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Vegetation dynamics after a prescribed fire in the southern Appalachians

Katherine J Elliott  ... Wayne T Swank 

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Abstract

In April 1995, the USDA Forest Service conducted a prescribed burn along with a south-facing slope of southern Appalachian watershed, Nantahala National Forest, western NC. Fire had been excluded for over 70 years and the purpose of the burn was to create a mosaic of fire intensities to restore a degraded pine/hardwood community and to stimulate forage production and promote oak regeneration along a hillslope gradient. Permanent plots were sampled at three locations along a gradient from 1500 to 1700 m. Plot locations corresponded to three community types: mesic, near-riparian cove (low slope); dry, mixed-oak (mid slope); and xeric, pine/hardwood (ridge). Before burning (1994–1995) and post-burn (summer, 1995 and summer, 1996) vegetation measurements were used to determine the effects of fire on the mortality and regeneration of overstory trees, understory shrubs, and herbaceous species. After the burn, mortality was highest (31%) at the ridge location, substantially reducing overstory

(from 26.84 pre-burn to 19.05 $\text{m}^2 \text{ha}^{-1}$ post-burn) and understory shrub (from 6.52 pre-burn to 0.37 $\text{m}^2 \text{ha}^{-1}$ post-burn) basal area. At the mid-slope position, mortality was only 3%, and no mortality occurred at the low slope. Not surprisingly, percent mortality corresponded to the level of fire intensity. Basal area of *Kalmia latifolia*, *Gaylussacia baccata*, and *Vaccinium* spp. were substantially reduced after the fire, but density increased due to prolific sprouting. The prescribed fire had varying effects on species richness and diversity across the hillslope gradient. On the ridge, diversity was significantly increased in the understory and herb-layer, but decreased in the overstory. On the mid slope, no change was observed in the overstory, but diversity significantly decreased in the understory. On the low slope, no change was observed in the overstory or understory.



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Keywords

Pine oak heath; Restoration; Mortality; *Kalmia latifolia*; *Pinus rigida*; *Quercus* spp.; Herbaceous flora; Diversity; Species nomenclature follows [Radford et al. \(1968\)](#)

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