

# The fast and the furious

## What we know about how plants burn

It's rare for the rainforest to catch fire; the Pacific Northwest's old-growth forests are some of the wettest places in North America. But this year, the Olympic Peninsula saw its driest spring in over a century, and in late May, a bolt of lightning ignited the desiccated lichen and timber of the Queets River Drainage in Washington's Olympic National Park.

Since then, the Paradise Fire has burned more than 1,600 acres, and fire officials expect it to continue until the end of summer. Much of the blaze has been spread by lichen, a composite symbiotic organism generally made up of fungus and algae. Lichen mantles the forest's centuries-old Sitka spruce, western hemlock and Douglas-fir, forming ladders that flames easily crawl up. When those ladders collapse, fallen logs provide more fuel and intensify the fire. Lichen and mosses are unusual culprits. Typically, fires are driven by one of four vegetation groups — grass, shrub, slash or timber. But climate change and an altered fire cycle mean different fuel types are now carrying fires, and that makes it all the more urgent for scientists to understand each species.

Matt Jolly, at the Missoula Fire Sciences Laboratory in Montana, is one of the only researchers in the world attempting to model fire behavior after

individual vegetation types. Instead of looking at a group, like timber, as a whole, Jolly examines the individual needles of a ponderosa pine. How quickly a plant ignites, and gets wet or dries, he explains, is directly related to its surface-area-to-volume ratio. "The fastest way to cook something is to flatten it out," he says. "By flattening it out, you increase the surface area and therefore the contact with heat."

That makes lichen, for example, incredibly flammable, far more than any other vegetation group. Moreover, unlike timber, which can take weeks to dry out, lichen can dehydrate in minutes. But just because lichen ignites quickly, doesn't mean it causes the most intense fires. Very hot fires need a large volume of fuel, or vegetation, to sustain them. That makes timber the most dangerous vegetation group.

Although the Pacific Northwest's forests are home to both lichen and massive stands of old-growth timber, fires there are typically restrained by other ambient factors, including rainfall. But as the drought persists and climate change alters humidity levels, rainforest fires could become more frequent. "It really depends what happens in the climate over the next 30 years," Jolly says. GLORIA DICKIE

has coordinated efforts to revegetate burned, mudslide-prone slopes.

Just as important as such concrete measures, Anders says, are the formal and informal networks built after the fire — within the county and without. "When we have to get a helicopter here, when we have to get the Red Cross here, we'll know who to call, and we'll be calling people we know intimately and personally," Anders says. "That is really the key — having that spiderweb of contacts that you can access right away."

