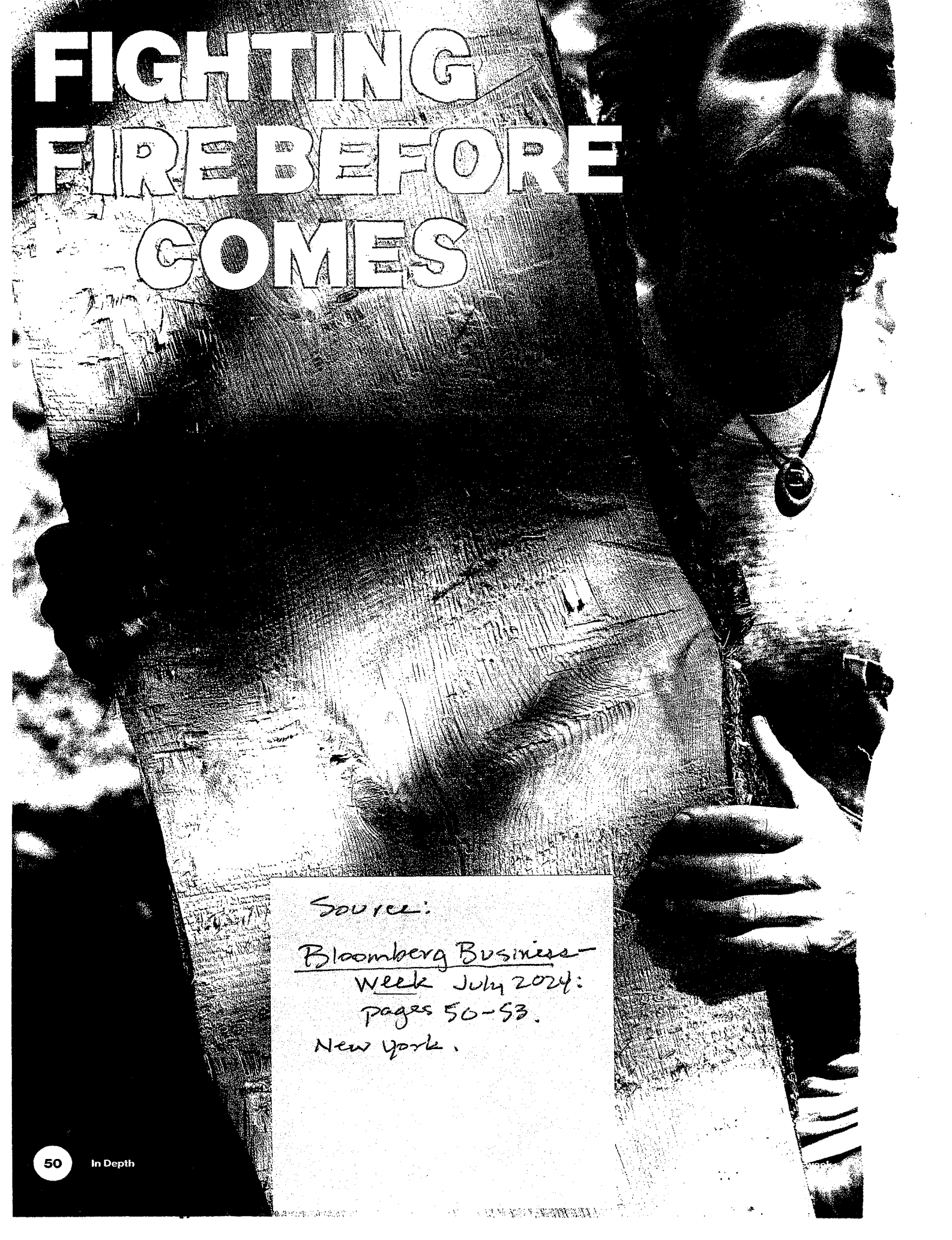


# FIGHTING FIRE BEFORE IT COMES



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**As wildfires become a bigger threat, US communities are scrambling for home protection solutions. In Boulder, Colorado, trees are getting torn out and mushroom spores are being scattered around town**

● By Kyle Stock

Juniper trees are ecological marvels. They can live for a millennium and have been growing in Boulder for about 40 million years. Birds nest in them and eat the berries, as do rabbits, raccoons and coyotes. Mountain lions hide in junipers when stalking prey, and porcupines love to nap in them. Landscapers are fond of them, too. Not only are junipers dense enough for privacy, but they're also drought-resistant, with oily leaves that look more like miniature clusters of ocean coral than evergreen needles.

It is, however, time for them to go.

