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Is Global Warming Fueling Increased Wildfire Risks?

The effects of global warming on temperature, precipitation levels, and soil moisture are turning many of our forests into kindling during wildfire season.

Photo: Marcus Kauffman/Unsplash

As the climate warms, moisture and precipitation levels are changing, with wet areas becoming wetter and dry areas becoming drier.

Higher spring and summer temperatures and earlier spring snowmelt typically cause soils to be drier for longer, increasing the likelihood of drought and a longer wildfire season, particularly in the western United States.

These hot, dry conditions also increase the likelihood that wildfires will be more intense and long-burning once they are started by lightning strikes or human error.

The costs of wildfires, in terms of risks to human life and health, property damage, and state and federal dollars, are devastating, and they are only likely to increase unless we better address the risks of wildfires and reduce our activities that lead to further climate change.

Wildfires are already on the rise

Wildfires in the western United States have been increasing in frequency and duration since the mid-1980s. Between 1986 and 2003, wildfires occurred nearly four times as often, burned more than six times the land area, and lasted almost five times as long when compared to the period between 1970 and 1986.

Natural cycles, human activities like land-use change and fire exclusion, and human-caused climate change can all influence the likelihood of wildfires. Many of the areas that have seen increased wildfire activity, like Yosemite National Park and the Northern Rockies, are protected from or relatively unaffected by human land-use change, suggesting that climate change is a major factor driving the increase in wildfires in these places.

Precipitation patterns, global warming, and wildfires

Photo: USDA

Though the current trend of increasing severe wildfire frequency in parts of the US is projected to continue as the climate warms, droughts and wildfires are not equally likely to occur every year.

Natural, cyclical weather occurrences such as El Niño events also affect the likelihood of wildfires by affecting levels of precipitation and moisture and lead to year-by-year variability in the potential for drought and wildfires regionally.

Nonetheless, because temperatures and precipitation levels are projected to alter further over the course of the 21st century, the overall potential for wildfires in the western United States is projected to increase.

As the world warms, we can expect more wildfires

US wildfire seasons—especially those in years with higher wildfire potential—are projected to lengthen, with the Southwest's season of fire potential lengthening from seven months to all year long. Additionally, the likelihood that individual wildfires become severe is expected to increase.

Researchers project that moist, forested areas are the most likely to face greater threats from wildfires as conditions in those areas become drier and hotter.

Surprisingly, some dry grasslands may be less at risk of catching fire because the intense aridity is likely to prevent these grasses from growing at all, leaving these areas so barren that they are likely to lack the fodder for wildfires to start and spread.

A conflagration of costs

Photo: FEMA

The economic costs of wildfires can be crippling. Data on total US property damage from wildfires are hard to come by, but the costs are estimated to be on the level of hundreds of millions of dollars per year.

In addition to property damage, wildfires cost states and the federal government millions in fire-suppression management. The US Forest Service's yearly fire-suppression costs have exceeded $1 billion for 13 of the 18 years between 2000 and 2017. In 2015, these costs exceeded $2 billion, and in 2017 they totaled almost $3 billion. The risk to property owners is particularly acute in areas at the "wildland-urban interface." In California alone, this area includes more than 5 million homes in coastal southern California, the Bay Area, and northeast of Sacramento.

The environmental and health costs of wildfires are also considerable. Not only do wildfires threaten lives directly, but they have the potential to increase local air pollution, exacerbating lung diseases and causing breathing difficulties even in healthy individuals.

Additionally, a counterintuitive aspect of mountain forest wildfires is their ability to increase flash flood risk. The loss of vegetation from wildfires and the inability of burned soil to absorb moisture can

cause flash floods in lower-lying areas when rains do come in the days and months following fires, especially to the semi-arid Southwest.

Wildfire safety and prevention

Greenhouse-gas emissions from human activities are raising global temperatures and changing the climate, leading to a likely rise in wildfire severity and frequency.

But it is not too late to act. What we do now has the power to influence the frequency and severity of these fires and their effects on us.

By engaging in fire safety efforts—creating buffer zones between human habitation and susceptible forests, and meeting home and city fire-safety standards—we can help reduce our current risks, and by taking steps to reduce our impact on the climate, we can help to keep our forests, our homes, and our health safe.

Learn more

- Global Warming FAQ
- Climate Change and Your Health
- The Health Effects of Hotter Days and Nights

Listen to fire expert Prof. John Bailey talk about wildfires in the US on the Got Science? Podcast:

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