Fire on Round Bald

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# Introduction

Upper montane treeless meadows - balds - have high floral diversity, panoramic views of the landscape, and origins shrouded in mystery (Murdock 1968, Gersmehl 1970). Balds exist above 4,000 feet in elevation, while true balds occur above 4,600 feet elevation. According to Murdock (1968), true balds only occur in the Southern Blue Ridge Physiographic Province. Two types of balds have been identified; heath balds which are dominated by woody ericaceous species such as blackberry and grassy balds which are dominated by herbaceous vegetation such as, grasses and sedges (Cain 1930, Murdock 1968). Gersmehl (1970) concluded that balds were formed as cultural artifacts that were maintained mainly by grazing of livestock and some form of burning. Round Bald is located about 16 miles North of Bakersville, North Carolina and 14 miles South of Roan Mountain, Tennessee next to Carver’s Gap. This bald crests at 5,800 feet in elevation and has a mostly south-facing slope at approximately 21-degrees. Since the 1980’s, mowing has been used to ameliorate species diversity loss from woody encroachment. However, these balds are still threatened by blackberry, *Rubus alleghaniensis*, signalling succession to the surrounding spruce-fir stand (Murdock 1968, Lenze 2015, Stokes and Horton 2022). In February of 2022 a low-intensity surface fire broke out on Round Bald and burned approximately 26 acres, with little visible effect on blackberry.

The intention of this study is to examine the changes in the plant community and soil seed bank caused by the fire. Differences in plant community and from what germinates from the seed bank following two growth seasons would provide incite whether this type of fire could be beneficial or detrimental to biodiversity on Round Bald. The goal is to provide data following disturbance to improve bald management and maintain these scenic wonders.

# Methods

Round Bald is located in the Roan Mountain Massif of the Unaka Mountain range of the Southern Appalachian Mountains, between Carver’s gap and Engine gap. The Appalachian Trail (AT) bisects the study site into North of the trail and South of the trail. The site itself is spread across Pisgah National Forest in North Carolina and Cherokee National Forest in Tennessee, at approximately 36° 06’N and 82° 60’W. In this study we sampled transects reestablished by Stokes and Horton (2022). In this study we measured the percent coverage of vegetation using a 1-m2 PVC quadrat divided into 100 equal sized squares. Each square was visually assigned by dominant vegetation type to equal 100% coverage per plot. Using the data collection tool from Stokes and Horton (2022) and USFS botanist Gary Kauffman, a total of 226 plots along 12 transects were sampled in 2020, of these 52 plots along the first four transects were in the February 2022 fire and another 47 plots along the same transects were untouched by the fire. This provided an opportunity to examine the changes in plant community composition following low-intensity ground fire over two sampling seasons in June of 2022 and 2023.

To examine the effects of the fire on the seed bank, seed bank samples were collected in July 2022. Approximately X grams of soil was obtained from the top 5 cm of soil at six random sites in one of four treatments; over 50% *Rubus*-in fire, over 50% *Rubus*-out fire, under 25% *Rubus*-in fire, under 25% *Rubus*-out fire. A total of 24 soil seed banks samples were taken, placed in tins, transferred to the greenhouse, and placed in 11x8.5 inch seedling trays filled with potting mix to 5 cm depth. An additional six trays only filled with potting mix will act as greenhouse controls to rule out contamination. Trays were randomly set in the greenhouse at ambient temperature and humidity and measured continuously with a Govee probe. As seedlings emerge they will be identified, recorded, and removed; while the species that cannot be identified will be repotted until identifiable following Price et al. (2010). Each month the trays were rotated in random order to rule out growth condition bias. In December of 2022, soil sample trays were placed outside to simulate winter conditions and potentially germinate seeds in the seed bank. A second soil sample following the same protocol will be conducted in March of 2023. These samples will examine what is readily germinable following natural winter weathering. These samples will be compared to the first set to examine post burn germinable seeds versus post winter germinable seeds.

# References

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