All the features that make junipers hardy also make them an economic and safety hazard in our warmed-up world. Junipers don't just catch fire, they essentially explode, jettisoning embers that can travel for miles on a windy day. "We call them 'green gasoline,'" says Steve Orr, a community risk reduction specialist with Boulder Fire-Rescue. "It's basically a perfect campfire."

Junipers blanket Canada, but thick fingers of them extend south at high elevations in the American West, and they thrive in Boulder, a crunchy college town tucked up against the Rocky Mountains about 40 minutes northwest of Denver. These days, Boulder is pushing a new agenda: Junk your junipers. As climate change exacerbates wildfire conditions in the western US, thousands of communities are going to extreme and expensive ends in hopes of avoiding catastrophic conflagrations. Last year, Boulder increased its spending on climate resilience from \$4 million a year to \$6.5 million; that's almost 2% of the city's operating budget, and one-quarter of the money is aimed at wildfire mitigation.

For Ryan O'Malley, thinning his 35 acres has been almost a full-time job for about six years

The city can trace its angst to Dec. 30, 2021, when the Marshall

Fire—the most destructive in state history—sparked to life. It had been a wet spring, so weeds and grasses grew tall and dense before the rain all but disappeared for six months. Typically, snow snuffs out fire season in late fall, but that hadn't showed up either.

By the time the Marshall blaze was contained six days later, it had destroyed 6,026 acres and 1,084 homes, mostly

chief of the Division of Wildland for Boulder Fire-Rescue, "and then all of a sudden overnight it's like, 'Can this happen here?'"

Alisa Koenigsberg has only recently finished rebuilding after her home was lost to the Marshall Fire. "The entire community has PTSD," she says. "On high wind days, they essentially explode"

Juniper trees are drought-resistant, though in a wildfire they essentially explode



in Boulder County just southeast of the city's border. In the same period, the city was inundated with about 500 requests for home assessments: detailed reports on what residents can do to lower fire risk—cleaning gutters, for example, or removing trees near buildings and fences.

"We've been talking about this stuff for decades," says Brian Oliver,

our anxiety is through the roof."

The refrain from public officials is brutally straightforward: A catastrophic wildfire will be costly, both ecologically and financially. "This is a crisis, and we're going to have to do some pretty extreme things to address it," says Victoria Amato, an environmental consultant working on Boulder's plan. "Sometimes it's not going to be very palatable, ►

◀ but it's going to help prevent the really catastrophic impacts."

In addition to scrubbing junipers, fire crews are burning open space whenever possible and thinning deadwood and forest canopies that have grown unchecked for decades. Meanwhile, the danger is catalyzing a cottage industry of fire mitigation services—both traditional and experimental—catering to increasingly wealthy residents eager for new solutions.

Trouble is, while mitigation programs reduce risk, even the most aggressive of them is unlikely to cancel the rising threat of wildfire in a warming climate.

The federal government estimates that about 72,000 communities bump up against fields and forests at risk of burning, the so-called wildland-urban interface. Many of these towns are rushing to update decades-old fire mitigation plans.

SWCA, an international environmental consulting firm, is helping to update Boulder's Community Wildfire Protection Plan, a 100-plus-page play-book for public officials and residents. In its 43 years, the company has worked on 100 such programs; at the moment, it has 10 underway.

"It's not even just the western US anymore," says Amato, a principal fire

planner at SWCA. "We're getting calls from Maine, Pennsylvania, the Upper Peninsula of Michigan."

When it comes to trees, Boulder has traditionally been more on the hugging side than the cutting. It attracts climbers, skiers and cyclists who've geared their life around the outdoors. In 2007 the city levied the first carbon tax in the country, and at Naropa University in town, students can get graduate degrees in ecopsychology.

The same things that make Boulder such a heaven for neo-hippies—miles of open space and pristine mountain forests and a relatively sparse population—have made it a mecca for tech refugees and other affluent newcomers. Google has about 1,500 employees in the area who flex their expense accounts at restaurants owned by Kimbal Musk, Elon's brother.

The median household income in Boulder County has climbed to \$97,000, almost one-third higher than that of the nation at large. And property values have surged. In the past five years, the average home price has increased 39%, according to the Federal Reserve. The median list price on Zillow is \$1.24 million.

The mitigation efforts haven't been met with protests, as they might have been a decade ago. Home equity and

fire anxiety go hand in hand, as residents consider the cost of properly insuring their property and, possibly, rebuilding. But it takes more than money to prepare: Commitment and time are required. Ryan O'Malley and Maya Ward-Karet's 35 acres, a 12-minute drive from downtown, are a showcase for how labor intensive wildfire mitigation can be.

The couple's cabin, which they built, sits on a cleared hill, swooning into steep ravines where meticulously spaced trees are, for the most part, free of deadwood. Hundreds of small stumps are peppered throughout, a testament to how dense it used to be.

