

**RAFINESQUE'S BIG-EARED BAT
(*Corynorhinus rafinesquii*) IN A FLORIDA CAVE IN WINTER**

Lisa M. Smith¹, John Mayersky², and Jeffery A. Gore²

¹Florida Fish and Wildlife Conservation Commission, Gainesville, Florida 32601

Email: Lisa.Smith@myfwc.com

²Florida Fish and Wildlife Conservation Commission, Panama City, Florida 32409

Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) occurs across the southeastern United States from Illinois to Florida (Lacki and Bayless 2013). This species roosts in various natural and anthropogenic settings (Barbour and Davis 1969, Belwood 1992, Hurst and Lacki 1999), but roost sites and winter roosting behavior vary with latitude. In the northern portion of their range, Rafinesque's big-eared bats typically overwinter in caves and mines in colonies as large as 1,500 individuals (Pearson 1962, Hurst and Lacki 1999, Lacki and Bayless 2013). Further south, winter colonies are much smaller, usually containing <50 individuals (Trousdale and Beckett 2004, Sasse et al. 2011, Clement and Castleberry 2013). Moreover, Rafinesque's big-eared bats in the south rarely roost in caves and instead occur in widely dispersed colonies in tree cavities (Clement and Castleberry 2013, Fleming et al. 2013) or manmade structures, including cisterns (Sasse et al. 2011), abandoned buildings (Finn 1996, Loeb and Zarnoch 2011), and bridges (Trousdale and Beckett 2004, Ferrara and Leberg 2005). We found only one record from the southern coastal plain of a Rafinesque's big-eared bat wintering in a cave, and that occurred in central Alabama (Best et al. 1992). The few winter roost sites documented in Florida were in abandoned buildings or culvert bat houses, and bats roosted in those sites year-round without an extended period of torpor (Finn 1996, Kevin Oxenrider, pers. obs.). A single non-torpid individual was found in winter in a highway culvert in Walton County, in northwest Florida (Paul Moler, pers. obs.), but no Rafinesque's big-eared bats have been reported in Florida caves in the winter.

During winters from December 2014 through March 2016, we visited 145 caves in north Florida 1-3 times to assess their status as bat roosts. On 2 February 2015, we observed a Rafinesque's big-eared bat in a cave at Falling Waters State Park in Washington County. The bat was not observed during visits in February 2014 or 2016, and no Rafinesque's big-eared bats were detected at other caves. To our knowledge, this is the first record of a Rafinesque's big-eared bat in a cave during the winter in Florida. Despite extensive surveys of cave bats in Florida (Rice 1955, Gore and Hovis 1998, Gore et al. 2012), only two Rafinesque's big-eared bats have been recorded in Florida caves and both are summer records: one in Florida Caverns State Park in Jackson County in 1942 (Florida Museum of Natural History, specimen UF 13016) and the other in a manmade cave near Silver Springs in Marion County (Neill 1953).

The Rafinesque's big-eared bat we observed was roosting in the twilight area of a short, narrow, fissure cave connecting two sinkholes. The open structure of this cave allows for large temperature fluctuations and increased airflow, conditions typically found in Rafinesque's big-eared bat hibernacula in the northern portion of the species range (Mumford and Whitaker 1982). The bat was roosting in this smaller, more exposed cave despite the presence of a larger, darker, and more climatically stable cave <20 m away. This neighboring cave is one of the largest tri-colored bat (*Perimyotis subflavus*)

hibernacula in Florida, and Rafinesque's big-eared bats frequently hibernate in caves near tri-colored bats and southeastern myotis (*Myotis austroriparius*) (Hurst and Lacki 1999, Sasse et al. 2011). However, the Rafinesque's big-eared bat we observed was within 3 m of a lone tri-colored bat.

The bat we observed was torpid and its surface body temperature was 3.0° C, the same temperature as the cave wall. These bats are typically more active and alert when roosting than are those of many other species, and they often undergo short bouts of torpor and move between different roost sites (Johnson et al. 2012). We visited the cave only once in 2015 and do not know how long the bat was present. Frequent roost switching may explain why we did not observe the bat during our survey in 2014 or 2016.

It is not clear why Rafinesque's big-eared bats rarely roost in caves during the winter in the southern portion of their range. Although caves are not as abundant in the southeastern coastal plain as in some more northern parts of the species range (Culver and Pipan 2009), caves are present and north Florida in particular contains many potential cave roosts (Florea and Vacher 2009). We suspect that the relatively warm climate of north Florida allows Rafinesque's big-eared bats to survive in a variety of roosts and remain active because insect prey is available on most nights. But that still leaves the question of why caves, which have relatively stable temperatures, are not used as roosting sites where caves are common or when temperatures are low. Minimum temperatures on the three days preceding our observation ranged from -1 to 2° C, which may have made the cave an attractive temporary roost. Although our observation demonstrates that Rafinesque's big-eared bats sometimes roost in Florida caves in winter, it only adds to the mystery of why non-cave sites are usually selected over stable cave environments as winter roosts.

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