

States are growing fewer trees. Forest owners say that's a problem

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When wildfires ripped through Oregon last Labor Day, they burned huge swaths of forest, including 63,000 acres of smaller, private lands.

Oregon state law requires forest owners to replant their land within two years of a wildfire, but many haven't been able to: They used to rely heavily on state-run tree nurseries, but Oregon closed its nursery more than a decade ago.

"We're scratching our heads over this trying to address the need from the fire," said Glenn Ahrens, a forester with the Oregon State University extension service.

Seedlings are hard to come by. Large, commercial nurseries typically grow large tree orders on contract, supplying industrial timber companies that plan operations years in advance. State-run nurseries provide a more diverse array of species to landowners, allowing smaller orders on short notice. Many of the family foresters hit by the Oregon fires have struggled to obtain [seedlings](#) from the private sector.

The seedling problem is not unique to Oregon. Eight states have closed their nurseries, most in the past two decades, according to a survey by the National Association of State Foresters. Twenty-nine states still operate nursery programs, though many have closed some of their facilities.

The declining state production has hurt small landowners, who own the largest share of the nation's forests. Private sector nurseries often lack many of the [tree species](#) offered by states, and they rarely accept small orders. In many cases, nursery closures have led to cutbacks in state research and breeding programs that produce [trees](#) more capable of withstanding the effects of climate change.

The foresters association survey found that seedling production at state-run nurseries fell by 28% between 2016 and 2018. In 2018, state nurseries produced 123 million seedlings, about a tenth of the nation's total.

There are many reasons for the closures. State nurseries often have to cover their own operating expenses through seedling sales, and they've struggled to break even on the unpredictable speculative market. They've also faced political pressure to reduce capacity or close, as private growers bristle at competition from the public sector.

"The private sector doesn't like the idea of competing with public nurseries," said Brian Kittler, a reforestation expert with American Forests, a Washington, D.C.-based conservation nonprofit. "That has led to dramatic reductions in production over time from state nurseries."

The result leaves small landowners at a disadvantage.

"It's much harder for them to enter that market, because a commercial nursery isn't very interested in an order for 100 trees," said Ryan Gordon, family forestland coordinator with the Oregon Department of Forestry. "That's precisely the niche that the state-run nursery would have filled."

Gordon said the now-closed state nursery would have allowed officials to meet some of the current seedling need directly. The state agency and Oregon State University are helping small landowners coordinate aggregate seedling orders, increasing their buying power. The state has also purchased 450,000 seedlings and is reserving them for small landowners to buy. The state's nursery would not have been able to fully meet the need caused by the fires, but its closure removed a major resource.

Many state nurseries were founded in the 1920s and 1930s, and for decades they provided most of the seedlings available to the public in their states. Some produced hundreds of millions of seedlings per year, meeting demand created by federal reforestation incentive programs to mitigate erosion and improve soil quality. Production ebbed and flowed

with timber harvest cycles, and over the years, commercial timber companies began to join the seedling market.

As more private nurseries sprang up, many states scaled back theirs. Georgia, for instance, operated five nurseries that produced more than 100 million seedlings a year in the late 1980s. Today, its last remaining nursery grows just 12 million to 16 million seedlings annually.

Forestry experts say the rise of private sector production isn't necessarily a problem, and there's no longer a need for states to produce at their previous volume. But state nurseries still play an important role. Many of them provide seedlings for reforestation on state lands, but in many states, their primary role is supplying small forest owners.

Half of the country's forestland is privately owned, and about two-thirds of that is owned by families and individuals. The nation's 10 million forest landowners have historically depended on state nurseries for seedlings after timber harvests, wildfires and windstorms.

"We relied on the public nurseries to supply us," said Keith Argow, policy director of the National Woodland Owners Association, a Vienna, Virginia-based education and advocacy group. "We knew the cost of seedlings and we knew they'd be available. When it started going to the private sector, you couldn't be sure what would be available."

When state nurseries have shut down, Argow said, he's heard a consistent message from small forest owners: "Help! H-E-L-P. What do we do now?"

Minnesota lawmakers decided in 2011 to close one of the state's two nurseries, and officials have capped production at 10 million seedlings to avoid competition with the private sector. But private nurseries have not met the demand for conservation-grade seedlings, said Kristina Somes,

who oversees the Minnesota Department of Natural Resources nursery.

"There isn't a lot of choice for a private landowner to get those different types of seedlings without going out of state," she said. "Each year we tend to run out of certain seedlings or species. Then customers can't get white pine, and we have a waitlist two pages long."

Daryl Buck is the district manager for the Winona County Soil and Water Conservation District, which procures trees on behalf of local landowners for conservation plantings. The district's efforts have been hampered by the drop in Minnesota's seedling production.

"The availability of trees to private landowners has dropped drastically," Buck said. "We used to buy most of our trees and shrubs through the DNR. They don't have the numbers, and we haven't bought from them the last couple years. We buy from private nurseries, but they don't have the numbers either. We've turned away a lot of sales because everybody's sold out."

The cutbacks have been felt most strongly in the Southeast, where much of the nation's private forestland and a majority of the state nursery production are concentrated.

Louisiana's program, which produced a nation-leading 33 million seedlings in 2016, closed its three nurseries amid statewide budget cuts. State Forester Wade Dubea said the state nurseries provided a wealth of low-cost seedlings, including important wetland species and small shade tree packets.

"The simple fact that state nurseries are having to downsize or close does not reflect at all that they're not needed," he said. "It simply had to do with the budget climate in Louisiana at the time."

Commercial nurseries in Georgia lead the nation in seedling production, growing more than 350 million trees each year. The state's nursery sells fewer trees, but offers more species and will sell smaller volumes of trees to owners with just a few acres.

