

Ten ways climate change can make wildfires worse

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Wildfires such as those raging across eastern Australia have become more common across the world in recent years. AFP talked to scientists about the ways in which climate change can make them worse.

Other factors have also fuelled an increase in the frequency and intensity of major fires, including human encroachment on wooded areas, and questionable forest management.

"The patient was already sick," said David Bowman, a professor of environmental change biology at the University of Tasmania and a wildfire expert.

"But [climate change](#) is the accelerant."

Fine weather for a fire

Any firefighter can tell you the recipe for "conductive [fire](#) weather": hot, dry and windy.

No surprise, then, that many of the tropical and [temperate regions](#) devastated by a surge in [forest fires](#) are those predicted in [climate models](#) to see [higher temperatures](#) and more droughts.

"Besides bringing more dry and hot air, climate change—by elevating evaporation rates and drought prevalence—also creates more flammable ecosystems," noted Christopher Williams, director of environmental sciences at Clark University in Massachusetts.

More fuel

Dry weather means more [dead trees](#), shrubs and grass—more fuel for the fire.

"All those extremely dry years create an enormous amount of desiccated biomass," said Michel Vennetier, an engineer at France's National Research of Science and Technology for Environment and Agriculture

(IRSTEA).

"That's an ideal combustible."

Change of scenery

To make matters worse, new species better adapted to semi-arid conditions grow in their place.

"Plants that like humidity have disappeared, replaced by more flammable plants that can withstand dry conditions, like rosemary, wild lavender and thyme," said Venetier.

"The change happens quite quickly."

Thirsty plants

With rising mercury and less rain, water-stressed trees and shrubs send roots deeper into the soil, sucking up every drop of water they can to nourish leaves and needles.

That means the moisture in the earth that might have helped to slow a fire sweeping through a forest or garrigue is no longer there.

More lightning

"The warmer it gets, the more lightning you have," said Mike Flannigan, a professor at the University of Alberta, Canada and director of the Western Partnership for Wildland Fire Science.

At the same time, he noted that 95 percent of wildfires worldwide are started by humans.

Weakened jet stream

Normal weather patterns over North America and Eurasia depend heavily on the powerful, high-altitude air currents—produced by the contrast between polar and equatorial temperatures—known as the jet stream.

But global warming has raised temperatures in the Arctic twice as fast as the global average, weakening those currents.

"We are seeing more extreme weather because of what we call blocked ridges, which is a high-pressure system in which air is sinking, getting warmer and drier along the way," said Flannigan.

"Firefighters have known for decades that these are conducive to fire activity."

El Nino

In the southern hemisphere, the periodic—every two to seven years—weather cycle known as El Nino leads to reduced rainfall, warmer temperatures and increased fire risk in Indonesia and eastern Australia, especially the southeast. The current fires, however, are not influenced by an El Nino event.

Unmanageable intensity

Climate change not only boosts the likelihood of wildfires, but their intensity as well.

"If the fire gets too intense" as in Australia right now, and in Greece last summer—"there is no direct measure you can take to stop it," said

Flannigan.

"It's like spitting on a campfire."

Beetle infestations

With rising temperatures, beetles have moved northward into Canada's [boreal forests](#), wreaking havoc—and killing trees—along the way.

"Bark beetle outbreaks temporarily increase [forest](#) flammability by increasing the amount of dead material, such as needles," said Williams.

Positive feedback

Globally, forests hold about 45 percent of Earth's land-locked carbon and soak up a quarter of human greenhouse gas emissions.

But as forests die and burn, some of the carbon is released back into the atmosphere, contributing to climate change in a vicious loop that scientists call "positive feedback."

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