



# Bat Research at Congaree National Park



## Research Summary

### Congaree Bats

Bats are an important part of the floodplain forest ecosystem at Congaree National Park. All of the bat species at Congaree National Park are exclusively insectivorous, meaning they only eat insects, and as a group they are the dominant predators of nocturnal flying insects like moths and beetles.

In a single night, one bat can consume up to 50% of its body weight in insects, or about 4,500 insects! During the day, most bats find shelter in “roost” trees. Some bat species roost in hollow cavities found in large, old trees, while other species roost in foliage or crevices in the bark. Many bats show preference for specific roost tree species, and these roost trees may not be located in the same area where the bats hunt for food. These combined, close connections between bats, insects, and trees make bats sensitive indicators of forest health and environmental change at Congaree National Park.

Congaree National Park and the NPS Southeast Coast Inventory and Monitoring Network partnered with the USDA Forest Service Southern Research Station and Clemson University to conduct research on bat populations and habitat usage. This summary highlights two recent bat research projects and includes some general bat facts.

### Bat Inventory

In 2004, researchers began to inventory, or count, the number of bat species found at Congaree National Park. Researchers used three approaches for inventorying bats:

1. *Mist nets*, or fine nylon nets, were used to capture bats. Live bats were examined to determine species, weight, forearm length, sex, age, and reproductive condition before being released unharmed. A few bats were fitted with transmitters to track their movements.
2. *Acoustic surveys* focused on recording the bats' echolocation calls. A computer scanned the recordings to identify individual species.

3. *Field surveys* involved simple searches for potential bat roosts in buildings, bridges, and hollow trees.

Seven bat species have been found at Congaree National Park. Three more are expected but not yet confirmed. With the 47 total mammals confirmed or expected at Congaree, these 10 bat species make up 21 percent of the mammal biodiversity! These bat species include the following (with unconfirmed records marked “\*”):

4. *Big Brown Bat* (*Eptesicus fuscus*)
5. *Brazilian Free-Tailed Bat* (*Tadarida brasiliensis*)\*
6. *Tri-colored bat* (*Perimyotis subflavus*)

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7. Eastern Red Bat (*Lasiurus borealis*)
8. Evening Bat (*Nycticeius humeralis*)
9. Hoary Bat (*Lasiurus cinereus*): This bat is listed as a species of conservation concern in SC.
10. Rafinesque's Big-Eared Bat (*Corynorhinus rafinesquii*): This bat is listed as endangered in SC.
11. Seminole Bat (*Lasiurus seminolus*)\*
12. Silver-Haired Bat (*Lasionycteris noctivagans*)\*
13. Southeastern Myotis (*Myotis austroriparius*): This bat is listed as threatened in SC.

## Roosting and Foraging Requirements of Rafinesque's Big-Eared Bat (RBEB)

In 2006, the USDA Forest Service Southern Research Station and Clemson University began a research study on the state-endangered Rafinesque's Big-eared Bat (RBEB) at Congaree. Two goals of this study were to document habitat requirements for RBEB roosting and foraging. RBEB are known to prefer mature bottomland forests with large, hollow trees for roosting, but many fundamental questions about their ecology remain unanswered. Results of this work will be used to enhance conservation and education efforts for RBEB at Congaree National Park and throughout the southeast.

To study RBEB at Congaree, mist nets were set up near permanent water sources, known roost trees and potential roost trees. All netted bats were examined to determine species, weight, forearm length, sex, age, and reproductive condition. RBEBs were fitted with both an identification band and tiny radio transmitter. Using a radio receiver and antenna, bats were tracked to their roost cavities and foraging areas. For each roost cavity, researchers recorded the tree's size, location, species and condition. Scientists also studied the surrounding vegetation to understand habitat preference.

A total of 15 RBEB were netted, and 43 roosts were located. At least one roost was used by a maternity colony of approximately ~100 individuals. Seventy-five percent of roost cavities were found in large Water Tupelo (*Nyssa aquatica*) trees, with an additional 18 percent in other Tupelo species. All roost trees were over twice the average size of random trees in the surrounding forest. The vegetation surrounding the roost trees was heavily dominated by Tupelo (60 percent) and Cypress (11 percent). When plotted on a vegetation map, seventy-six percent of the roost trees fall in a Cypress-Tupelo habitat that makes up only 8.7 percent of the park.

Radio tracking data from RBEBs indicates that they stay within 0.6 km of their roost trees when foraging at night. This small range is due to the fact that RBEBs tend to have a relatively small wing area, which makes them less efficient at flying long distances than some other bat species.

Congaree's RBEB population appears to be healthy, but there are still questions about the population size and sustainability. The roosting cavities used by RBEB form in large old-growth Tupelo trees. Other (non-Congaree) studies have suggested that such large, hollow trees do not remain standing very long. This means that land managers need to focus conservation efforts on Tupelo-Cypress stands and protecting a multi-generational Tupelo population that will continually provide large, hollow trees as the oldest ones eventually fall. Although more data on foraging range size is still needed, ongoing moth inventories will provide additional information about RBEB food resources. Additional research may shed light on seasonal behavioral changes, competition with other species, and potential effects of climate change.

## A Few More Bat Facts

Fascinating and frequently mis-understood, BATS ARE...

1. The only mammals with a true flying wing.
2. Adapted to using echolocation (like radar) as a primary sense for finding food, shelter, and other bats.
3. NOT all fearsome bloodsuckers. Congaree's bats are only after tiny insects - not people! The legendary vampire bat includes three species that only live in Mexico, Central America, and South America. Other bats around the world eat fish, fruit, or nectar. Congaree's bats are *only* after tiny insects - not people!
4. Potential carriers of rabies. Public health measures have significantly reduced the risk of rabies from bats in the U.S., but individuals can still take precautions. Avoid direct contact. Do not enter bat roosts. Seal small cracks around the house to prevent bats from roosting in attics. Seek medical attention if you are bitten by a bat or wake to find one in your sleeping quarters.

## For More Information

1. Check out the NPS Nature and Science Website at: <http://www.nature.nps.gov/>
2. Check out USDA bat publications at: [http://www.srs.fs.usda.gov/pubs/gtr/gtr\\_srs068.pdf](http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs068.pdf)
3. Check out the Bat Conservation International website at: <http://www.batcon.org/home/default.asp>

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