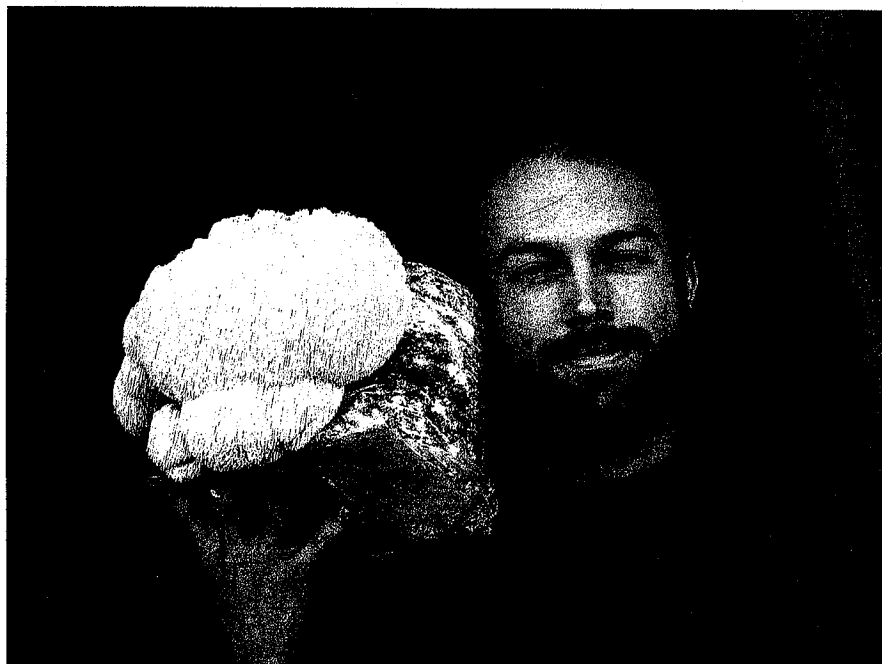
O'Malley spends most of his waking hours tending to the land: felling trees, limbing trees, hauling and winching and whacking and chipping and burning. He's been at it for almost six years and has only begun to feel as if he's getting to a good place.

"It's literally a lifetime of work, and it doesn't end," he says.

Boulder kicked off its junk your junipers campaign about a year ago and in May began to mow borders around much of the city's open space. Public officials have set an aggressive schedule of prescribed burns and hired a team to assess the fire risk of the town's homes and businesses. So far they've inspected about one-third of the buildings in town. When they finish, they'll start over.

The danger has also catalyzed entrepreneurship in the private sector, creating alternatives to simply cutting and burning. Jacob Austin was a senior at the University of Colorado's Boulder campus when the Marshall Fire raged; his Flatiron Fire Defense grew out of a business class assignment. This year his crews will provide mitigation to about 100 Boulder-area homes, a service that executes many of the city's recommendations, including tree removal, gravel barriers, and the installation of metal siding and guards over vents and gutters. The average Flatiron mitigation service runs about \$2,500, though Austin says

many of his customers are willing to pay far more. ◀ Hedstrom's Boulder Mushroom sprays fungi spores on wood chips, helping them retain moisture



Tom Pietrykowski, a chemist who owns two homes west of Boulder, is on the waitlist for Flatiron's Ember Defense System, which is a network of sprinklers that douse a home in water and foam if a blaze gets close. Each deployment will cost between \$25,000 and \$50,000, plus an annual fee.

Most of the homes destroyed in a wildfire aren't engulfed in flames. Rather, they succumb to small, smoldering embers. Gutters, baseboards and vents in the roofs and eaves are particular weak points. "What you can do in the zero to 5 feet around your home can absolutely save your property," says Amato, the environmental consultant.

