Squeezing secrets from the trees

Jessie Young-Robertson ’20

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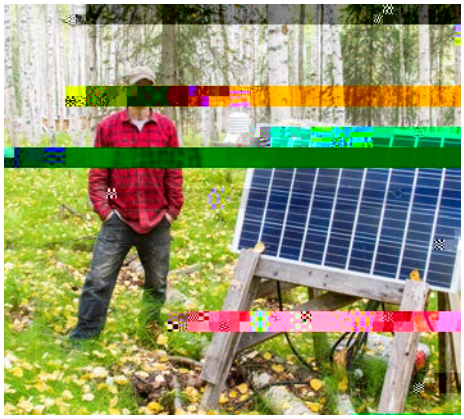
The bands, used to measure trunk circumference, had slipped down the trees. Without the bands in place, she had no data.

Young-Robertson, a UAF research associate professor, suspected what had happened.

Today, her research has not only confirmed her suspicions but also inspired a project that could help clean up Alaska's wood stove smoke by identifying the best times to cut firewood.



That reading pleased Milkowski, especially since his wood had just sat through one of the wetter Augusts on record. If the moisture content had been higher than 20 percent, Milkowski soon would not have been able to sell his product.

On Oct. 1, the state Department of Environmental Conservation set new rules for the local area considered to be in "nonattainment" of federal air quality rules. Any firewood advertised, marketed or sold in the area must have a moisture content of 20 percent or less.

The idea is to reduce wood stove emissions of particulate matter 2.5 micrometers or smaller. That’s about 1/20th the diameter of a human hair.

When burned, wet wood produces far more of these particles than dry wood does.

The airborne partic ® particles t o = òmD v oĊ

Given that situation, Milkowski said, he is happy to play a small part in Young-Robertson’s project.

Young-Robertson and her husband Matt Robertson, a field technician at UAF's Forest Soils Laboratory, set up a variety of sensors in the woods just off Milkowski's sale site.

The state-of-the-art tree sensors — not the old drop-prone metal bands — are bolted to birch trees near Milkowski's

Young-Robertson earned a doctorate in ecology and evolutionary biology at the University of Arizona. She'd grown up in New Mexico, but she decided "the desert wasn't my thing." So she moved north, becoming a postdoctoral researcher at UAF in 2009.

She later found a research faculty position at what is now the Institute of Agriculture, Natural Resources and

“They’re a lot more active than people have thought,” she said.

contains solutes, she said. The solutes could lower the freezing point, similar to the chemical effect seen in saltwater.

“These are very cold-adapted trees,” she said.

Young-Robertson continues to investigate the patterns in this process.

“It seems to depend on the winter. You can have an October where suddenly it drops way, way below freezing and stays there, and they’ll dump a lot of water. Or it will dip just a little below freezing, and they’ll dump less water more slowly,” she said.