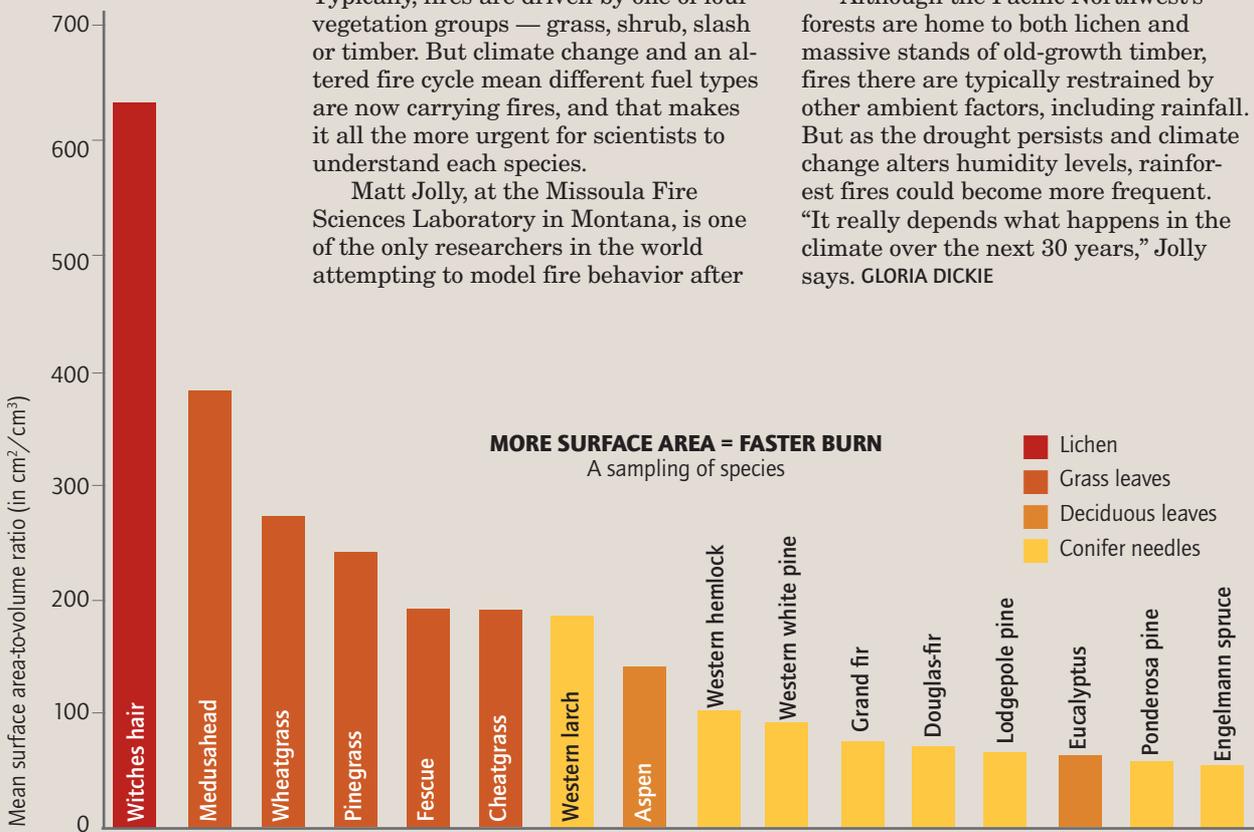
Relationships at the most local level have changed, too. "You think you know your neighbors," she says, "but you don't know them until you're sitting across the table from them and they're telling you about the pictures that they lost, the insurance they didn't have, all the things that are bothering them."

"We know each other like we've never known each other before — and I can tell you, these people will cover each other for decades. There is generational support in these relationships."

The cultural contradiction at the heart of the rural West — stubborn individualism combined with a deeply ingrained expectation of government support — may have met its match in large, destructive fires like the Carlton Complex. While many in Okanogan County still treasure their independence, many now recognize the value of interdependence, among their communities and beyond county boundaries. And though questions linger about last summer's state and federal firefighting efforts, there's a growing sense that wildfires are no longer just someone else's responsibility. Modern wildfires require more of everyone—not only of federal, state and local governments, but also of homeowners and neighborhoods.

Since 2009, the Department of the Interior and the Department of Agriculture have been developing a new wildland fire management strategy — usually referred to as the "Cohesive Strategy" — that emphasizes community preparation. "We've evolved from saying 'We can get it done' to recognizing that shared responsibility is absolutely critical," says David Calkin, a Forest Service fire researcher. Community preparation not only protects homes but may also relieve persistent local and state pressure on the Forest Service to fight essentially untamable fires — which would, in turn, save money, reduce firefighter risk, and allow fires to finally regain their place in the ecosystem.

This summer, Sen. Maria Cantwell, D-Wash., is preparing to introduce legislation that would, among other measures, build on the Cohesive Strategy by providing financial assistance to counties that protect existing houses and prioritize development in areas with lower fire risk. At the same time, Western governors, including Inslee, are calling on the Federal Emergency Management Agency



### BURNS FASTEST (under similar environmental conditions)



### BURNS HOTTEST

SOURCES: MATT JOLLY, MISSOULA FIRE SCIENCES LABORATORY; JAMES K. BROWN, RATIOS OF SURFACE AREA TO VOLUME FOR COMMON FUELS, 1969. PHOTOS CC VIA FLICKR BY, FROM LEFT, SCOTT DARBEY, JIM KENNEDY, NATURE80020, MAREN, SANCHO MCCANN