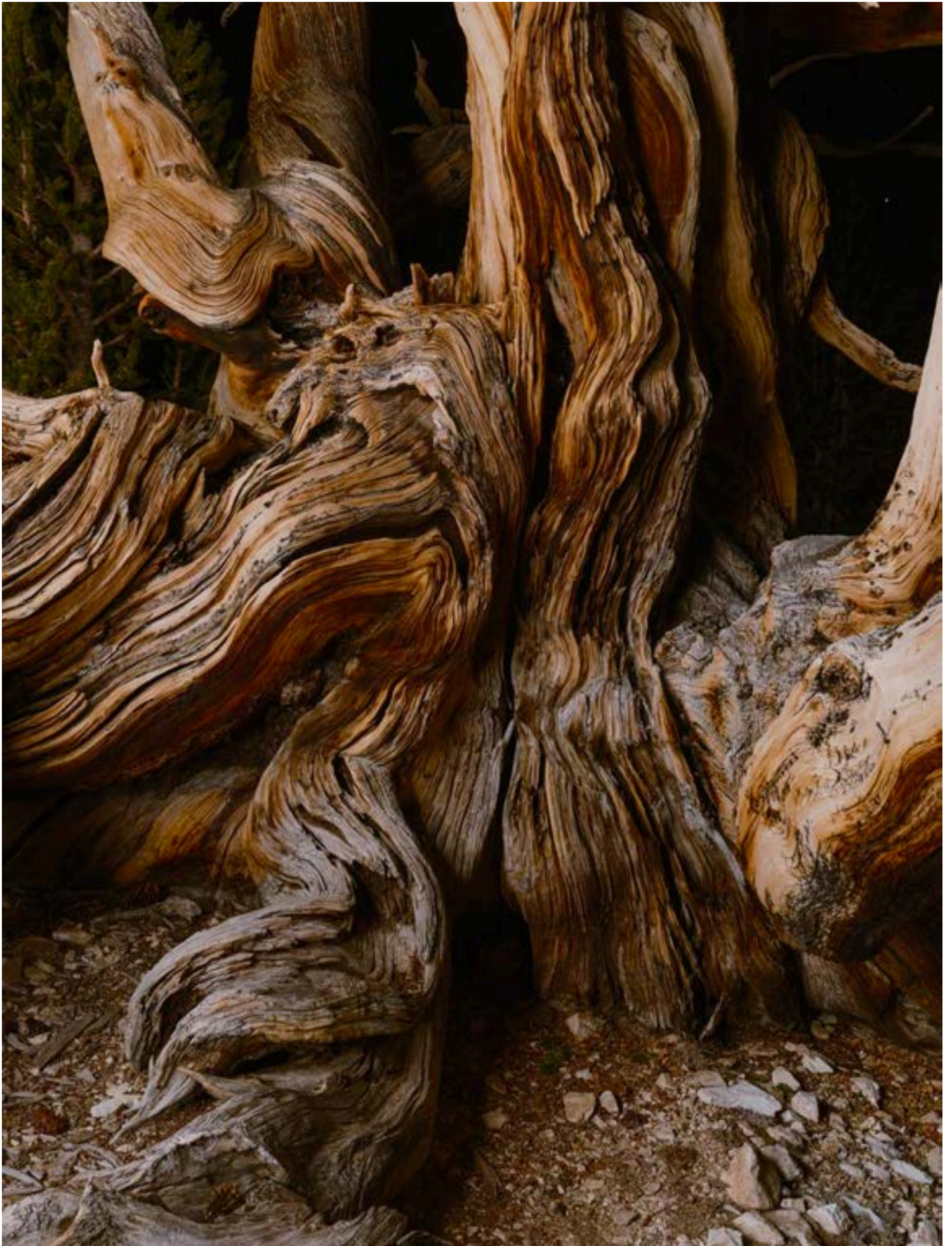


SCIENCE

Don't cut them down: Letting dead trees rot can help make new life

From microbes to four-legged critters, dead trees play an essential role in a forest's ecosystem. Experts say it's rare that removal is necessary.



