

The influence of climate change is unfolding as bushfires ravage Tasmania

After a record breaking dry spring and a dry, hot summer, bushfires are running rampant across Tasmania's ancient forests and World Heritage wilderness.

The fact that these bushfires are devastating such a unique Australian landscape of enormous ecological and cultural significance has prompted many in the public and the media to ask the Climate Council about the influence of climate change on extreme weather events such as bushfires.

What's happening in Tassie and why is it so destructive?

More than 72,000 hectares of western Tasmania have been burned by a cluster of bushfires ignited by lightning strikes on 13 January. Of course, Tasmania is no stranger to bushfires, especially after the arrival of European settlers, but this year's fires are particularly destructive because: (i) they are threatening vegetation that is unique to Tasmania, including iconic alpine species such as the Pencil Pine, cushion plants and temperate rainforests; and (ii) the fires are burning up vast tracts of organic soils which the unique Tasmanian vegetation depends on. It is extremely unlikely that burnt areas with alpine flora will ever fully recover because of the slow growth of these species and the increased risk of subsequent fires given the change to more flammable vegetation and the slow accumulation of peat soils, which takes thousands of years (Bowman 2016).

So what made the landscape so prone to such devastating bushfires this summer?

Dry, hot summer and long-term drying trend fuelling the fire

A record-breaking dry spring and a dry, warm summer has left fuels and peat soils bone dry.

Unusual warmth marked the last quarter of 2015. October was the warmest on record for Australia for both maximum and minimum temperatures, with the monthly mean temperature anomaly the largest on record for any month of the year. November mean temperatures were the equal second-warmest on record and spring as a whole was the second-warmest on record for Australia. October–December was also the warmest on record for both maximum and minimum temperatures. Numerous December records were broken in Tasmania for daily maximum temperature. Exceptionally high minimum temperatures on the night of 19–20 December were even more significant, with record-high minimum temperatures for December observed over large parts of Tasmania (BoM 2016).

Below average winter–spring rainfall and a very warm start to October created conditions conducive to dangerous spring fire weather across the southeast. Extreme fire danger was declared over much of Tasmania during the early October heatwave; Forest Fire Danger Index (FFDI) values at a number of sites were near record-high for so early in the season. Furthermore, annual rainfall was below average for Tasmania (BoM 2016), indicative of a two-decade drying trend likely influenced by climate change (CSIRO and BoM 2015).

Climate change, drying trend in southeast Australia and more high fire danger weather

Southern Australia has experienced a drying trend over the past few decades, characterised by a 10–20 percent reduction in cool-season (April–September) rainfall. The reduction is most pronounced in Tasmania and other parts of southeast Australia from the mid-1990s. Climate change is likely a contributing factor to the observed rainfall declines via its influence on the southward shift of the rain bearing fronts from the Southern Ocean, which normally account for much of the cool-season rainfall in southern Australia (CSIRO and BoM 2015).

In Australia's southeast, it is very likely that an increased incidence of drought - coupled with consecutive hot and dry days - will result in longer fire seasons and an even larger number of days of extreme fire danger (e.g. Clarke et al. 2011).

Climate change is increasing the frequency and severity of many extreme weather events, including extreme bushfire conditions (Climate Council 2015). Over the last 30 years extreme fire weather has increased in Tasmania and other parts of southeast Australia. The Forest Fire Danger Index (FFDI), an indicator of fire danger weather, increased significantly over the period 1973 to 2010 at 16 out of 38 measuring stations around Australia, with no stations showing decreases; stations showing significant increases in FFDI are concentrated in the southeast (Clarke et al. 2013).

Climate change is also having an impact on the length of the Australian fire season which now extends beyond summer, into October and March, in many regions (Clarke et al. 2013). Analysis of global climate data has shown that the frequency of long fire weather seasons has increased in eastern Australia (Jolly et al. 2015). Longer fire seasons will reduce opportunities for controlled burning and increase pressure on firefighting resources (Matthews et al. 2012; IPCC 2014). The east of the country, including Tasmania, is most likely to be affected by changes to the bushfire season length in future (Jolly et al. 2015).

Tackle climate change to protect Australians and natural heritage

Changes in extreme weather events are critically important in terms of risks to our health, communities, infrastructure, economy, livelihoods, and natural ecosystems. We must therefore cut our greenhouse gas emissions rapidly and deeply to stabilise the world's climate. Most of the known fossil fuel (coal, oil and gas) reserves must remain in the ground. In addition, carbon stored in land systems is vulnerable to being returned to atmosphere (from, for example, bushfires), undoing the earlier uptake of carbon from the atmosphere. It is very risky, and scientifically flawed (Mackey et al. 2013), to use land carbon to "offset" emissions from fossil fuel combustion - yet another reason why we need to keep fossil fuels in the ground. Investments in and installations of renewable energy (e.g. solar and wind) must therefore increase rapidly.

Australia is on the front line of climate change. We must strive to cut our emissions rapidly and deeply to join global efforts to stabilise the world's climate if we are to reduce the risk of even more extreme events, such as the bushfires that are currently ravaging our World Heritage areas in Tasmania and ecosystems in other parts of the country.

Further reading

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