

EASTERN RED BAT (*Lasiurus borealis*) AND EASTERN PIPISTRELLE (*Pipistrellus  
subflavus*) MATERNAL ROOST SELECTION: IMPLICATIONS FOR FOREST  
MANAGEMENT

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A Thesis  
Presented to  
the Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science  
Forest Resources

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May 2004

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## ABSTRACT

Over the past century, suppression of natural fires and reduction in anthropogenic fires have resulted in the build up of unusually high fuel levels in the United States which has led to many destructive wildfires. The National Fire and Fire Surrogate Study (FFSS) is a nationwide study whose objective is to assess how forest ecosystem components and processes are affected by using fire and other treatments which may act as surrogates to natural fire to reduce fuel levels. However, there have been few studies determining how mid-rotation forest management practices, such as prescribed burning and thinning, affect forest bat communities. The objectives of this thesis were to determine eastern red bat (*Lasiurus boerhavi*) and eastern pipistrelle (*Pipistrellus subflavus*) maternal roost use and selection at the tree, microhabitat, and macrohabitat scales. Additionally, used habitats were compared to those located in FFSS treatment plots to make inferences on how these fuel reduction treatments may affect roosting behavior. The study was conducted on and around the Clemson Experimental Forest, located in the upper Piedmont of South Carolina. During the summers of 2002 and 2003, reproductive female red bats ( $n = 11$ ) and pipistrelles ( $n = 4$ ) were radiotracked to 32 and 7 roost trees, respectively. Red bats roosted within live foliage of a diversity of overstory hardwood tree species, however they roosted in hickories (*Carya* spp.), yellow-poplar (*Liriodendron tulipifera*), and oaks (*Quercus* spp.) most often. Hickories were used more than available as roost trees, indicating selection. The microhabitats surrounding red bat roost trees contained fewer trees than non-used habitat plots, which was the most important characteristic predicting their presence. Red bats primarily used mature,

undisturbed hardwood-dominated stands and had higher roost fidelity earlier in the maternity season than later. Pipistrelles roosted in live foliage and clusters of dead leaves, primarily in oaks. Microhabitats surrounding their roosts had a taller overstory and midstory and contained larger diameter trees than non-used areas. Pipistrelles used both hardwood-dominated and pine-dominated stands. These results suggest that conversion of hardwood stands to pine stands probably would not be beneficial to red bat maternal roosting. However, mid-rotation practices, such as thinning, and an uneven-aged forest management system, such as single tree selection, may reduce forest structure and provide maternal roosting habitat for red bats. In both instances, suitable roost trees should be retained. Forest management practices conducted during the early part of the maternity season, from May to mid-July, may negatively affect roosting behavior since red bats have higher roost fidelity during this period. Since both bats had small roosting range areas, shelterwood harvests that retain suitable roost trees may be beneficial to both bat species. FFSS treatments probably provide more habitat to pipistrelles than red bats, since pipistrelles used stands that were more comparable to those found in FFSS treatment sites. Also, more suitable roost trees for pipistrelles were located in the treatment sites than for red bats. Burn or thin treatments or no management may provide suitable pipistrelle roosting habitat in pine stands.