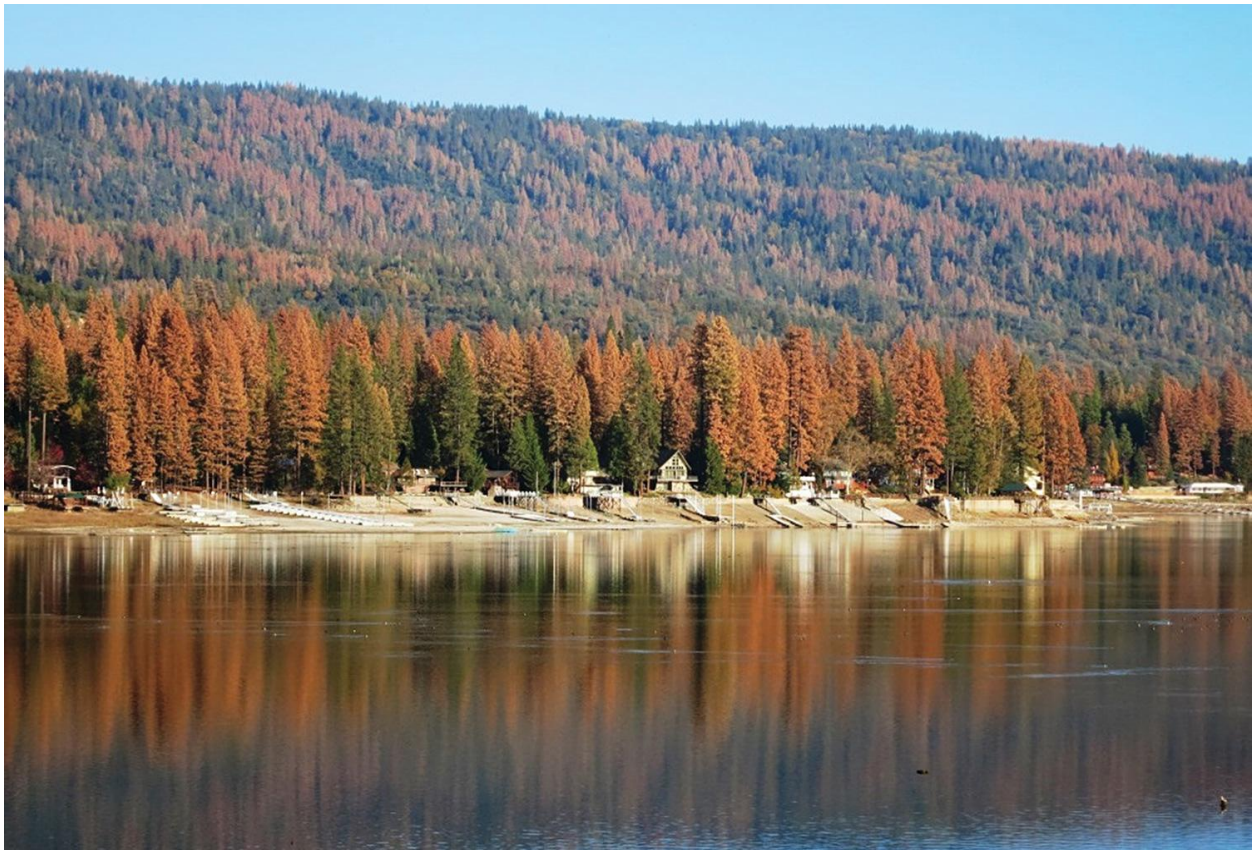
California plans to log its drought-killed trees

Cutting down dead trees may not reduce wildfire risk.

Jane Braxton Little **Aug. 8, 2016***From the print edition*



Dead trees near Bass Lake in the Sierra National Forest in California.
U.S. Forest Service

Looking north from Blue Canyon near Shaver Lake, copper-colored forests blanket mountain slopes that stretch ridge after ridge to the horizon. The patches of fading green that dappled these hillsides last fall have merged into an unbroken cover of rust-needled pines. At dusk, when the winds die down, an eerie stillness gives way to the

muffled sound of munching as beetles chomp through one tree after another, thousands after thousands.

This is the look — and the sound — of drought.

Four consecutive winters with little to no snowpack, followed by four dry summers, have devastated California's southern Sierra Nevada. At least 66 million trees are already dead statewide, and millions more are expected to die as the drought persists into a fifth summer.

On the Sierra National Forest, up to 90 percent of the mid-elevation ponderosa pines are dead. Weakened by drought, oaks are succumbing to sudden oak death along the central and northern coast, and the disease has moved into the
Central Valley. Pines gray as ghosts haunt coastal, Cascade and Sierra foothills. The epidemic is spreading across choice vistas owned by millionaires as well as remote landscapes rarely entered by humans.

