

Devastating wildfires in Eastern forests likely to be repeated, expert warns

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Eastern forests, after many decades of fire suppression, when faced with prolonged drought, are more vulnerable to hotter-burning, terribly destructive wildfires, according to a researcher in Penn State's College of Agricultural Sciences. Credit: U.S. Forest Service

The intense wildfires that swept through the Smokey Mountains in Tennessee late last month were a tragic melding of the past and the future, according to a researcher in Penn State's College of Agricultural Sciences.

And the fast-moving, wind-whipped blazes that burned more than 150,000 acres, killed 14 people and damaged 2,400 structures in Gatlinburg and Sevier County may be a portent of things to come, he warned.

"Many people have been lulled into believing that it is just the West that is prone to devastating wildfires, but that's not true," said Marc Abrams, professor of forest ecology and physiology, who for three decades has studied the historic role of fire in Eastern forests.

"Fire has played an important role historically in the

forest ecosystem in the eastern United States, but the balance created by frequent—but not catastrophic—forest fires was upset by the Smokey Bear fire suppression regimen beginning in the late 1940s. Now, Eastern forests, when faced with prolonged drought, are more vulnerable to hotter-burning, terribly destructive wildfires."

Abrams has published a series of research papers that focused on how Native Americans used fire to manage Eastern forests and made the forests more productive in yielding foods for themselves and the wildlife on which they depended. He believes the absence of fire has set the stage for catastrophic infernos such as those that recently raged through Tennessee.

Worse, Abrams sees a unique confluence between the past, when frequent forest fires were interrupted by a period of almost none, and the future, when a changing climate may well result in more severe and more prolonged droughts—resulting in fires more destructive than ever before.

"The fires we saw a few weeks ago in Tennessee were the worst in Eastern forests in my lifetime. The size of the area burned exceeded the number of acres that would burn in a normal year in the East," he said. "It's a reminder that the Eastern forests have always burned and are still pyrogenic, and because they are not managed with fire, they are now prone to have more [catastrophic fires](#). The buildup of fuels is certainly a factor."

The southeastern United States is in a decades-long drought, Abrams pointed out, and he noted that some climate change models suggest extremely dry weather trends will continue. If so, more devastating fires like the recent Tennessee blazes are likely to occur. Although most climate change models suggest the East will, overall, receive slightly more precipitation, they also predict that more prolonged and more severe droughts will develop in places.

"We are seeing this in the Southeast and also in the Great Lakes states. Even though average precipitation has slightly increased, there are also areas in the East where drought has increased. It sounds counterintuitive, but it is occurring," he said.

"We have very pyrogenic forest vegetation in the eastern United States. Most of it is not as flammable as we think about in the West, where there are catastrophic crown fires in conifer forests every year, but most of the eastern U.S. is dominated by oak, hickory and pine, and these are fire-adapted species that have burned over thousands of years as part of their normal ecology."

The melding of past and future for Eastern forests threatens to reverse a phenomenon that Abrams' research identified. In a paper published in January this year, he debunked claims that climate change has been the most important factor changing the composition of Eastern forests, presenting a convincing argument that human activities such as land use and fire suppression have been more influential.

Everything that changed after the Europeans arrived in North America may be changing again as extreme droughts become more prevalent, Abrams contended.

A changing climate creating conditions conducive to devastating forest fires may become a primary driver of forest composition change. "Droughts have always occurred, but more severe, more persistent droughts have the potential to change forest composition most in the long run," he said.

"The long-term absence of fires in the East has caused a decrease in fire-adapted trees and an increase in species sensitive to [fire](#) and drought. This increased sensitivity will likely result in increased tree mortality associated with future fires and drought."

Provided by Pennsylvania State University

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