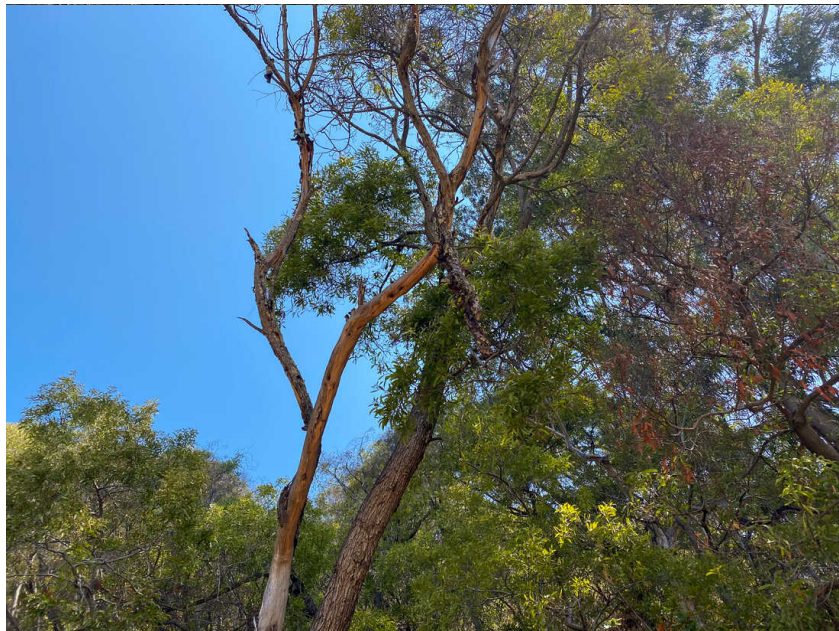


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Climate Change Is Killing Trees And Causing Power Outages

Julia Simon

16-21 minutes



A spiral of dead bark hangs off a sickened acacia branch. California's climate change-fueled drought and opportunistic fungi weakened the tree. "We have never seen the sort of mass mortality that we're seeing now," Igor Lacan says of the acacias. **Julia Simon for NPR** **hide caption**

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On a hill in Oakland, Calif., Igor Lacan looks out from under his Stetson hat at the neighborhood below and begins listing trees.

"Maples to birches to plums to liquid amber," says Lacan, horticulture adviser for the University of California Cooperative Extension. "A cedar. I see some palms, and then you've got a monkey puzzle up here!"

In between the trees is a crisscrossing web of power lines, delivering electricity to the houses below. Lacan works as an adviser for California utilities such as Pacific Gas & Electric, and he says while most of the trees seem to be flourishing, that's not true for some nearby acacias. He points upward to a spiral of dead bark hanging off an acacia branch.



Lacan stands near a dying acacia tree on a hill in Oakland, Calif. Lacan is horticulture adviser for the University of California Cooperative Extension, and part of his job involves advising utilities such as Pacific Gas & Electric how to spot sick trees at risk of toppling onto power lines. **Julia Simon for NPR**

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"If you can see the wood underneath, which in this case you can, that's typically a sign that that part of the tree is dead, which is why we didn't stand under that branch."

According to [researchers at the University of California, Berkeley](#), opportunistic [fungi](#) are killing these trees. [California's climate change-fueled drought](#), which has persisted for the better part of two decades, has stressed the trees and made them vulnerable to parasites.

Lacan says of the local acacias, "We have never seen the sort of mass mortality that we're seeing now."

Climate change has stoked a host of threats to trees, not just in California but across the country. Extreme storms, [droughts](#), [disease](#) and [insects](#) are stressing and killing trees, and these trees pose a growing threat of wildfires and to grid reliability, many large utilities say. The Dixie Fire in Northern California, [which has already burned more than 950,000 acres](#), was likely sparked by a tree falling onto a power line.

According to more than a dozen of the country's largest utilities, branches and trees falling on power lines are a leading source of power outages. Some utilities say that because of factors related to climate change, trees are dying faster than they can reach them on their normal trimming cycles.

Outages caused by falling vegetation go beyond inconvenience for customers, says [Tremaine Phillips](#), commissioner on the Michigan Public Service Commission. "We know that there are individuals who rely on medical equipment, and that equipment requires electricity. We know that there are families who have medications that need to be kept refrigerated," he says. "So these impacts are real and for certain families very acute and potentially dire."



Researchers at the University of California, Berkeley say that a fungus is killing this acacia tree (left). The eye-shaped hole is a canker, a sign of the fungus's presence. Lacan shows the yellowed

phyllodes (right) of a dying acacia. Climate change-fueled drought weakened the trees and made them vulnerable to parasites. **Julia Simon for NPR hide caption**

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Julia Simon for NPR

Climate change make trees more likely to fall

[Nina Bassuk](#), professor of urban horticulture at Cornell University, explains that climate change can kill tree cells through a confluence of stressors. "It's not like an animal, which dies when you pierce the heart — trees die cell by cell," she says.