By Leah Worthington

Photographs by Cody Cobb

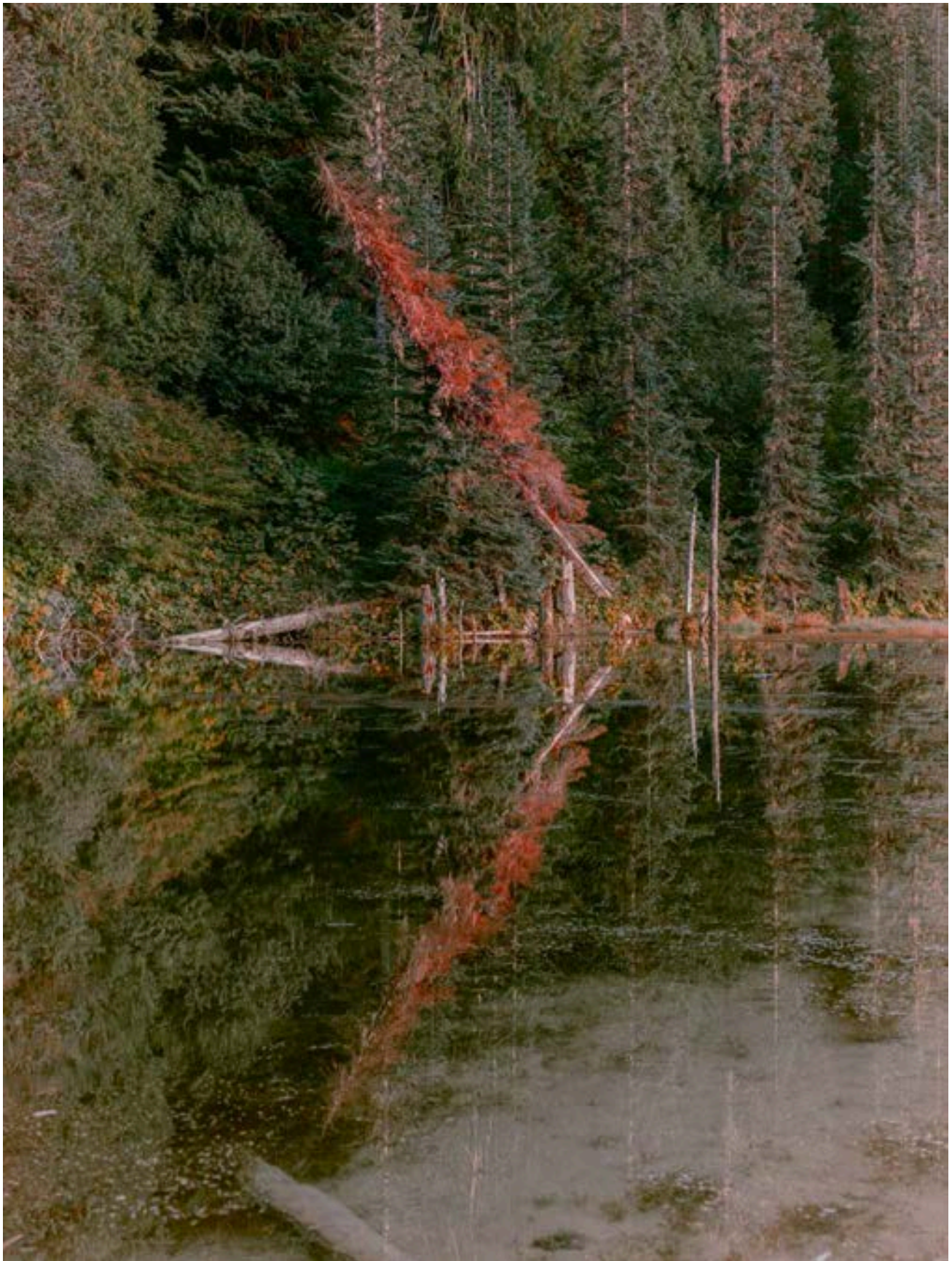
May 31, 2024

At first glance, a dead tree might seem to be little more than a barren, crumbling log. But look closer. Beneath the splintering bark, the wood is teeming with life. From burrowing beetles to wood-decay fungi to roosting bats, a whole community of critters has settled in, their very survival often dependent on the tree's demise.

Dead trees are now becoming a focal point of forest management. Recent decades have brought greater understanding of the vital function dead trees serve in supporting biodiversity and forest regeneration—and, with it, a growing movement to preserve them.

“Leave them there,” says David Lindenmayer, forest ecologist and professor of ecology and conservation biology at the Australian National University. “Large dead trees have a very, very important role for storing carbon, providing habitat, [and] nutrient recycling.”

Despite their many benefits, dead trees can pose a safety risk in some circumstances. Experts explain their ecological function and how to make a decision about allowing them to decompose naturally.



A dead pine tree leans sideways at June Lake in the Cascade Mountains of Washington.



Northern Flickers like to make holes for nests in dead tree trunks or large branches.

The afterlife of a dead tree

The death of a tree is hardly the end. Instead, a rapid transformation begins, bringing new vitality into the lifeless branches.

Upon its death, the tree's tightly sealed plumbing, previously used to funnel nutrients and water, becomes empty and permeable, according to Matteo Garbelotto, a professor of forest pathology at the University of California, Berkeley.

For Hungry Minds

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These hollowed out skeletons, still standing upright, are also known as snags or wildlife trees. Because of their verticality, snags can host a high diversity of species that varies from top to bottom. Fallen trees—often called logs—are also valuable habitats, though for a different group of smaller-scale species, Garbelotto says.

Both are like magnets for all sorts of life, starting with fungi.

