

# Western wildfires destroying more homes per square mile burned, finds new analysis

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More than three times as many houses and other structures burned in Western wildfires in 2010–2020 than in the previous decade, and that wasn't only because more acreage burned, a new analysis has found.

Human ignitions started 76% of the wildfires that destroyed structures, and those fires tended to be in flammable areas where homes, commercial structures, and outbuildings are increasingly common.

"Humans are driving the [negative impacts](#) from [wildfire](#)," concluded lead author Philip Higuera, a fire ecologist and professor at the University of Montana, who wrote the assessment during a sabbatical at the Cooperative Institute for Research in Environmental Sciences (CIRES) and CU Boulder. "Human fingerprints are all over this—we influence the when, the where, and the why."

Most measures of wildfire's impact—expansion of wildfire season into new months, and the number of structures in flammable vegetation, for example—are going in the wrong direction, Higuera said. But the new finding, published February 1 in *PNAS Nexus*, also means that [human action](#) can lessen the risks of wildfire damage.

"We have levers," he said. "As climate change makes vegetation more flammable we advise carefully considering if and how we develop in flammable vegetation, for example."

During Higuera's visiting fellowship at CIRES, he worked with several researchers to dig into the details of 15,001 Western wildfires between 1999 and 2020.

Burned area increased 30% across the West, the team found, but structure loss increased much more, by nearly 250%. Many factors contributed, including climate change, our tendency to build more homes in flammable ecosystems, and a history of suppressing wildfire. Co-author and CIRES/CU Boulder Ph.D. student Maxwell Cook said that the forcible removal of Indigenous people from landscapes played a role, by all-but-eliminating intentional burning, which can lessen the risk of more destructive fires.

"Prescribed fire is an incredibly important tool, and we have a lot to learn about how people have been using fire for centuries," Cook said.

In the new assessment, the team found some just plain horrible years for wildfire: 62% of all structures lost in those two decades were lost in just three years: 2017, 2018, and 2020, Cook said. And some states had it much worse than others: California, for example, accounted for more than 77% of all 85,014 structures destroyed during 1999-2020.

Across the West, 1.3 structures were destroyed for every 1,000 hectares of land scorched by wildfire between 1999 and 2009. Between 2010 and 2020, that ratio increased to 3.4.

Importantly, Higuera and his colleagues also found variability among states in how much burning occurred and how many structures were lost in wildfires. Colorado, for example, doesn't burn that much relative to how much area could burn, but the state's wildfires result in high structure losses. Here, wildfires were dominated by human-related ignitions late in the season and near structures and flammable vegetation. The 2021 Marshall Fire, too late to be included in this analysis, exemplifies this pattern, Higuera said.

California also sees losses from wildfires, but [burns](#) much more overall. Each state could benefit from policies that address human-related ignitions, especially during late summer and fall and near developments, the paper concluded, and from policies that address fire-resistant building materials and consideration of nearby vegetation.

States like Montana, Nevada, and Idaho, by contrast, have large areas of less-developed land, so most wildfires burn from lightning ignitions and few destroy homes or buildings. Policies in these [states](#) could focus on maintaining safe landscape burning.

Finally, [climate change mitigation](#) is also essential, Higuera, Cook, and their co-authors concluded. Longer fire seasons—a result of [climate change](#)—mean that human-related ignitions are more consequential, leading to more destructive wildfires in the fall and early winter, for example, when they were once rare.

**More information:** Shifting social-ecological fire regimes explain increasing structure loss from Western wildfires, *PNAS Nexus* (2023). [DOI: 10.1093/pnasnexus/pgad005](https://doi.org/10.1093/pnasnexus/pgad005)

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