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## USE AND SELECTION OF HIGHWAY BRIDGES BY RAFINESQUE'S BIG-EARED BATS IN SOUTH CAROLINA

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### Abstract

Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) occur throughout the South and into some Midwestern states. However, they are rare throughout their range and are considered to be a species of special concern in every state in which they occur. Previous studies have documented the use of bridges by Rafinesque's big-eared bats in Louisiana, Mississippi, and North Carolina, but information on bridge use across the range is lacking. Furthermore, two of the three studies on bridge use were conducted in national forests. Thus, our objective was to determine the use and selection of bridges as day roosts by Rafinesque's big-eared bats on all public roads in South Carolina.

We surveyed 1,129 bridges within all 46 counties from May to August 2002. During the summer of 2003, we monitored 236 bridges in previously occupied areas of the state one to five times to evaluate bridge-roost fidelity. Colonies (including maternal groups) and solitary big-eared bats were found beneath 38 bridges in 2002 and 55 bridges in 2003. Occupancy in both years was strongly influenced by bridge size ( $P < 0.001$ ) and construction type ( $P < 0.001$ ); bats selected large, concrete-girder bridges and avoided flat-bottomed, slab bridges. Rafinesque's big-eared bats occupied bridges in the Upper and Lower Coastal Plain, but were absent from bridges in the Piedmont and Blue Ridge Mountains. Big-eared bats demonstrated a high degree of roost fidelity (65.9 percent). We also found that checking bridges three times at two-week intervals ensured the detection of bats, but checking more than three times did not increase detection probabilities.

The high degree of fidelity and use by maternal groups suggest that highway bridges are important roosting sites for Rafinesque's big-eared bats in the South Carolina Coastal Plain. Our results also suggest that if repair or maintenance work is planned for girder bridges during the summer, they should be inspected three times over a four to six week period. Because other studies have shown that Rafinesque's big-eared bats rarely use bridges during winter, delaying work on occupied bridges until that time will aid in the conservation of this rare species.

**Biographical Sketch:** Frances Bennett completed an honor's degree in biology from the University of Saskatchewan in 1999, after which she worked as a field biologist for three years in eastern Canada for provincial and federal agencies and Acadia University. She attended Clemson University to complete a master's degree in environmental/wildlife toxicology from 2002-2004, where she conducted a statewide survey for Rafinesque's big-eared bats in South Carolina and also carried out an assessment of metal exposure in these bats. Ms. Bennett attends the University of Cincinnati, where she plans to continue her research into the effects of environmental contaminants on insectivorous bats.