Shorter and warmer winters can allow insects and diseases to proliferate, she says. Fluctuating temperatures, heat waves and drought can disrupt growth or health.

"So if you have a bunch of cells that are dead, a branch, for instance, that will be more apt to fall," she says.

In 2020, Tropical Storm Isaias left 1.2 million Connecticut residents without power for a week in the middle of a summer heat wave. The state's Public Utilities Regulatory Authority recently fined the state's largest utility, Eversource, the maximum \$28.5 million for failing to prepare and respond to that storm.

Diego Cerrai is professor of engineering at the University of Connecticut, and he's been working with Eversource to study why the outages occurred.

"That storm created many more outages than what was expected by anyone," says Cerrai, who manages the [Eversource Energy Center](#). "[We started investigating why](#). And one of the reasons was that there was a severe drought over the past two years in this area of the United States, and trees were weaker and more likely to fail."

Connecticut's drought, severe storms and winds have weakened trees' defenses, says Sean Redding, vegetation manager for Eversource Connecticut. That makes trees vulnerable to insects such as gypsy moths, emerald ash borer and hemlock woolly adelgid, and diseases such as root rot. Now those dead trees and their branches are falling on power lines.

"When you have that amount of trees succumbing to these bugs and resulting in mortality, you have a large impact to customers," Redding says. "Because of the cumulative effect of climate change,

insect infestation and disease on our forests here in Connecticut, more trees came down, resulting in more outages."

Redding says these days when it comes to dead trees, "there are more of them than we can manage in a timely manner."



Lacan points to cuttings in this acacia trunk made by researchers from UC Berkeley. They were looking for the source of the cankers on the tree. A canker is "sort of a wound that doesn't heal," Lacan says. "That's a good indication there's something going on." **Julia Simon for NPR** **hide caption**

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More "hazard trees" are falling onto power lines

Trees don't need to be ravaged by insects, fungi or drought to feel the effects of climate change. Unusually intense storms can be enough to topple trees, especially with high winds and heavily saturated soil.

Several storms in quick succession have crashed through Michigan this summer, including [severe floods](#) and [tornadoes](#). Some storms packed winds of 75 mph, according to the National Weather Service, [slightly more than the minimum wind speed for a](#) Category 1 hurricane.

In late June and July, around 740,000 customers of the state's largest utility, DTE Energy, lost power in a series of storms. Then, in August, at least 500,000 DTE customers lost power, [some for as long as a week](#). When he went out in the Detroit suburbs after one of the summer storms, Jamie Kryscynski, DTE's tree trim manager, saw large trees "completely sheared apart."

"Oaks, they're very strong trees, like they're one of the strongest trees out there. And we had oaks that just snapped," he says. "The point is it's just we had a lot more very large tree impacts compared to what I'd say an average large storm."

Michigan is seeing increased rainfall intensity, says [David MacFarlane](#), professor at the Michigan State University's Department of Forestry. Some areas of the state now can get a month's worth of rain in half a day. In the summer when trees are covered with leaves, the leaves sop up that extra water. "When you get heavier rains all at once, it softens the soil and also creates extra weight on the crowns of the trees," MacFarlane says, "So it makes them more susceptible to being uprooted and pulled over."

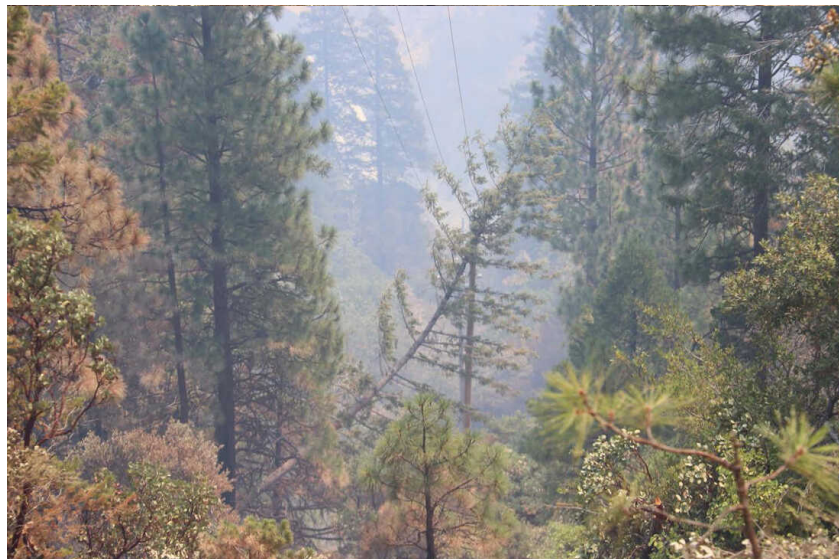
In vegetation management, there's the concept of the "right of way" — the area around lines that transmit electricity to people's houses. A patchwork of national and state regulations require utilities to trim around these lines, says Scott Aaronson, vice president of security and preparedness at the [Edison Electric Institute](#), the largest trade group for investor-owned electric utilities.

