

Climate change increases risks of tree death

Planting a tree seems like a generally good thing to do for the environment. Trees, after all, take in carbon dioxide, offsetting some of the emissions that contribute to climate change.

But all of that carbon in trees and forests worldwide could be thrown back into the atmosphere again if the trees burn up in a forest fire. Trees also stop scrubbing carbon dioxide from the air if they die due to drought or insect damage.

The likelihood of those threats impacting forests is increasing nationwide, according to new research in *Ecology Letters*, making relying on forests to soak up carbon emissions a much riskier prospect.

"U.S. forests could look dramatically different by the end of the century," says William Anderegg, study lead author and associate professor in the University of Utah School of Biological Sciences.

"More severe and frequent fires and disturbances have huge impacts on our landscapes. We are likely to lose forests from some areas in the Western U.S. due to these disturbances, but much of this depends on how quickly we tackle climate change."

Wildfire, drought and insects

The researchers modeled the risk of tree death from fire, climate stress (heat and/or drought) and insect damage for forests throughout the United States, projecting how those risks might increase over the course of the 21st century.

By 2099, the models found, that United States forest fire risks may increase by between four and 14 times, depending on different carbon emissions scenarios. The risks of climate stress-related tree death and insect mortality may roughly double over the same time.

But in those same models, human actions to tackle climate change mattered enormously -- reducing the severity of climate change dramatically reduced the fire, drought and insect-driven forest die-off.

"Climate change is going to supercharge these three big disturbances in the U.S.," Anderegg says.

"We've seen devastating fire seasons with increasing severity in the past several years. Generally, we expect the western U.S. to be hit hardest by all three of these. And they're somewhat interconnected too. Really hot and dry years, driven by climate change, tend to drive lots of fires, climate-driven tree mortality and insect outbreaks. But we have an opportunity here too. Addressing climate change quickly can help keep our forests and landscapes healthy."

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