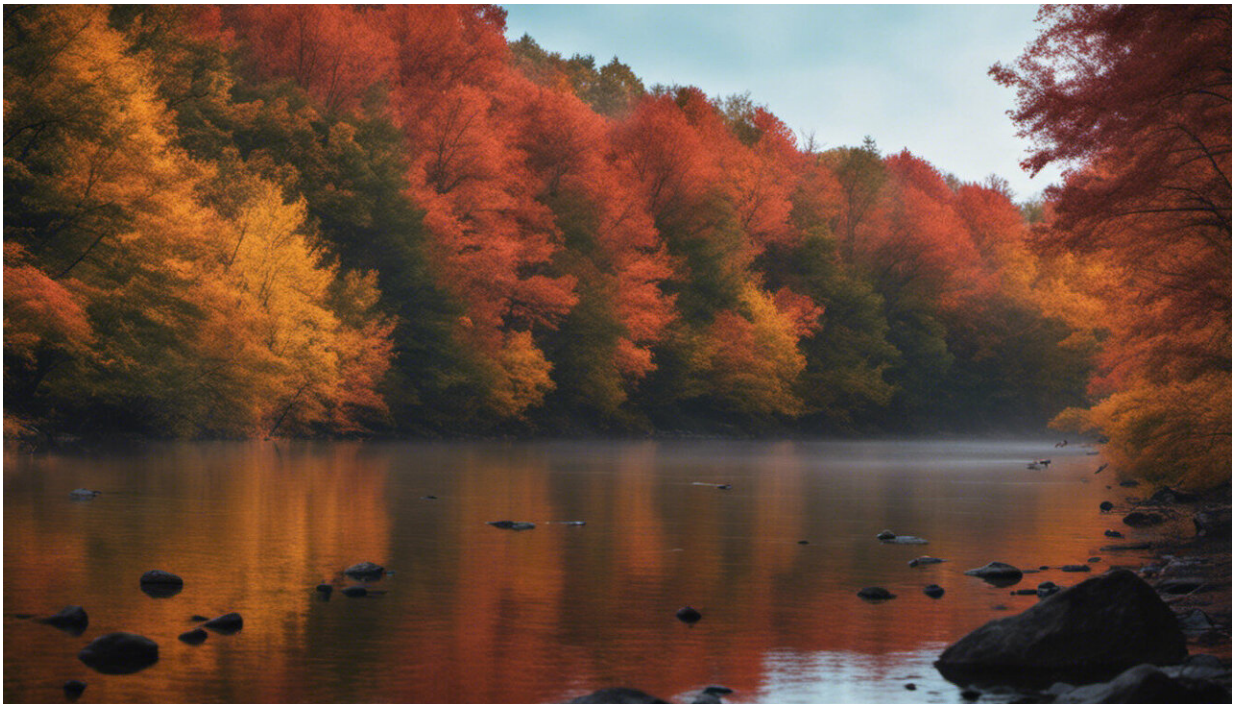


Expert discusses causes of the Tennessee wildfires

December 13 2016, by Thea Singer



Credit: AI-generated image ([disclaimer](#))

Wildfires raged recently through the foothills of Tennessee's Great Smoky Mountains, fueled by severe drought and high winds in the eastern part of the state. The fires damaged or destroyed more than 1,400 structures, including homes, chapels, and resort cabins. Fourteen people were killed, and nearly 150 others were injured. [The New York](#)

Times reported that [more than 14,000 people](#) fled Gatlinburg alone. On Wednesday, two juveniles were taken into custody and charged with aggravated arson in connection with the deadly wildfires, according to the [Tennessee Bureau of Investigation](#).

Sources such as Climate Central suggested that [rising temperatures](#) may have played a role in the fires. We asked Northeastern's Auroop Ganguly, an expert on climate extremes and water sustainability in the Department of Civil and Environmental Engineering, about the possible relationship between climate change and severe events such as wildfires. Ganguly, who worked as a scientist at the Oak Ridge National Laboratory in East Tennessee for seven years before coming to Northeastern, provided insight into the many factors that may have contributed to the blaze.

Why do you think that many people immediately point to climate change when they hear about increased instances of wildfires?