“Wood-decay basidiomycetes are unusual in that they can break down a major compound of the wood called lignin,” says Gregory Gilbert, a professor of environmental studies at the University of California, Santa Cruz. “Once that is broken down, the easier-to-eat cellulose is available for other fungi, insects, and bacteria.”



A mushroom, illuminated by UV light, grows from the trunk of a dead pine tree in Washington's Cascade Range.

Fungi do much of the hard work of expediting the decomposition process, softening the hard trunk into something porous and penetrable. This allows in a whole host of colonizers seeking safe refuge and sustenance: beetles burrow in to lay eggs, amphibians and rodents nestle under detached bark, and insectivorous birds build nests within the trunk itself.

The assemblage of wildlife changes over the course of the tree's decay, with each new species contributing to and profiting from its crumbling. Logs generally increase opportunities for insects, amphibians, and reptiles and are "complementary" to snags, Gilbert says.

While some organisms like bark beetles and woodpeckers strongly prefer dead or rotting wood for nesting, others, including wood-decaying fungi, can only survive in deadwood.



Lichen hangs off a fallen tree in the Cascade Mountains of Washington.

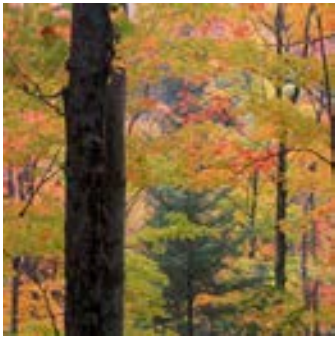
In the U.S., [more than 1,200 wildlife species](#) rely on dead or dying trees for shelter and food. The survival of these so-called “saproxylic organisms,” which live in decaying wood, is threatened by over-clearing of snags and logs, Lindenmayer says. “In the northern hemisphere, in places like Sweden, Norway, Finland...you’ve got very large numbers of red-listed species that are associated with deadwood,” he adds. [Violet click beetles](#) and [knothole moss](#), for instance, are considered endangered by the International Union for Conservation of Nature.

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And it's not just the animals who rely on decaying trees. They provide natural protection and sustenance for young seedlings to sprout safely, according to Lindenmayer. As trees decompose, carbon and nitrogen stores are slowly reabsorbed into the soil, a critical step in nutrient recycling, both for saplings and for the larger ecosystem.

From a climate perspective, letting trees rot is critical, Lindenmayer says. Large trees in particular act as significant carbon sinks, and allowing them to decompose naturally extends the carbon sequestration process, reducing the amount of carbon dioxide—and, thus, heat—in the atmosphere.

What to do with dead trees

Whenever possible, forestry experts prefer to leave dead trees untouched. “In forested areas, we would typically recommend that standing trees be left that way,” says Kevin Rohling, a specialist in forest management and ecology at the University of Illinois.

This advice marks a change of tune from previous generations when uncontrolled logging and forest clearing were common practice. Today, within both public agencies and private consultants, “there is an emphasis on retaining deadwood and snags in forested areas,” Rohlings says.

“As the amount of private forest that's used for logging has decreased in California, and as the Forest Service has implemented this wildlife tree policy, I think things definitely are looking up,” Garbelotto says.

Still, there are certain areas where leaving snags can be problematic.

“Anywhere there's the possibility of a dead tree harming people or property—in those cases, oftentimes, we just recommend removal,” Rohling says. In deciding whether or not to clear a tree, he says it's important to consider whether a tree might deteriorate or collapse completely and, if so, whether it could hit something, particularly in high-use areas like playgrounds, campgrounds, and roadways. When in doubt, he advises people to consult with a certified arborist or other tree care professional.

Is there any benefit to keeping a dead tree in your backyard? Again, the answer depends on context, according to experts.

“For personal properties, it’s a little bit more complex,” Garbelotto says. Trees infected by diseases like sudden oak death, for instance, can appear healthy despite growing progressively drier and structurally unsound. For people who live in wildfire-prone territory, such as the wildland urban interface, he adds, “keeping a dead tree within your property—unless your property is very large—really represents a big risk.”



A longhorn beetle rests on wood in Andalusia, Spain. The larvae from this family of beetles eat wood, both in living trees and untreated lumber.
PHOTOGRAPH BY WILD WONDERS OF EUROPE /OXFORD/NATURE PICTURE LIBRARY

Whether clearing dead trees reduces or increases wildfire susceptibility remains a topic of much debate. Lindenmayer, for his part, is adamant that protecting snags doesn’t exacerbate the risk. It takes a lot to make

deadwood catch on fire (other fuel is nearby, fire is hot enough, dry conditions and wind are present, etc.) compared to smaller debris like pine needles and twigs. That's why deadwood does not contribute as much to quick-fire spread, according to an [article from Oregon State University](#). That said, deadwood can be harder to put out once it is ablaze.

Still, the biodiversity boost from retaining dead trees is probably small in a private backyard environment. "I think it would help," Garbelotto says. "But I'm sure that you're not getting the whole suite of benefits you're getting when you're doing this in the forest."

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