

Dry lightning has set Tasmania ablaze, and climate change makes it more likely to happen again

Written by Nick Earl, Postdoctoral associate, School of Earth Sciences, University of Melbourne

Every year Tasmania is hit by thousands of lightning strikes, which harmlessly hit wet ground. But a huge swathe of the state is now burning as a result of “dry lightning” strikes.

Dry lightning occurs when a storm forms from high temperatures or along a weather front (as usual) but, unlike normal thunderstorms, the rain evaporates before it reaches the ground, so lightning strikes dry vegetation and sparks bushfires.

Dangerous, large fires occur when dry lightning strikes in very dry environments that are full of fuel ready to burn. Cold fronts in Tasmania, which often carry fire-extinguishing rain, have recently been dry, making these fires worse. The fronts draw in strong hot, dry northerly winds, fanning the flames.

Read more: [*Fires in Tasmania's ancient forests are a warning for all of us*](#)

Research has found that as climate change creates a drier Tasmania landscape, dry lightning – and therefore these kinds of fires – are likely to increase.

History and detection in Tasmania

Lightning has always started fires across Tasmania. Fire scars and other paleo evidence across Tasmania show large fires are a [natural process](#)) in some places. However, frequent large, intense fires were rare. Now such fires are being fought [almost every year](#)

Contrary to anecdotal belief, our recent preliminary work suggests that lightning activity has not increased over recent decades. So why do fires started by lightning appear to be increasing?

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As temperatures rise, evaporation rates are increasing, but current rainfall rates are about the same. In combination this means the Tasmanian landscape is drying. The landscape is more often primed, waiting for an ignition source such as a dry-lightning strike. In such conditions, it only takes one.

When dry lightning strikes

Lightning struck just such a landscape in late December 2018, starting the Gell River bushfire in southwest Tasmania. This uncontrollable fire burnt about 20,000 hectares in the first half of January and is still burning. These large fires deplete the state's resources, fatigue our volunteer and professional fire fighters and can have [disastrous effects](#) on natural systems.

With no significant rain falling over Tasmania since mid-December, the island is breaking dry spell records and thousands of dry lightning events have occurred. On [January 15 alone](#) over 2,000 lightning strikes sparked more than 60 bushfires.

Most of these were controlled rapidly, a credit to Tasmania's emergency responders. One of the worst-hit areas was the Tasmanian Wilderness World Heritage Area, where many bushfires continue to burn in inaccessible locations.

This is putting some of Tasmania's most pristine and valuable places in danger of being lost. The state stands to lose its most remarkable old-growth forests, like Mount Anne, which is home to some of the world's largest King Billy Pines, a species endemic to Tasmania.

Increasing dry area

Ongoing climate change is making dry spells longer and more frequent, increasing the fire-prone area of Tasmania. Almost the whole state is becoming vulnerable to dry lightning.

Some regions of the west coast of Tasmania used to have very little to no risk of bushfires as they were always damp. However, this is no longer the case, resulting in species coming under threat.

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Unlike most of Australia's vegetation, many of Tasmania's alpine and subalpine species evolved in the absence of fire and therefore do not recover after being burnt. Endemic species like Pencil Pine, Huon Pine and Deciduous Beech may be wiped out by one fire.

So what does the future hold? Using data from [Climate Futures for Tasmania](#), we can peek into the future. Our models indicate that climate change is highly likely to result in profound changes to the [re climate of Tasmania](#), especially in the west. [fi](#)

Climate change already playing a role

With a warming climate, the rain-producing low-pressure systems are moving south and many storms that used to hit Tasmania are drifting south, leaving the island drier. This, combined with increasing evaporation rates, result in rapid drying of some areas. Areas that historically rarely experienced fire will become increasingly prone to burn. The drying trend is projected to be particularly profound throughout western Tasmania.

By the end of the century, summer conditions are projected to last [eight weeks longer](#). This drying means that lightning events (and therefore dry lightning) will become an ever-increasing threat and the impact of these events will become more significant.

Higher levels of dryness will mean when bushfires occur the potential for these to burn into the rainforest, peat soils and alpine areas will be significantly increased.

Read more: [How far away was that lightning?](#)

These changes are already happening and will get progressively worse throughout the 21st century. Climate change is no longer a threat of the future: we are experiencing it now.

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