING WIND SPEED, FUEL LOAD, FUEL TYPE, FUEL MOISTURE, AIR  
TEMPERATURE, HUMIDITY, TERRAIN AND SLOPE.**

The rate of fire spread in undisturbed, flat to undulating grasslands can reach more than 20 km/hr in certain conditions and up to about 12 km/hr in forest areas. Burning bark, twigs and leaves carried upwards in convection columns can cause new fires that are also known as spot fires, kilometres ahead of the main fire.

Fires travel faster uphill, as flames can more easily reach new fuel, and this effect is increased if the uphill slope is aligned with the wind direction. For every 10 degrees of uphill slope, fires travel twice as quickly.

During the Black Saturday bushfires in Victoria in February 2009, many people spoke of seeing smoke in the distance, before seeing their homes engulfed in flames just minutes later. The catastrophic Blue Mountains bushfire in 2013 also demonstrated how fast fires can spread. On the 13th October, 196 houses burned down and 146 buildings were damaged in the space of three hours. The phenomenon of pyroconvective fire activity (fire storms) is becoming more common, such as in Canberra in 2003 when tornado-like winds generated by intense fires tore mature trees out of the ground and roofs off buildings.

Having a bushfire preparation plan is extremely important. As climate change contributes to lengthened bushfire seasons and more frequent and extreme bushfire weather, these plans may need to be updated to accommodate increased risks. Relying solely upon previous fire behaviour and experience may not guarantee safety as bushfires become more intense. With lengthening fire seasons, it's also important to be prepared throughout the year.

Figure 3: House destroyed from the Black Saturday bushfires in Victoria in 2009.



**6****MYTH:**  
**ALL AUSTRALIAN NATIVE PLANTS ARE ADAPTED TO BUSHFIRES****FACT:**  
**THE ABILITY OF NATIVE PLANTS TO SURVIVE AND REPRODUCE AFTER A BUSHFIRE DEPENDS ON THE PARTICULAR SPECIES, SOIL AND LANDSCAPE, AND ALSO THE TYPES OF FIRES PREVIOUSLY EXPERIENCED IN THE AREA.**

For example, many eucalypts and wattles are fire resistant and need fire of a certain regularity and intensity to reproduce. But even “fire adapted” species can be disadvantaged or pushed to the verge of local extinction if fires are too intense, or occur too frequently for plants to mature and reproduce. Further, bushfires are now occurring in vegetation types like alpine areas and rainforests that are extremely sensitive to damage. For example, fires in January 2016 occurred in the World Heritage Area alpine vegetation of Tasmania, destroying pencil pines that were over 1,000 years old. Recovery of these areas has been slow to non-existent. The International Union for the Conservation of Nature’s Red List identifies fire as a threat to more than 100 endangered species in Australia due to direct mortality and habitat loss. Animals that survive fires may need to rely on small areas of unburnt land with reduced food supply and increased risk from predators.

Figure 4: Burnt cushion plants and alpine vegetation, Lake Mackenzie bushfire (2016), Tasmanian Wilderness World Heritage Area.



**7**

**MYTH:**  
**FIRES IN AUSTRALIA ARE  
IGNITED BY HUMANS, SO  
CLIMATE CHANGE IS NOT  
THE CAUSE**

**FACT:**  
**WORSENING LONG-TERM CLIMATIC CONDITIONS AND MORE INTENSE  
SEVERE WEATHER EVENTS MAKE FIRES MORE FREQUENT, MORE INTENSE  
AND MORE DESTRUCTIVE.**

Although many bushfires are accidentally or deliberately ignited by humans, lightning is another major cause. Lightning strikes are the most common natural ignition source for fires and were responsible for igniting the 2003 Canberra fires. A study published in May 2018 linked lightning-ignited fires to rising temperatures in the southern hemisphere (Mariani et al. 2018). Warmer ocean and air temperatures lead to higher evaporation rates and higher humidity, increasing the likelihood of lightning.

Figure 5: Lightning strikes causing bushfires in Western Australia.



