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Fueled by Climate Change, Wildfires Erode Air Quality Gains

Such fires are causing spikes in fine particles that threaten human health

By Scott Waldman, E&E News on July 17, 2018



Ventura, California during Thomas Fire in December, 2017. *Credit: Al Seib Getty Images*

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Fourteen years ago, University of Washington researcher Daniel Jaffe installed an air pollution monitor on a mountainside outside Eugene, Ore.

His intention was to measure pollution levels, with a particular focus on tracking emissions from China that drift into the United States in the spring. But in recent years, the monitor has unexpectedly produced a second and more urgent data set: tracking fine particle pollution from wildfires in the western United States.

“We spend more of our time not worrying about what’s coming across the ocean but worrying about what’s coming here,” he said.

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Climate change is not just increasing the likelihood of wildfires in some areas of the country; it's also erasing decades of air pollution gains in those same regions, according to a study published yesterday in the *Proceedings of the National Academy of Sciences*. It shows that wildfires are causing a spike in air pollution across the West.



A man walks along Ventura Ave. in Ventura, California during the Thomas Fire in December, 2017.

Credit: Wally Skaliy Getty Images

Global warming creates conditions that feed wildfires. It has led to earlier snowmelts in the West, increased temperatures in summer and spring and drier conditions, research shows. That has sparked more frequent wildfires that last longer. And that increase in wildfires has increased fine particle air pollution, according to the study.

In the United States, fine particulate matter (PM_{2.5}) is generated by coal-burning power plants, automobiles and the manufacturing sector, among other sources. PM_{2.5} refers to fine particulates that are no more than 2.5 microns in diameter, or one-thirtieth the width of a human hair.

EPA's National Ambient Air Quality Standards have been successful at lowering human-caused PM_{2.5} standards across the country for years, researchers found. A 2017 study found that reducing fine particle pollution even slightly could save 12,000 lives annually, particularly among vulnerable populations such as the elderly and people with asthma.

“These findings suggest that lowering the annual NAAQS may produce important public health benefits overall, especially among self-identified racial minorities and people with low income,” that study said.

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The new research shows that natural factors, exacerbated by human-caused climate change, may have more of a role in declining air quality than previously realized.

Wildfires in Montana last year caused a spike in PM_{2.5}, Jaffe said. Monitors picked up the highest levels of air pollution ever recorded in the United States during August and September in Montana. And climate change is likely to drive similar events in the future, mostly in the summer and in Western states plagued by more frequent fires, he said.

In some areas of the United States, fine particles from wildfires are driving a second round of pollution events. Weather patterns in the winter can see cold air mass entrapped under warm air, which snares fine particles and raises air pollution levels. Both Utah and Fairbanks, Alaska, typically record high levels of air pollution in the winter, but wildfires are driving a second spike in PM_{2.5} levels in the summer.

PM_{2.5} is detrimental to human health. It affects the lungs as well as the heart, according to EPA. It can aggravate asthma, decrease lung function, and lead to premature death in people with lung and heart disease.

Clean Air Act regulations have targeted PM_{2.5}. Controls on coal-burning power plants and other sources of pollution have yielded significant reductions of pollution for years. Nationally, the amount of fine particle pollution has dropped 42 percent since 2016. However, researchers found that emissions have increased in parts of the country where wildfires are concentrated.

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Scientists examined data from rural monitoring sites. They found increases in PM_{2.5} in all or parts of Montana, Idaho, Oregon, California, Nevada, Utah and Wyoming. They found an increase for total carbon, which indicates wildfire emissions, in the Northwest. By contrast, the rest of the country saw decreasing total carbon, researchers found.

“If you’ve been out in the West at all in the last few years, we’ve just seen more and more fires and bigger fires, so that was why we went looking for it,” Jaffe said. “I

guess what surprised us was the geographic extent over which we could really pull out a statistically significant increase.”

The results show that fine particle pollution from wildfires may be worse than researchers have realized, Jaffe said. What’s more, they come as EPA has proposed a new science transparency rule that would restrict the use of key air pollution studies in crafting regulations. Critics have noted that the proposed transparency rule would exclude future consideration of a landmark 1993 Harvard University air pollution study—the “Six Cities” paper—that has been used to back air regulations for decades.

Jaffe said snowpack has a direct effect on the wildfire season, especially if the snow extended into late June and early July and kept the soil wet. In addition, insects such as the pine bark beetle have damaged millions of trees, providing fuel for bigger fires that last longer, he said. Still, he cautioned that climate change is a threat multiplier for wildfire season but that forest management issues have also played a significant role in driving wildfires.

“We want to be careful not to put it all on climate change, but climate change is clearly a contributing factor, and particularly in the size of these fires,” he said. “A fire that used to become a small fire has now become a massive conflagration.”

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With fine particle pollution from wildfires increasing, it may need even more consideration by future regulators, said Gannet Hallar, an atmospheric scientist at the University of Utah who was not involved in the study. She said it shows that the highest-polluting wildfire events are intensifying.

“The really important point of this paper is that these events, although episodic, are increasing in their intensity,” she said.

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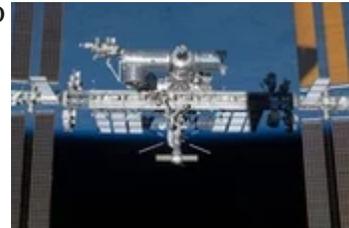
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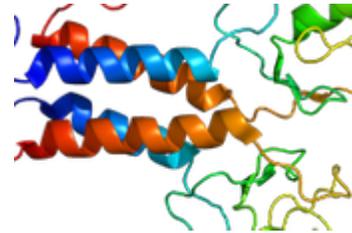
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