Some Appalachian birds like it hot: high-severity plus repeated burns increase the long-term abundance of breeding birds in oak forests.

In Appalachian forests, a number of bird species that are dependent on disturbance and open conditions have declined as the landscape is now dominated by closed-canopy forests. Dr. Cathryn Greenberg (Research Ecologist, USDA Forest Service Southern Research Station) and colleagues, have studied the effects of mechanical thinning and repeated burns on breeding birds in a long-term study in western North Carolina. This study is located on the Green River Game Land, managed by the NC Wildlife Resources Commission, and was a site within the national Fire and Fire Surrogates (FFS) Study Network, funded by the Joint Fire Science Program (https://www.firescience.gov/).

The 2018 paper, published the journal Forest Ecology and Management, describes the response of breeding birds to four treatments over a 15-year period (2001- 2016): 1) untreated, 2) mechanical thinning from below, 3) burn only (four prescribed fires), and 4) mechanical +4 burns.

Key Findings:

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Forest Structure/Habitat

- Thinning of mountain laurel and small trees (<4" diameter) nearly doubled fine fuel loading. The increased fuel loading led to the first fire being higher intensity in the mechanical+burn (MB) stands than in the burn-only stands.
- Over time, and with three more lower-intensity burns (years 5, 11, 14) in the MB stands, basal area was reduced by 30% and tree density by 70%. Repeated burns in the MB stands maintained an open canopy and a dense shrub layer of re-sprouts (trees and shrubs) and Rubus, as well as creating a greater density of snags.

Breeding Birds

- Birds were monitored in 11 breeding seasons, from 2001-2016. During this time field crews recorded 7,236 individuals of 56 species.
- In the 3 treatments (controls, thin only, and burn only) in which the canopy remained closed, breeding bird populations showed mostly minor changes over time.
- In the MB stands, where canopy openings were created and maintained, the abundance of breeding birds was increased, by up to 68%, and maintained over time. Likewise, the number of bird species also increased, by up to 70% and remained elevated.
- The significant gains in the MB were the result of:
    - Greater abundance of shrub nesters, such as Blue-headed Vireos, Eastern Towhees, Hooded Warblers, and Indigo Buntings.
    - With more snag, there was a greater abundance of cavity nesters, such as Carolina Chickadees, Tufted Titmice, and White-breasted Nuthatches.
    - Tree nesters remained just as abundant in the MB as in other treatments, despite the tree mortality. Of the most common tree nesters, Red-eyed vireos, Blue-gray gnatcatchers, and Scarlet Tanagers did not differ between treatments, while Eastern Wood-pewees and Black-throated Green Warblers were more abundant in the MB stands than on one or more of the other treatments.

Take Home:

Dr. Greenburg and her co-authors conclude that repeated burning every 3-6 years after a high severity fire or other canopy disturbance (e.g., shelterwood harvest), will maintain canopy openings and shrubby conditions, which can sustain a greater abundance and diversity of breeding birds in Appalachian oak forests.