

EFFECTS OF PRESCRIBED FIRE AND UNDERSTORY
REMOVAL ON BIRD COMMUNITIES IN A
SOUTHERN APPALACHIAN FOREST

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ABSTRACT

Fire exclusion has contributed to increased fuel loads and potential for catastrophic fires in forested landscapes. In 2000, the National Fire and Fire Surrogate Study was initiated to research the ecological consequences of fuel reduction techniques in several ecosystems across the country. The Green River Game Lands in Polk County, NC, were chosen to represent the Southern Appalachian upland hardwood forest ecosystem. Three treatments (mechanical understory removal, prescribed burns, and mechanical understory removal with prescribed burns) and a control were implemented to reduce fuel loads. Mechanical understory removal treatments were implemented in 2002. All stems of *Rhododendron*, *Kalmia*, and trees >1.8 m tall and <10.2 cm diameter at breast height (DBH) were cut. Prescribed burn treatments implemented in March 2003 produced flames 1-2 meters high with an objective to remove the shrub layer.

Breeding, wintering, and early migrant bird communities were sampled at each treatment area using three 50-meter fixed radius points that were visited three times per season for three years in spring (breeding birds) and during winter 2002-2003 (resident birds) before and during 2003 early migration after the burn treatments were implemented. A total of 2,489 bird detections of 59 species was observed.

No differences were detected among treatment areas in breeding season abundance, species richness, or evenness for any year ($p > 0.10$). Species diversity (H) was highest in controls during the 2003 breeding season. Abundance of ground nesters differed among treatments only in 2001 when no treatments had been implemented. Richness of ground nesting species was highest in controls in 2002 and 2003. There were

no treatment differences in breeding season abundance of cavity, shrub or tree nesting species or richness of shrub or tree nesters in 2001, 2002, or 2003. Richness of cavity nesting species differed among treatments in 2001, 2002, and 2003. No treatment differences were detected in abundance or richness of ground or tree foraging species in 2001, 2002, or 2003. Treatment differences were detected in abundance of shrub foraging species in 2001 and 2003, when controls were most abundant. Richness of shrub foraging species was highest in controls in 2003.

Nest success varied by guild and treatment. The three-year success rate averages of 1) cavity nests were 100% in controls, burns, and mechanical understory removal sites; 2) ground nests were 67% in controls and 100% in mechanical understory removal sites; 3) shrub nests were 56% in controls, 38% in burns, and 60% in mechanical understory removal sites; and 4) tree nests were 25% in controls, 33% in burns, and 60% in mechanical understory removal sites. No cavity, ground, or shrub nests were found in sites with mechanical understory removal and prescribed burns combined. Nest substrate characteristics differed in percent nest cover for all nests but did not differ for any variable measured for successful nests.

No changes in abundance, species richness, diversity, or evenness of early migrant bird communities or foraging guilds were detected after the prescribed fire. Post-treatment shrub and ground cover, snag density and litter layer depths differed among treatments.

Initial avian responses to fuel reduction treatments in the Southern Appalachians were minimal and often reflected guild or species responses rather than the responses of an entire community.