

Climate Change Is Making Fire Weather Worse for World's Forests

Forest fires are on the rise globally. An increase in severe fire weather is largely responsible.

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In 2023 and 2024, the hottest years on record, more than 78 million acres of forests burned around the globe. The fires sent veils of smoke and several billion tons of carbon dioxide into the atmosphere, subjecting millions of people to poor air quality.

Extreme forest-fire years are becoming more common because of climate change, new research suggests.

“Climate change is loading the dice for extreme fire seasons like we’ve seen,” said John Abatzoglou, a climate scientist at the University of California Merced. “There are going to be more fires like this.”

The area of forest canopy lost to fire during 2023 and 2024 was at least two times greater than the annual average of the previous nearly two decades, according to a new study published Monday in the journal *Proceedings of the National Academy of Sciences*. The researchers used imagery from the LANDSAT satellite network to determine how tree cover had changed from 2002 to 2024, and compared that with satellite detections of fire activity to see how much canopy loss was because of fire.

Globally, the area of land burned by wildfires has decreased in recent decades, mostly because humans are transforming savannas and grasslands into less flammable landscapes. But the area of forests burned has gone up.

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Boreal forests lost more than two times the canopy area in 2023-24 compared with the period between 2002 and 2022, the study found. Tropical forests saw three times as much loss, and North American forests lost nearly four times as much canopy, mostly because of Canada's wildfires.

Significant losses were in remote forests, far from human activities. That isolation suggests fires are increasing primarily because of climate change, said Calum Cunningham, a fire geographer at the University of Tasmania who was not involved with the study. "Chronic changes in climate are making these forests more conducive to burning," Dr. Cunningham said.

Climate's fingerprint on forest fires, particularly remote ones, can be obvious. That's because fires are limited either by how much there is to burn or by how wet or dry the fuel is. So when scientists see more fires in remote forests, far from cities, infrastructure or other human activities, like logging, they look to climate for an explanation.

Specifically, they look to fire weather.

Fire weather encompasses all the conditions that have to be right for a blaze to take off. Unrelenting spells of hot, dry weather and high evaporation rates let plants and soil dry out. Local wind patterns can shift, potentially pushing fires across a landscape, up and over hills and roads. Longer, hotter, drier stretches of fire weather make fires more likely.

Climate change is making severe fire weather more common around the world, raising the chances of worsened forest fire seasons, a study in the journal *Nature Communications* found. Previous work has shown that climate change is in many places making the fire season longer. But many studies that attribute climate change to fires are regional, not global.

The study assessed globally how much more likely extreme fire-weather conditions are to occur in the modern climate, compared with the preindustrial period, before greenhouse gas emissions rose significantly. The researchers used satellite observations of burned areas, along with weather data, to connect observed fire weather with actual occurrences of forest fires.

The chances of seeing extreme fire weather are roughly double in today's climate

compared with the preindustrial period, the researchers found. Years with extreme fire-weather conditions had more forest fires and more carbon dioxide emissions than typical years without severe fire weather. Carbon dioxide, the main greenhouse gas, acts as a blanket in the atmosphere, trapping the sun's heat and warming the environment.

Neither study's findings were particularly surprising to the experts, because most of the regions the studies highlighted have burned in recent years. Both studies add to a growing body of evidence that points to climate change as one of the main reasons the planet is experiencing more frequent and more severe forest fires, often overlapping.

"It really puts to bed any debate about the role of climate change in driving these extreme fires," Dr. Cunningham said.

When more places are hit with fire weather at the same time, countries' capacities for sharing firefighting resources drop. "You get stretched thin," Dr. Abatzoglou said. Reduced firefighting can create a dangerous feedback loop: Bigger fires mean more emissions, which creates more fire weather and makes future fires more likely.

Budget and staffing reductions at science agencies in the United States, along with policy changes can exacerbate climate driven changes to fire trends, said Peter Potapov, an ecologist at the World Resources Institute who led the PNAS study. For instance, repealing the "roadless rule," which banned roads in some remote American forests could increase human activity there, along with fire risk. Terminated satellites could degrade fire forecasting. And funding cuts to the United States Agency for International Development, a State Department program that has been largely dismantled by the Trump administration, ended a program that helped other countries improve their fire monitoring capabilities.

A correction was made on July 21, 2025: An earlier version of this article misstated part of the name of an organization. It is the World Resources Institute, not Research.

When we learn of a mistake, we acknowledge it with a correction. If you spot an error, please let us know at nytnews@nytimes.com. [Learn more](#)

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