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Effects of fire suppression and climate change on wildfire activity in the Pacific Northwest

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The frequency of large and severe wildfires has increased over recent decades in many regions across the Western U.S., including the Pacific Northwest. This is likely driven in large part by wildfire suppression, which promotes fuel accumulation. Recent studies also suggest that climate change intensifies wildfire activity by increasing fuel aridity. However, the contribution of these drivers to shifting fire regimes is not well quantified at regional scales. Understanding the relative influence of climate and fire suppression is crucial for developing fuel management strategies under a new climate paradigm. To quantify the extent to which fire suppression and climate change have contributed to increases in wildfire activity in the Pacific Northwest, we conduct a modeling experiment using the ecohydrologic model RHESSys and the coupled stochastic fire spread model WMFire. Specifically, we use climate inputs from GCMs, combined with suppression scenarios to gauge the extent to which these drivers promote the spread of severe wildfires in a 565-km^2, mixed-pine-dominated watershed in north-central Idaho. We run 500 model iterations for suppressed, intermediate, and unsuppressed fire management scenarios, both with and without climate change in a factorial design. After deriving fire spread "fingerprints" for each combination of possible drivers, we evaluate whether these fingerprints match observations in the fire record. We expect that climate change plays a role in the spread of severe wildfires, but the magnitude of this effect is mediated by prior suppression. Preliminary results suggest that reducing the extent of contiguous, even-aged fuels may help curtail increases in wildfire activity.