And the bark beetles that caused this desolation? They're reproducing at triple the normal rate. Forest ecologists used to consider them a natural part of the forest dynamic — and they are. Stressed by drought and decades of air pollution in overcrowded stands, however, the natural chemicals trees pitch out in self-defense can't keep up with the onslaught of bugs. No one is calling what's happening here natural anymore.

"Nobody imagined this would come on as fast as it has, or be as lethal," says Craig Thomas, conservation director for Sierra Forest Legacy, a coalition focused on Sierra Nevada national forest issues. "And nobody really knows what the hell to do."

Overwhelmed by the die-off, forest management agencies are resorting to a century-old strategy: removing dead trees to minimize future wildfires, which they predict will be inevitable and cataclysmic. Gov. Jerry Brown declared a state of emergency in October, citing a

public safety hazard from falling trees and worsening wildfire risks. The tree mortality task force he convened has marshaled a small army to log over 6 million acres.

In June, U.S. Agriculture Secretary Tom Vilsack called for Congress to provide funding to fight the “unprecedented and increased risk of catastrophic wildfires.”

It may seem logical that all these dead trees would fuel massive conflagrations. Scientists, however, say climate, not dead trees, drives fire risk. That leaves California poised to log millions of standing dead trees without addressing a central -question: Are they actually a fire hazard?

A worker cuts the top off a bug-killed tree in the Lake Tahoe area of California. Statewide, drought and bark beetles have killed more than 66 million trees.
Randy Pench/The Sacramento Bee/ZUMAPress.com

Chainsaws and chippers are already at work in 10 counties clustered along the Sierra Nevada's southwestern slopes. Crews are focusing first on some 230,000 acres of dead trees along roads, in public campgrounds and around communities, a task expected to continue through the summer and beyond next winter.

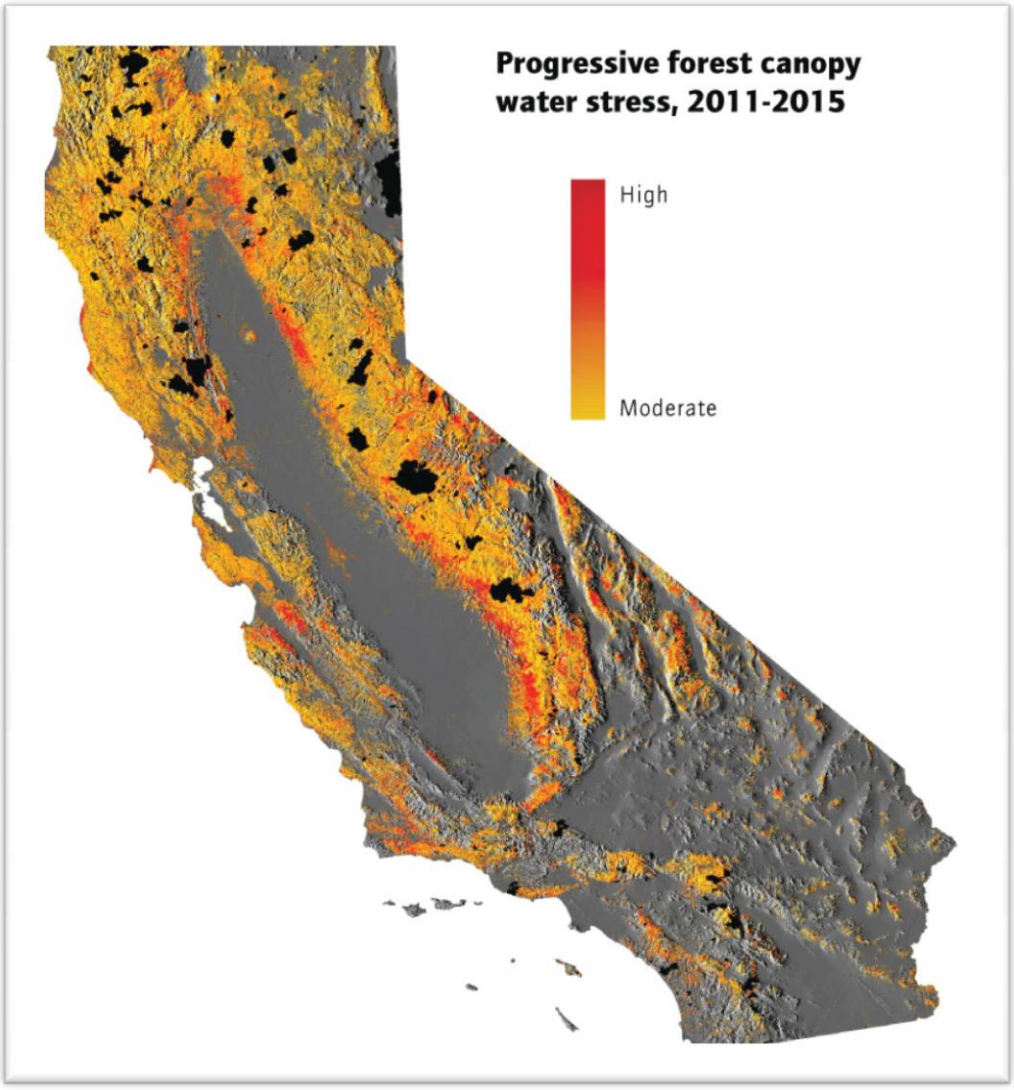
Nearly everyone supports removing dead trees that can crash onto houses, roads and power lines. It is the next phase that is controversial. The task force has identified high-hazard areas in both privately and publicly owned forests totaling 6.3 million acres — more than double the combined size of Yosemite and Yellowstone national parks. The computer-generated hazard-tree maps include entire watersheds where mortality exceeds 1.5 percent. Some are in the backcountry far from human habitation.

