

# Early Growing-Season Prescribed Fires Shown to Burn More Completely and at Greater Intensity than Dormant Season-Burns

Many of the prescribed fires in the Appalachians are conducted in the dormant-season, (February-April), or after leaf fall (late October-November). Expanding the burn window into the early growing-season, between bud-break and full leaf-out, may restore fire-adapted forests and woodlands. The [Joint Fire Science Program](#) awarded funding for the project: *Community and Ecosystem-level Effects of Growing vs. Dormant Season Burning in the Southern Appalachians*. This project was conducted by [Donald Hagan](#), Associate Professor of Forest Ecology at Clemson University. Dr. Hagan and his team investigated fire season and topographic effects on fuel moisture, percentage of landscape burned, fire intensity, and fuel consumption. Matthew Vaughan, Donald Hagan, William Bridges, Matthew Dickinson, and Adam Coates published the paper, "[How do fire behavior and fuel consumption vary between dormant and early growing season burns in the southern Appalachians?](#)" which was published in the journal *Fire Ecology*.

## Study Sites and Methods:

- Burn units were oak forests of the Chattahoochee National Forest in Georgia and Sumpter National Forest in South Carolina. Units averaged 700 acres.
- Fuel loading and moisture were measured prior to burning.
- Prescribed fires were conducted in 2018, 2019; dormant season (DS) burns were late January-early April; growing season (GS) burns were April 18 to 24. Hand and aerial ignitions were used. Weather data was collected on burn days.
- Thermocouple probes recorded surface temperatures. Amount and duration of heat on the thermocouples (index of heating) were calculated by the authors - time and temperature above 60 °C / 140 °F.
- After burns, fuel loading was measured to determine consumption, including bole char height.



## Key Findings:

- Winds speeds, RH, and KBDI were similar for DS and GS burns. Great solar energy, radiation, warmer temperatures, and lower fuel moisture levels occurred during the GS burns, having more complete burns.
- Index of heating was more than 5X greater in the GS burns, driven by greater fire intensity in the mid-afternoon (2-4 p.m.)
- Litter consumption was similar. No duff consumed in the DS burn.
- Topographic effects on bole char height were variable. GS burns has greater bole char than DS burns.

## Take Home Points:

- In early growing season, before full canopy leaf out, greater solar radiation and drier fuels resulted in more complete and intense burns occurring in the mid-late afternoon.
- Fuel consumption was comparable. Complete duff consumption only occurred in GS burns.
- This study shows that early growing season burns can be used to have more desirable ecological effects by burning at greater intensity, in addition to reducing the sprouting ability of fire-sensitive species.

This study was a component of Matthew Vaughan's Master Thesis at Clemson. Another paper from Matthew's Thesis found on initial vegetation responses to the DS and GS burns: [Effects of burn season on fire-excluded plant communities in the southern Appalachian Mountains, USA](#). Allison Melcher, a Clemson graduate student, also worked on this study and was advised by Don Hagan. Her research focused on burn season effects on birds and forest structure/habitat.