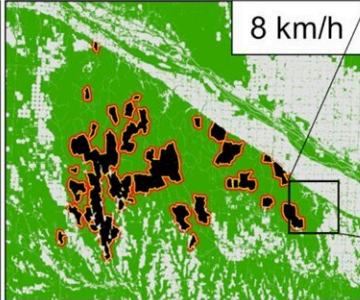

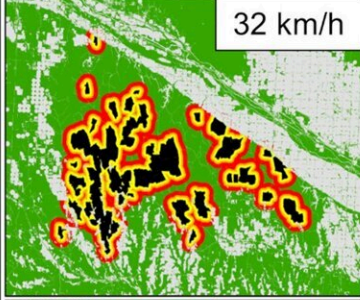





Study: Wildfire spread risk increases where trees, shrubs replace grasses

May 18 2023, by Kirsten Romaguera

		Landscape	Single Fire Event	Max Spot Fire Distance
Prescribed Fire Conditions		 8 km/h		Grassland = 0.2 km Encroached Grassland = 0.2 km Woodland = 0.5 km
		 32 km/h		Grassland = 0.5 km Encroached Grassland = 0.8 km Woodland = 1.6 km
	Conditions	 64 km/h		Grassland = 1.0 km Encroached

A comparison of maximum potential spot fire distance under prescribed fire (8 and 32 km/h) versus wildfire (8, 32, 64, 97, and 129 km/h) wind speeds relative to the grassland state (yellow), juniper encroached grasslands (orange), and the juniper woodland state (red) in the Loess Canyons Experimental Landscape. Column 1 shows a landscape representation of changes in the potential exposure of receptive fuels relative to maximum spot fire distance from burn units in the Loess Canyons if they were all grassland (yellow), all juniper encroached grassland (orange), and all woodland (red). Column 2 focuses on changes in

maximum spot fire distance relative to a single burn unit, where black lines represent the circumference of potential spot fire exposure and colored lines represent the maximum spot fire distance if the burn unit was all grassland (yellow), woody encroached grassland (orange), or woodland (red). Column 3 lists maximum spot fire distances for each encroachment scenario. Green areas in maps represent receptive fuels and gray areas represent non-receptive fuels (urban areas, agriculture, water, barren areas) [52]. Maps were generated using ArcGIS [45]. Credit: *PLOS ONE* (2023). DOI: 10.1371/journal.pone.0283816

Across the United States over the past decade, an average of over 61,000 wildfires have burned some 7.2 million acres per year. Once a wildfire starts spreading, the firefighting task is exacerbated by issues like spot fires, where winds carry lofted sparks and start new fires outside of the original fire perimeter. The greater the potential spot fire distance, the more difficult wildfires are to monitor, control and suppress.

A new study published in *PLOS ONE*, led by University of Florida forest management researcher Victoria Donovan, has found that as [woody plants](#) like shrubs and trees replace [herbaceous plants](#) like grasses, spot fires can occur farther away from the original fire perimeter. This "woody encroachment" is not only a major issue in grasslands where the study takes place, but also in wetland and savanna systems like longleaf pine, an important ecosystem in Florida.

"Spot fires are one of the most common reasons why houses burn in a wildfire," said Donovan, an assistant professor with the School of Forest, Fisheries, and Geomatics Sciences at the UF/IFAS West Florida Research and Education Center in Milton, Florida. "It's not typically because the flames from wildfire reach a house, but that embers from that fire land on roofs, travel through home ventilation systems, or land on other combustible material on or near the home, and ignite the house from there. They're a big concern for structural damage."

Donavan's study indicates that prescribed fire, which is commonly used in Florida to control woody plant growth, could help reduce spot fires.

The study looked at three phases of woody encroachment: the first a largely grassland area, the second grassland with new forested growth, and the third a dense forest. The research was modeled using a mathematical fire simulation program and considered various conditions in Loess Canyons Experimental Landscape in south Nebraska. Donovan conducted this study as a researcher at the University of Nebraska-Lincoln.

"Our study shows that the risk of spot fire is much lower when you're burning under the [weather conditions](#) used for prescribed fire, regardless of encroachment phase, compared to waiting for the potentially more extreme conditions we can see during wildfires," Donovan said. "This tells us that using prescribed fire early to control encroachment and reduce [fuel load](#) is a lot safer than waiting for a wildfire to occur."

The safety concerns of woody encroachment extend beyond structures and residents to also include the firefighters battling the blaze.

"It is not only spot fire distance that increases wildfire risk from woody encroachment. Shrubs and trees can grow much taller than grasses," Donovan said. "Think about putting out your campfire on the ground by pouring water on it, and compare that to trying to put out a fire a couple stories above you."

The concerns are universal, she said, and reveal similarities no matter the land type where the [wildfires](#) occur.

"We're seeing the same kind of issue here in Florida, where fire suppression has led to a lot of encroachment of shrubs," Donovan said. "This creates these really dense forest stands rather than the open

savannah systems that we would have seen historically with more frequent fire."

She added that Florida has become a model for prescribed burning across the country, though there is still hesitancy among some private landowners. Donovan cautions: "Using prescribed fire as a controlling process for woody encroachment has far less risk than allowing woody encroachment and waiting for wildfire to occur."

"Across the country, data has shown that fire is inevitable," she adds. "Using prescribed fire allows us to decide what we want a lot of that fire to look like."

More information: Victoria M. Donovan et al, Spot-fire distance increases disproportionately for wildfires compared to prescribed fires as grasslands transition to Juniperus woodlands, *PLOS ONE* (2023). [DOI: 10.1371/journal.pone.0283816](https://doi.org/10.1371/journal.pone.0283816)

Provided by University of Florida

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