

New uses for dead ash, fir and tamarack trees could help restore Minnesota's forests

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One invasive beetle is ready to devour just about every ash tree left in Minnesota's woods. A caterpillar has killed more than 200,000 acres worth of balsam fir trees in just the last year. Another beetle, a native in

the midst of a population boom, has already destroyed about half of the state's tamaracks.

Add it all up and pest outbreaks have left Minnesota with quite a lot of dead trees, useless lumber and dried-out and wasted stands, which, if left to rot, will become one large fire hazard.

But there's little incentive to cut ash, balsam fir and tamarack trees down—even as state and local foresters need to thin them before the pests come through—because they have limited uses and have never been highly sought for lumber.

To try to change that, researchers at the University of Minnesota Duluth have been racing to find novel ways to make the trees more desirable and valuable to builders, homeowners, lumber mills, city wastewater plants and anyone else who might be willing to come and remove them both before and after the bugs take them down.

"Anything we can do to find a way to increase the harvest of those trees is good," said Matt Aro, researcher at the university's Natural Resources Research Institute.

One of the more promising uses of the dead [wood](#) is to heat it to extremely high temperatures to reduce it to a char. The charred remains, when done at the right temperatures in kilns with limited oxygen, are a powerful filter for chemicals and bacteria in wastewater and soil. The city of Minneapolis has been working with the Research Institute to test out "biochar," which also comes from agricultural waste, on roadways and in soil remediation projects since 2014.

Jessica Hartshorn, a forester with the Minnesota Department of Natural Resources, points out a dead larch beetle under the bark of a tamarack tree in the forest south of Grand Rapids. The bugs, native to Minnesota,

have exploded since 2000 because of longer warm seasons. Photo by Josephine Marcotty

It's helped restore boulevard trees harmed by road salt, as well as filter E. coli and pesticides from soils, said Jim Doten, biochar project manager for Minneapolis.

"You first hear about it and think maybe it's snake oil, but it works," Doten said.

Those dead ash, fir and tamarack trees don't just pose a fire hazard. When they die too quickly, young saplings struggle to grow up to replace them, especially in the case of tamarack trees that grow in northern swamps and marshes where few other trees survive.

Studies from the Department of Natural Resources and the University of Minnesota show that when tamaracks are left for the beetle and killed where they stand, only 100 or so saplings survive per acre. That's low enough to risk deforestation. On the other hand, when the trees can be cleared by foresters and reseeded before the beetle kills them off, they replenish with about 800 to 1,000 new saplings per acre, well within the bounds of a healthy young forest.

The problem is there has never been much demand for tamarack wood.

So the quickest way to get to some of those [trees](#) before they die off is to improve their usefulness as lumber, Aro said.

Aro and the Research Institute have been thermally modifying tamarack wood, changing its chemical makeup by heating it in a low-oxygen environment.

The idea is nothing new. Farmers have been heating wood to make it

more useful for centuries, burning the bottoms of fence posts to keep them from rotting in the soil, Aro said.

"Wood and water have been enemies forever," Aro said. "When wood is wet it swells and when it dries it shrinks, causing it to warp or crack."

After the wood is thermally modified it absorbs less water, avoiding swelling and shrinking. It becomes more resistant to fungal decay and rot, turning tamarack into an option for decking, boardwalks and building construction.

It's hard to say how strong the market may be for modified wood, Aro said. The industry is relatively new in North America, gaining steam here in the last 15 years or so.

"But what we're seeing is that it can take some of the lower-value wood in our region and upgrade it and make it possible to be used in ways it couldn't be used before," he said.

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