



## Research Brief for Resource Managers

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# Fire suppression biases fires to be more extreme

Kreider, M.R., P.E. Higuera, S.A. Parks, W.L. Rice, N. White, A. J. Larson. 2024. "Fire Suppression Makes Wildfires More Severe and Accentuates Impacts of Climate Change and Fuel Accumulation." *Nature Communications* 15 (1): 2412.

<https://doi.org/10.1038/s41467-024-46702-0>.

Decades of fire suppression have increased fuel loads and fire severity, leading to the "fire suppression paradox"—by suppressing fires we make fires harder to put out in the future. However, in a new paper, we show a separate impact of fire suppression that may cause even greater increases in average fire severity than climate change or fuel accumulation.

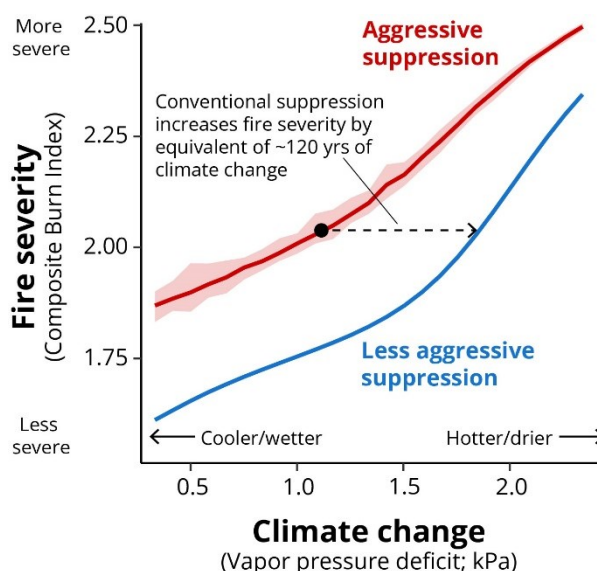
Suppression tends to remove fires that are low-intensity and occur under moderate weather conditions when suppression is highly effective. For example, the Forest Service suppresses ~99% of fires before they reach 300 acres. The 1% of fires that evade suppression are typically extreme and make up nearly all the burned area. We call this effect the "suppression bias"—by removing less-extreme wildfires, we ensure that the fires that occur are the most extreme.

In this study, we used fire modeling simulations to estimate how this "suppression bias" affects patterns of fire, compared to climate change and fuel accumulation. Our study shows that fire suppression makes fires more severe, less diverse, and increase at faster rates. Aggressive fire suppression increased average fire severity by an amount comparable to over a century of climate change effects (Fig. 1). Suppression, by disproportionately extinguishing low-intensity fires, guarantees that the remaining fires will be as severe as fires burning in a significantly hotter,

### Management Implications

- Fire suppression disproportionately removes lower-intensity fire, selecting for fires under extreme conditions
- Fire suppression may increase average fire severity more than either climate change or fuel accumulation
- Allowing fires to burn under less extreme conditions (managed wildfires, prescribed fires, and cultural burns) can reverse the impacts of fire suppression

drier, and more fuel-loaded future. Safely allowing fires to burn under moderate conditions may be as critical as other necessary interventions, such as mitigating climate change and reducing unintentional human-related ignitions.



**Figure 1:** Aggressive suppression greatly increased the fire severity of simulated fires.