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Dormant Season Burning Impacts to Migratory Bats
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Background:

Day-roost selection and foraging habitat use by non-hibernating tree bats (Genus *Lasiurus*) during winter is poorly known throughout much of the southeastern Coastal Plain. This is of particular interest to the Department of Defense (DOD) natural resource managers that use dormant season prescribed fire for stewardship and range purposes. Although not affected by White-nose Syndrome as hibernating bats are, non-hibernating, migratory bats such as the eastern red bat (*Lasiurus borealis*) and hoary bat (*Lasiurus cinereus*) are being impacted by increasing wind-energy development in eastern North America. Many DOD installations in the Southeast are important overwintering sites for non-hibernating bat species. Because dormant season burning is to some degree out of ecological “sync” in systems that were presumed to often have burned naturally in the growing season, there is concern that dormant season burning is a possible additive stressor to bats.

Objectives:

Our objectives were to: 1) To describe winter day-roost selection of tree bats in a frequently burned Coastal Plain ecosystem during the dormant season; 2) To observe response of tree bats to dormant season prescribed fire in real-time; and 3) using acoustics, to examine the effects of land cover, distance to mesic habitat, mean fire return interval, time since fire, temperature, and season (i.e., early versus late dormant season) on bat activity

Summary of Approach:

We mist-netted and radio-tracked Seminole bats (*Lasiurus seminolus*), hoary bats and eastern red bats (*Lasiurus borealis*) to their day roosts in February-March and December 2019 at Camp Blanding Joint Training Center in northern Florida to assess a variety of day-roost variables. For a subset of bats, following day-roost location, we conducted a series of small prescribed burns surrounding occupied roosts to observe bat response to fire. To additionally assess the impacts of fire and environmental factors on bat activity, we deployed 34 zero-crossing/frequency division acoustic detectors across the installation from late February to early April 2019, and from mid-December 2019 to mid-January 2020 in a variety of habitat conditions from xeric sandhill pine habitats to bottomland hardwood swamps and across a gradient of

low- to high fire return intervals and time since fire.

Benefit:

Understanding that installations managed using fire benefits non-hibernating, migratory bats and that dormant season burning does not appear to have a negative impact and provides additional evidence that current stewardship and range management on military lands in the dormant season in the Coastal Plain contribute positively to migratory bat conservation.

Accomplishments:

Generally, Seminole bats selected day-roosts in more mesic forest stands with high mean fire return intervals. Roosts, primarily in longleaf pine (*Pinus palustris*), loblolly pine (*Pinus taeda*) and slash pine (*Pinus ellioti*), tended to be larger, taller and in higher canopy dominance classes than surrounding trees. Of day-roosts subjected to prescribed burns, only one male Seminole bat and one male eastern red bat evacuated during the fire event. In both cases, these bats had roosted at low heights and immediately moved to nearby mesic forest types. Our results suggest tree bats choose dormant season day-roosts that both maximize solar exposure and minimize risks associated with fire. We acoustically identified eight bat species at Camp Blanding: northern yellow bat (*Dasypterus intermedius*), big brown bat (*Eptesicus fuscus*), eastern red bat, hoary bat, Seminole bat, southeastern myotis (*Myotis austroriparius*), evening bat (*Nycticeius humeralis*), tri-colored bat (*Perimyotis subflavus*), and Brazilian free-tailed bat (*Tadarida brasiliensis*). Overall dormant season bat activity was related to the proximity of mesic habitats. However, this varied by species depending on morphology, echolocation call frequency and food habits. Our results suggest fire use that varies in space, time and frequency provides a diverse landscape pattern of mesic, deciduous habitat within the larger pine forest matrix thereby supporting a diverse bat community during the dormant season and in manner compatible with stewardship and range management activities.

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