

Multi-scale Winter Roost Site Selection by Rafinesque's Big-eared Bats and Southeastern Myotis in Bottomland Hardwood Forests in Mississippi

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Abstract: Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) and southeastern myotis (*Myotis austroriparius*) are species of concern listed as Federal Category 2 candidate species for protection. Bottomland hardwood forests are important for roosting by both species and $\geq 80\%$ of these forests have been cleared or degraded in Mississippi. There is limited information on roost site selection or how these sympatric species partition use of roost sites. Similarly, there is no standardized method for estimating observer ability to detect roost occupancy. Our objectives are to quantify: 1) roost selection of Rafinesque's big-eared bat and southeastern myotis at the tree level, 2) roost selection of Rafinesque's big-eared bat and southeastern myotis at the landscape scale, 3) habitat partitioning between Rafinesque's big-eared bat and southeastern myotis, and 4) visual count error while conducting surveys using infrared cameras. Our study will be conducted at Noxubee and Panther Swamp Wildlife Refuges from October 2009–February 2010. To estimate survey effort required, we will use previous survey data to calculate probability of tree cavity use and conduct pilot surveys to estimate detection probability for each species. Cavities will be visually monitored to estimate use and conduct counts of each species. Tree characteristics including cavity size, diameter at breast height (DBH), and location of cavity will be measured and analyzed estimate influential factors in roost tree use. We will also predict the location of a roost across the landscape and roost occupancy by examining metrics at the landscape level including distance to nearest water, basal area, and tree composition. We will then apply this data using geographical information systems to predict potential areas of use. Visual count error will be estimated using a double-count with two observers and comparing these data with images taken with an infrared camera. Understanding winter roost site selection with refined estimates for detecting occupancy will improve our ability to monitor populations of these species and protect important habitat.

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