Critics argue that this is an unacceptably low threshold that poses unacceptably high risks to forests. It could lead to logging in old-growth forests and other stands that are still healthy and not severely impacted by drought, thereby threatening wildlife diversity and disturbing ground cover that nourishes an array of plants and animals. Only a well-tended tree farm would be safe under such standards, says Brian Norwicki, California climate policy director for the Center for Biological Diversity.

But at the heart of the logging debate is the question of whether dead trees are a fire hazard. The conventional assumption is that insect outbreaks increase wildfire risk because dead trees are more flammable than green ones. That is a conclusion most scientists have long disputed.

Researchers have found that beetle kill, even when it consumes whole landscapes, does not increase the likelihood of the big, hot fires that can wipe out entire stands and leave soils so charred they can't absorb water. Some analyses indicate that dead trees can even reduce fire risks: Once the needles on a bug-killed tree drop to the ground, the

most flammable fuel has left the forest canopy. This reduces the source of the flames that spread most quickly from tree crown to tree crown, escalating the scale of the blaze, Garret Meigs wrote in an April study published in *Environmental Research Letters*. The Oregon State researcher found forests impacted by the mountain pine beetle were actually less susceptible to fire for as long as two decades after the trees died.



Areas with high water stress between 2011 to 2015 are the approximate regions where the Forest Service counted 66 million dead trees from 2010 to 2015. Measuring water stress can help predict the mortality of trees, and trees under water stress are better indicators of fire risk than dead trees because they still have needles (fire fuel), and they are dry. *Source: Gregory Asner/ Carnegie Institution for Science*

Hot, dry, windy climatic conditions, not dead-tree density, drive fire risk, scientists say. And not just in drought-plagued California: Between 1979 and 2013, increases in temperature and wind speeds combined with a greater number of rain-free days to lengthen fire seasons worldwide by nearly 20 percent, according to a study published in *Nature Communications.* As counterintuitive as it may seem, during extreme drought, green forests may be even more flammable, says Dominik Kulakowski, a research professor at Clark University in Massachusetts. Needles lost from the tops of trees are more important to reducing the risk of fire than the standing dead wood, he says.

Whether scientific studies like these will affect California's response is an open question. But the sheer magnitude of the die-off is forcing a focus on forest management that transcends the immediate emergency. Land managers, conservation and community leaders are reassessing past practices, such as fire suppression, that have led to high-severity fires and forest mortality. "It's not a path we want to stay on," says Jim Branham, executive officer of the Sierra Nevada Conservancy. The drought offers an opportunity to determine how to deal with a future where the climate is changing, he says.

The shock of losing so many trees has also generated an unexpected consensus over such issues as returning fire to the landscape to restore forest health. People's minds are changing "as fast as anything I've ever seen," says Thomas, the Sierra Legacy director and an advocate of prescribed fire and managing, rather than putting out, fires started naturally by lightning. "That tells me we're getting somewhere."

These discussions remain contentious, and they are happening under the duress of an epidemic of dead trees in a culture accustomed to suppressing fire. Meanwhile, more trees are turning brown day by day as bark beetles munch their way through another summer.

Jane Braxton Little explores science and natural resources for publications including National Geographic, Scientific American *and* The Sacramento Bee *from Northern California.*