Extreme weather and hydrological events—including heat waves and heavy rain and perhaps floods, drought, and hurricanes—are precisely what so-called "global weirding" is expected to produce under [global climate](#) and regional land-use changes. Such events are projected to become unprecedented in scale. Climate scientists have long said that wildfires are among the extreme events that climate change may enable. Indeed, various news reports quoted Tennessee Gov. Bill Haslam as saying, "This is the largest fire in the last hundred years of the state of Tennessee."

From the perspective of human psychology, it is natural to try to find a causal link, even among completely unrelated events or chance occurrences. The ability to explain frightening events helps us feel as if

we have some control over them, even when, in reality, we don't. When there has been forewarning, as there has been regarding the possible repercussions of climate change, those explanations become even more credible.

This is not to say that climate change didn't play a role in the fires in Gatlinburg. But we want to be careful. The chain of causality is not always direct or linear, or even easy to follow.

You mentioned chain of causality. How would you describe the chain of causality for the disaster in the Great Smoky Mountains? What were the contributing factors?

Many components—longer-term enabling factors, current conditions, and then immediate triggers—frequently come together to shape events, both extreme and otherwise.

Consider a viral disease in an urban setting, say, Greater Boston. Each of us would be exposed at various levels. Each of our bodies would fight back based on our natural defenses. A few of us may be more susceptible, and some of that may be because of how we take care of ourselves. If we let ourselves go over the longer term by, for example, not eating right and getting enough sleep and exercise, we may fall sick. That lack of attention to our health is an enabling factor. The immediate contributing factors to catching the disease might be additional stress and not dressing warmly enough. The trigger would be exposure to the virus.

Now consider the Tennessee wildfires. Climate change over the longer term, as well as changes in land use such as deforestation and urbanization, may make conditions riper for large fires. The immediate contributing factors included current weather conditions—in this case,

[high winds](#), dry conditions, and warm temperatures. The trigger was human activity—the two juveniles who allegedly started the fire and are now charged with arson.

When asked how and if we can connect individual [extreme weather](#) events to climate change, Jerry Meehl, a [climate scientist](#) at the National Center for Atmospheric Research, used a baseball analogy. Imagine an athlete capable of hitting home runs, yet for many years he takes performance-enhancing drugs. Eventually the ballplayer is caught and dismissed. Can we attribute any particular home run over those years to a single cause? Was the fifth one last season due to natural ability? Was yesterday's due to the drugs? Were they a combination of both as well as other factors?

Again, I would not cast aspersions on climate change as a contributing factor to [wildfires](#). After all, it is not completely illogical to point to an unhealthy lifestyle as a factor in catching a virus or to the use of steroids as contributing to stellar performance on the field. But the cause of an effect is complicated. We cannot and should not ignore all the contributing factors, including current conditions and immediate triggers.

How can we, as a nation, learn to embrace a more nuanced, complex response to hot-button issues like climate change?

This is a very important question. Climate change does not need to be, to use your words, a "hot-button issue." A fear seems to have arisen around climate-change science and policy, as if even discussing the topic could threaten jobs and businesses. An informed discussion is important, not just concerning the scientific uncertainties, but also about how best to proceed. After all, both action and inaction have associated costs. We

need to do a better job in communicating the risk-management principles and the cost-benefit tradeoffs associated with something as complex as climate change, including the need to adapt (get ready for what already is or will soon become inevitable) and to mitigate (try to prevent what may be difficult to manage).

Talking about [climate change](#) during or in the immediate aftermath of an extreme weather event may be the wrong timing, both because of possible misunderstandings about cause and the psychological impulse during crises to explain things. As our experience with perceptions about cigarette smoking and disease shows, people are open to learning when information is appropriately communicated. Climate-change science is not a matter of belief. Science demands examination of hypotheses in a principled way. It also requires that those communicating it be clear about the uncertainties. Earning trust through credible knowledge and transparency about uncertainties must come first. Only then can the translation of science—to risk assessments, engineering and design principles that enable adaptation and mitigation, operational decisions, and strategic policy—follow. At each step, scientists and engineers must engage not only with experts from multiple disciplines but also with citizens at large. Granted, some people may act with vested interests. But as Shakespeare claimed (albeit in a different context), and as this country's experience with smoking shows, if we are careful in how we communicate what we accept as credible within our communities, eventually the "truth will out."

Provided by Northeastern University

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