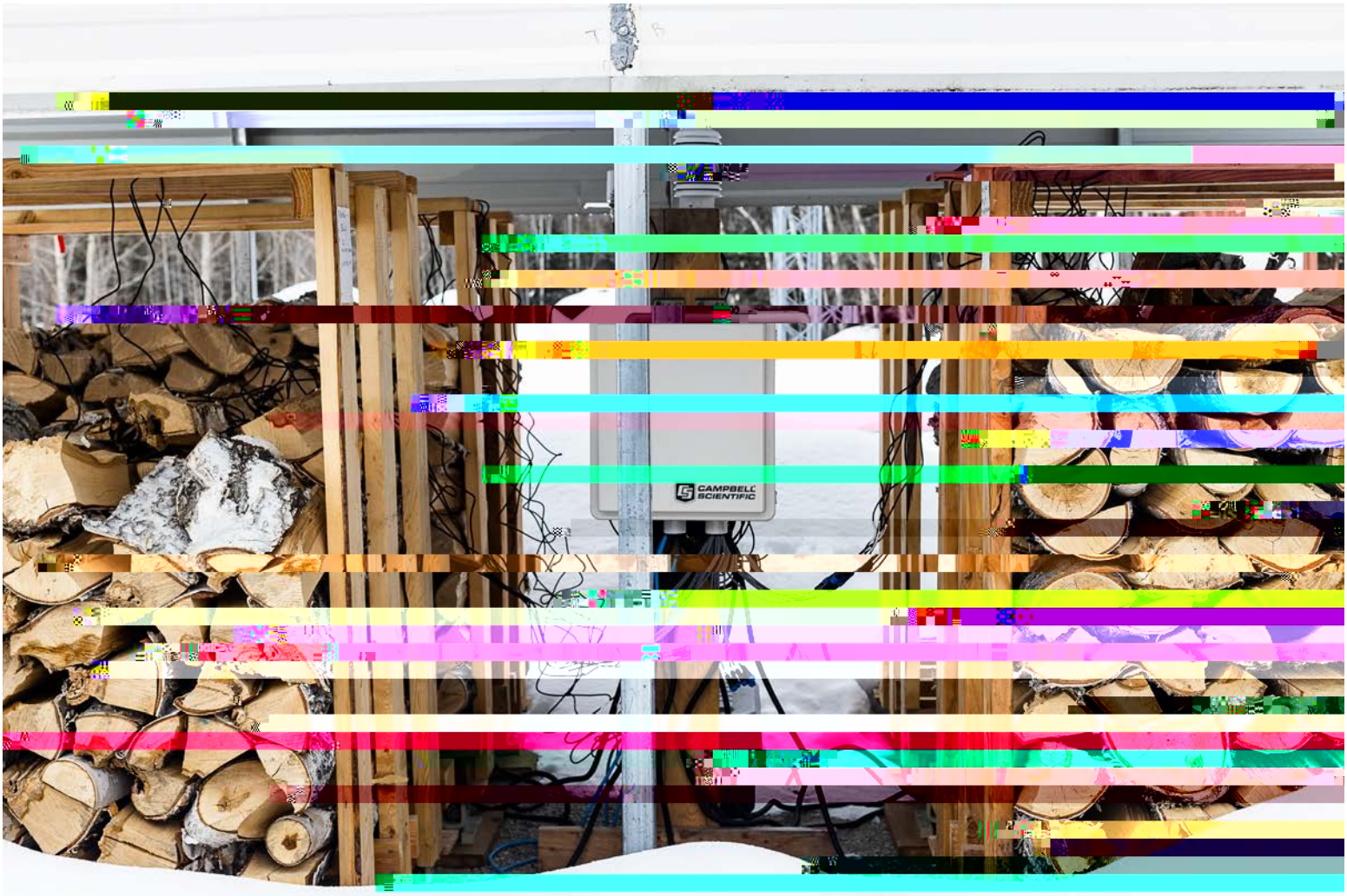
“We’re still learning how much they dry over the winter,” she added.

In spring, as temperatures rise and fall around the freezing

But when spring temperatures remain firmly above freezing, the trees become highly saturated, she said.

Then, as leaves sprout, the water content in the trunks will drop again. “They can put almost 20 percent of their water