**8**

**MYTH:**  
**BURNS ARE THE ONLY INJURY I CAN GET FROM A BUSHFIRE**

**FACT:**  
**BUSHFIRES GENERATE SMOKE CONSISTING OF PARTICLES OF SOOT (AEROSOLS), WHICH CONTAIN RESPIRATORY IRRITANTS AND CANCER-CAUSING CHEMICALS, ALONG WITH GASES SUCH AS CARBON MONOXIDE AND NITROGEN OXIDE.**

Inhalation of smoke and gases from bushfires can affect human health, especially in the elderly, young or those with heart or respiratory conditions. Smoke from bushfires and controlled burns can also travel long distances, exposing millions of people in major cities, leading to increased ambulance callouts and hospital admissions.

Ash, debris and aerial fire retardants (substances used to slow or stop the spread of fire) can contaminate drinking water, making it unsafe to consume. Bushfires have also been linked to mental health issues such as post-traumatic stress disorder, depression, and increased substance usage due to displacement, distress and disruption to everyday life. After the Blue Mountains bushfire in 2013, over 100 households requested wellbeing assistance from the Red Cross. A number of firefighters, traumatised by what they saw, are known to have succumbed to post-traumatic stress disorder following the Blue Mountains fires.

**9**

**MYTH:**  
**AUSTRALIA GETS HELP FROM OTHER COUNTRIES, SO WE WILL BE ABLE TO COPE WITH INCREASED BUSHFIRE RISK**

**FACT:**  
**AUSTRALIA, NEW ZEALAND, THE UNITED STATES AND CANADA HAVE RESOURCE-SHARING ARRANGEMENTS FOR FIREFIGHTING PERSONNEL AND EQUIPMENT, SUCH AS LARGE WATER-BOMBING AIRCRAFT, WHEN NEEDED. BUT AS CLIMATE CHANGE CONTRIBUTES TO THE INCREASING OVERLAP OF FIRE SEASONS IN THE NORTHERN AND SOUTHERN HEMISPHERES, THESE RESOURCE-SHARING ARRANGEMENTS ARE BECOMING MUCH MORE DIFFICULT.**

Increasing bushfire risk is thus escalating the need for firefighting resources to be substantially boosted. Australia does not have any large firefighting aircraft and relies solely on leasing this equipment. In California, authorities are already talking about a "year-round fire season" as is the Australian Bushfire & Natural Hazards Cooperative Research Centre. As a result, governments will be increasingly constrained in their ability to share resources and deal with larger, more destructive bushfires.



#### **MORE INFORMATION**

For information on local bushfire risk and how to develop your own household bushfire survival plan, contact your state or territory rural and urban fire services, or simply drop into your nearest fire station. All of these agencies have useful information available on their websites.

## REFERENCES

ABC (Australian Broadcasting Corporation) (2018) Bushfire threat now a year-round situation in Australia, expert warns. ABC News (29 August). Available from: <http://www.abc.net.au/news/2018-08-29/year-round-bushfire-warnings-needed-australia/10168204>

Cary GJ, Bradstock RA, Gill A, Malcolm, and Williams RJ (2012) Global change and fire regimes in Australia. In R. A. Bradstock, A. Malcolm, Gill & R. J. Williams (Eds.), *Flammable Australia: Fire Regimes, Biodiversity and Ecosystems in a Changing World* (pp. 149-169). Collingwood, Vic: CSIRO Publishing.

CSIRO and BoM (Commonwealth Scientific and Industrial Research Organisation and Bureau of Meteorology) (2016) State of the Climate 2016. Accessed at: <http://www.bom.gov.au/state-of-the-climate/State-of-the-Climate-2016.pdf>

Deloitte Access Economics (2014) Scoping study on a cost benefit analysis of bushfire mitigation. Australia Forest Products Association. Accessed at: <http://ausfpa.com.au/wp-content/uploads/2016/01/AFPDAE-report-AmenedFinal-2014-05-27.pdf>.

Mariani M, Holz A, Veblen T, Williamson G, Fletcher M-S, Bowman D (2018) Climate Change Amplifications of Climate-Fire Teleconnections in the Southern Hemisphere, *Geophysical Research Letters*, DOI: 10.1029/2018GL078294

## IMAGE CREDITS

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