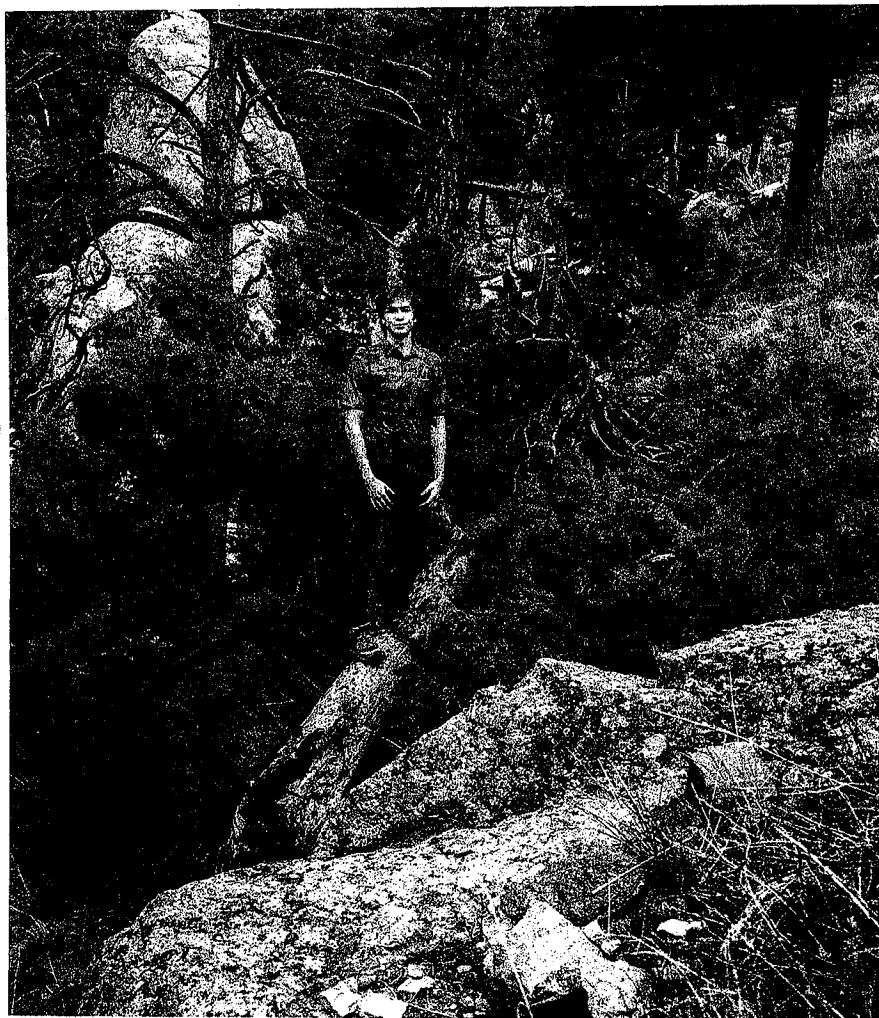
If all those things are soaked to begin with, Flatiron figures, the embers will find no purchase. "It certainly can't hurt," Pietrykowski says. "If your roof and eaves are wetted down, it gives you a chance."

Zach Hedstrom, meanwhile, has an organic solution. He started Boulder Mushroom in 2020, selling fungi to restaurants, but the business plan morphed when the Marshall blaze broke out a year later.

"The 'aha' moment was realizing, How would nature get rid of all this wood?" Hedstrom says. "There are two ways: fire and fungi."

He started treating wood chips with mycelium, a network of fungal threads that are more or less mushroom roots. The fungus spreads through the biomass like a dense spiderweb, sucks up moisture and slowly releases it. "You can think of it almost like a biological sponge," he says. The treated wood chips retain as much as four times more moisture than they would otherwise and decompose in less than two years, rather than the 50 or so that's typical in Boulder's arid environment.

In a small warehouse north of town, Hedstrom is brewing huge vats of mycelium—essentially mushroom soup—that can be sprayed on wood chips, ideally at a municipal depot where homeowners may fill a truck to get enough to spread around their property. If there's enough rain, the chips will "fruit" edible mushrooms, an unintentional upside.



The solution is still very much in beta mode. Among other things, Hedstrom is trying to dial in which fungi strains work best on which types of wood. But public officials are optimistic. To help scale up this operation, Boulder County gave Hedstrom a \$100,000 grant.

Still, all this hustling—whether by public officials and homeowners or environmental consultants and entrepreneurs such as Austin and Hedstrom—may be a bit of a Hail Mary in an environment that's growing drastically hotter and drier. In the past eight years, wildfires have burned more than 10 million US acres a year three times, a threshold that wasn't reached in three prior decades, according to the National Interagency Fire Center.

Brett KenCairn, the city's senior policy adviser for climate, says the best research suggests Boulder's wildfire risk will rise sixfold in the years ahead. Although Oliver,

of Boulder  
Fire-Rescue,  
says the town's urban  
center is finally in "a pretty  
good place" with mitigation, the vast forests stretching into the mountains to the west are a different story. For most of the past 100 years, the official response to wildfire was to snuff it out quickly. Consequently, the forests are 10 to 100 times denser than they should be, according to the county.

Up on his sprawling property, O'Malley is rigging a wood chipper onto the tracks of a deconstructed snowblower. He's worried about the thick national forest to the west. The US Forest Service and his neighbors in that direction aren't as diligent as he is, and he still has more to do. "The fire's coming. We know that," he says. "It could be tomorrow or could be years from now. I just hope it doesn't come until I get most of this done." **B**

↑ Austin's Flatiron Fire Defense is developing an automated sprinkler system that can coat a house in wet foam