"We cater to the smaller landowners and try to meet that niche," said Jeff Fields, chief of reforestation at the Georgia Forestry Commission. "A lot of that would be lost [if the state nursery closed], because a lot of the larger companies are just wanting to deal with larger customers."

South Carolina has taken a unique approach. Its nursery production, which stood at 147 million seedlings in 1960, fell to 1.1 million by 2015 as the [private sector](#) expanded in the state.

The state's last remaining nursery was struggling to stay afloat, but officials knew it was still important to its customers. In 2018, the state agreed to lease the nursery to ArborGen, a private company, for 10 years. ArborGen is working to upgrade the facility, and has also pledged to supply up to 5 million seedlings annually for the state, filling the role the state nursery once held.

"We can still determine the selections to be offered at a price that we set," said Tim Adams, resource development director with the South Carolina Forestry Commission. "Some people want seedlings for unique habitats and ecosystems, and because of this agreement, ArborGen is still producing those seedlings."

Owen Burney, an associate professor at New Mexico State University who has researched nurseries, said public-private partnerships like the South Carolina model could be a way to continue to meet the role of state nurseries while accounting for the financial challenges they face.

"That combination could allow for the money that's generated through

the large contracts to help support the speculative growing for the small landowners," he said. "We still need to grow for those very unique and important niches."

Forestry experts say all nurseries, not just state ones, need to drastically scale up production to meet the nation's reforestation needs, especially as severe wildfires, droughts and diseases exacerbated by climate change increase tree mortality.

A recent joint study by state, federal, industry and nonprofit researchers found 128 million acres in the United States have the potential to be reforested. To plant just half of those acres would require a 2.3-fold increase in current nursery production, according to the February study, which was published in the journal *Frontiers in Forests and Global Change*.

"We have these denuded landscapes that are primed for invasive species, and we are not replanting at the capacity we need to be," said Burney, who co-authored the study. "If we don't do this soon, we'll be losing these forests left and right."

Private landowners play a critical if unheralded conservation role, said Amos Eno, the president and CEO of the Land Conservation Assistance Network, a nonprofit that provides tools for landowners to manage their land for conservation purposes.

"Eighty percent of endangered species habitat is on private land; 82% of wetlands are on private land," he said. "It is inarguably the most important conservation portfolio in the United States."

Private forestlands are especially vulnerable, he said, as many of them are owned by older adults who are increasingly selling off to developers. Without access to seedlings from state nurseries, it could become harder

for owners to maintain those lands.

Producing seedlings isn't as simple as planting a certain species of tree.

"A white oak that does well in Minnesota is not the same genotype as one that does well in Missouri," said Marvin Brown, who heads the Forest Resources Management Committee with the National Association of State Foresters. "As climates shift, it's going to be important to match those genotypes to the right environment."

Washington state, for instance, has 18 different "seed zones" for Douglas fir trees, and it produces seedlings that are adapted to each, based on soil types, elevation, temperature, sunlight and precipitation.

"State nursery stock is suited to the soil types and climate within their state, which can be quite different from a commercial nursery," said Argow, with the woodland owners group. "Most private landowners wouldn't have a clue how to get trees that are suitable to grow on their woodlands [without state nurseries]."

States also participate in tree improvement programs, which breed and research trees to find varieties that grow faster, withstand drought and disease and sequester more carbon. As some states have closed their nurseries, they've withdrawn from those programs as well.

Steve McKeand works with the North Carolina State University Cooperative Tree Improvement Program, which includes timber companies and state agencies throughout the South. He said the loss of state partners has slowed the group's work.

According to McKeand, tree improvement adds about 1% in economic value to the loblolly pine trees planted each year in the South by increasing volume and disease resistance. When tree improvement work

slows by just 0.1%, it has an economic impact of \$200 million per year, he said.

While some private companies have programs for popular timber species, divestment at the state level has left other breeds vulnerable.

"The only way to mitigate these exotic pests like the emerald ash borer is trying to find genetic resistance," McKeand said. "The private companies are not going to go out and have seed orchards and tree improvement programs for 25 or 30 different species the way some of the states do. That concerns me, and I worry about these ecologically sensitive species."

Brian Morris, who manages Washington's state nursery, said tree improvement has been an important part of the state's work.

"Our best tree of 15 years ago is worse than our worst tree today," he said. "We're producing a much better-quality tree, and you can reforest a larger number of acres if you're producing higher-quality trees."

One state is bucking the trend of nursery divestment. California closed its last nursery in 2011, but after the state was hit with devastating wildfires and tree die-offs, officials changed course.

Since 2017, the California Department of Forestry and Fire Protection has been working to restart the [nursery](#) program at the L.A. Moran Reforestation Center. The agency expects to grow 260,000 seedlings this season, with the goal of working up to 500,000.

"There was a realization that we're going to need to provide seedlings in response to losses from fires and tree mortality," said Anthony Lukacic, who manages the reforestation center. "For small private landowners especially, there was a hole in supply for that sector. Half a million

seedlings is a drop in the bucket in terms of what's needed, but the more options there are to get seedlings at a reasonable price, the more likelihood that property will get reforested."

The agency is also collecting seeds from California's 88 seed zones, and it's working with federal and academic partners to come up with seed transfer guidelines, helping landowners determine which seed stocks may be the best match as climate change alters conditions.

That sort of work is a crucial role of state nurseries, said Brett Butler, a U.S. Forest Service researcher who works with forest landowners.

"That educational piece tends to be more governmental in nature," he said. "State nurseries have a larger palette they can use to help landowners paint the landscape."

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