It looks like any other neatly arranged Fairbanks woodpile, except that this one sprouts a variety of wires and electronic devices.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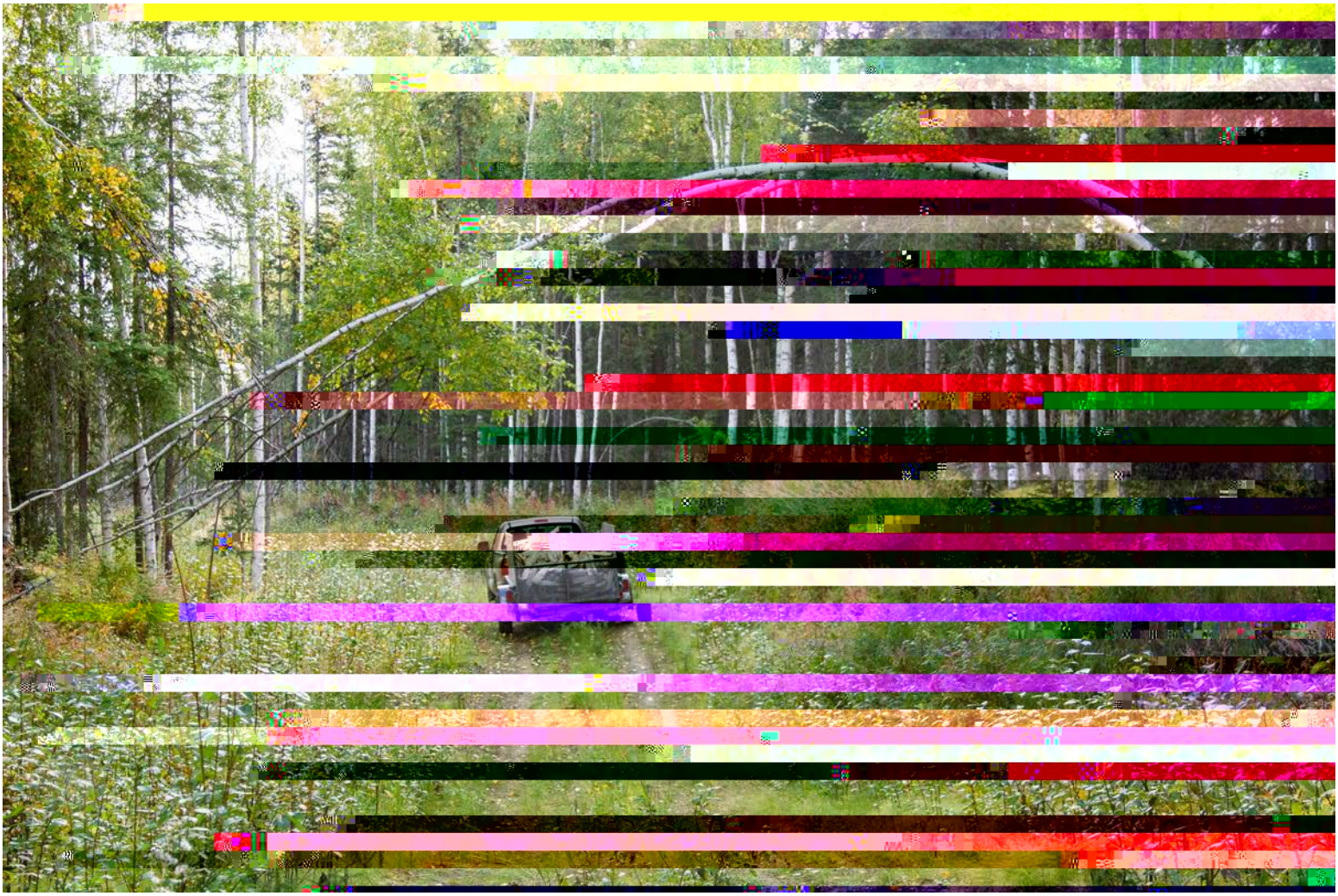
The stacks were cut in July, September and October 2020, respectively. They sit on scales, and pieces of wood within them have been outfitted with the same moisture sensors used on the live trees.

“We’re measuring their dry-down, through weight, and we’re calibrating it to the sensors,” Young-Robertson said.

The goal is to produce an ideal drying schedule based on when a person has cut their wood.

“What we’re doing here is to recreate something that somebody might have under their woodshed at home,” she said. “Matt followed guidelines for how to stack and split and all that.”



Milkowski said he sees Young-Robertson's study as potentially most helpful to private woodcutters or small commercial operators like him who have flexibility to cut