But as more trees and branches topple due to climate-related stresses, trees that might not have been technically in utilities' jurisdiction now pose a danger to utility infrastructure. Utilities call them "hazard trees."

"So you might have a right of way, but maybe just a couple of feet beyond that you might have a 150-foot tree that is being impacted by drought or by a bug infestation," Aaronson says. "And so it's a constant battle to not just keep up with the right of way but to also identify those hazard trees outside of the right of way."

In Arizona, a 20-year-drought and an infestation of [bark beetles](#) are all leading to a mass mortality of [ponderosa pines](#), a tree that can grow to 200 feet. Because these dead pines are so tall, it falls on the utility to manage them, says Andrew Rable, manager of forestry, fire and resource management of Arizona Public Service Co., or APS, the state's largest utility. "If they do fail," he says, "they do have the ability to impact or strike our equipment." (Tree failure is industry speak for when trees or branches fall.)

APS is one of several large utilities that has created a new vegetation management cycle to remove dead and dying trees at risk of toppling. Rable describes it as "an entire program that addresses trees that will fail prior to us getting there during our routine maintenance schedule."



This fir tree lies on a power line in an area near the start of the Dixie Fire in California. PG&E says the costs of maintaining trees near power lines are part of the reason it is moving to bury 10,000 miles of new power lines at a cost of at least \$15 billion. **PG&E**
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PG&E

Utilities are rethinking putting lines underground

Vegetation management isn't cheap. DTE Energy is another utility on an "enhanced" tree trimming cycle, or cutting trees farther away from the power lines and wires. It spent \$150 million on clearing trees from power lines last year alone. This month the company's CEO announced [another \\$70 million](#) for tree trimming in light of this summer's outages.

For some utilities, the high costs of maintaining trees have them turning underground. In July, PG&E announced plans to bury 10,000 miles of electricity lines, a process the utility projects will cost at least \$15 billion. The utility declined to specify a timetable for the project.

That's after PG&E cut down about 564,000 hazard trees suffering from drought or bark beetle infestation from 2014 to 2020. PG&E told NPR in an email that undergrounding lines will "ease the need for vegetation management efforts" and that the utility will "over time, transition more and more to undergrounding."

Putting power lines underground was long considered prohibitively expensive but not anymore. In July, PG&E [told state regulators](#) in a

preliminary report on the Dixie Fire, the largest fire burning now in the U.S. and second largest fire in California history, that an employee discovered the fire near [a tree that had fallen onto live power lines](#). The increasing costs of vegetation management of above-ground lines as well as the legal liabilities that come with fires and outages mean undergrounding looks more and more attractive, says Aaronson of the Edison Electric Institute.

"That's something that is evolving, the cost benefit analysis of 'Do we underground?' or 'Do we more aggressively maintain above-ground overhead lines?' is kind of constantly changing," Aaronson says. PG&E says that ultimately, costs of maintaining above-ground lines are now on par with undergrounding.



A patchwork of national and state regulations require utilities to trim around their power lines. More than a dozen of the country's largest utilities told NPR that falling trees and branches represent a leading cause of outages. **Ryan Kellman/NPR** **hide caption**

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Utilities help fuel the climate change now affecting them

Daniel Tait of the Energy and Policy Institute, a utility watchdog group, says it's important to remember the context for why utilities are now having to adapt vegetation management programs to the changing climate.

"Utilities are now seeing the impacts of climate change, but the big thing is that utilities have fueled climate change for decades," he says, pointing out that [60% of U.S. electricity comes from fossil fuels](#), whose emissions heat up the planet.

Tait says some of the same utilities grappling with tree mortality related to climate change still invest in new fossil fuel infrastructure. DTE Energy, for example, is currently building a new natural gas plant. "They share culpability for the fact that trees are dying," Tait says.

DTE Energy says in an email that the [new gas plant](#) has about 70% less carbon emissions than the coal plants it's replacing and that it will "bring on more renewables." DTE Energy produces more than two-thirds of its electricity from [coal and gas](#).

As climate change leads to more tree mortality and more blackouts, horticulturalists such as Lacan say the solution isn't to plant fewer trees. It's to plant different trees that can better endure drought and a hotter climate. Plus, shorter trees, he adds. "There are a number of short tree species that work quite well under those distribution

lines."

Looking out at the Oakland hills, Lacan says planting trees is a long-term decision. "What you see here before you is a result of someone's decision 50 years ago," he says. "So I think we should be planting more trees and the right trees, the trees that are more able to withstand some of these stresses."