

Prescribed Fire Behavior in Mid-rotation Pine Stands of Mississippi

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Abstract: Fire's stochastic behavior caused by vegetation, topography, and weather has caused concern and reduced use among landowners and managers. To better understand fire behavior in fire-absent forest stands, we examined fire characteristics relative to vegetation conditions manipulated with or without a prior herbicide application. We used six replicate stands with four randomly-assigned treatment plots (burn, herbicide, burn*herbicide, control) to assess dormant season burns with a three-year fire return interval. We measured fuel moisture and weather variables pre-burn, residence time, rate of spread and flame height during burns, and pre- and post-burn fuel composition. We used a mixed-models repeated measures ANOVA to test for differences between treatments (burn and burn*herbicide) within years, interaction terms, and differences within treatments if we detected significant interaction. We detected temperature, wind speed, and fuel moisture differences ($P < 0.05$) across years as expected given annual differences in weather and vegetation and debris coverage differences across years that reflected treatment effects. Across multiple years, weather conditions, and vegetation variations, prescribed burning with and without herbicide application performed consistently across similar vegetation types. We recommend that wildlife managers continue using prescribed burning where appropriate for management objectives.

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