

## VOLUME 24, NO. 3 Fall 2006

Designing Homes for Forest Bats  
Moms and pups accept artificial trees  
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The first pups were born in mid-May. The maternity roost was a ramshackle old farmhouse tucked into the thick pine forests of the Trinity River National Wildlife Refuge in East Texas. Thirty to 45 Rafinesque's big-eared bats (the species' second-largest colony known in Texas) had been roosting in the long-abandoned structure at least since March. They mostly snubbed the two 14-foot (4.3-meter) cinder-block towers that we had built for them nearby.

By late May, we counted 40 bats in the farmhouse, but only one in the tower roost that sits mostly in the sun and features a heat-absorbing black roof. Not a single bat was inside the cooler tower at a shadier site.

Then things took a curious turn.

When she checked on the little colony on June 26, U.S. Fish and Wildlife Service Biologist Laurie Lomas counted 40 bats in the farmhouse, then found another 16 mothers and pups nestled inside the warmer cinder-block tower. Only one bat was in the cool tower. Another month passed, and the house held 35 bats, the warm tower 15 and the cooler tower 18. As the pups are learning to fly, Lomas concluded, they are moving into the tower roosts with their mothers. Glimmers of success for our artificial tree hollows!

Fast-forward to early September: The colony had grown to 73 bats, but their roost selections had changed radically. Only four bats still favored the farmhouse, the warm tower hosted just one. The other 68 mothers and pups were all roosting in the cool tower.

There seems to be a pattern to the bats' roost selections through the hot Texas summer, a pattern driven apparently by seasonally changing temperature needs. Early in the season, greater warmth helps pups grow rapidly. Then, when the young have reached adult size, lower temperatures help them build stores of fat in preparation for winter.

The key to fully accommodating nursery colonies of Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) may lie in providing multiple roosts that offer a range of temperatures. Additional temperature monitoring, with comparisons among various roosts, will help us document the species' exact needs.

The 2006 results at Trinity River clearly demonstrate the promise – and progress – of the experimental roost designs that the BCI Bat House Project and its partners are testing. This latest version is the most successful so far at mimicking Raf-inesque's big-eared bats' traditional roosts: extra-large cavities in old-growth trees that are fast disappearing.

This is a forest-dwelling species that naturally roosts in small colonies (typically 5 to 50 females, rarely more than 200) in hollows of old-growth black gum, water tupelo, American beech and bald cypress trees. In a healthy forest, Rafinesque's big-eared bats typically alternate among several roosts, probably in part to reduce parasites and confuse predators, although our latest results suggest temperature also is an important part of the puzzle.

This now-rare species faces widespread loss of natural habitat and roosting sites and is believed to be in rapid decline range-wide. Displaced bats frequently turn to abandoned cabins and barns as roosts of last resort, but these old buildings (like the farmhouse at Trinity River) are often at risk of collapse or marked for dismantling. Hence the pressing need for our artificial tree hollows.

Real success will come when bats choose the tower roosts throughout their entire active season. The birth of pups in the towers will demonstrate full acceptance.

The evolution of BCI's tower roosts followed a twisting path. In August 2000, BCI and Walter Sedgwick collaborated, with on-site supervision by Laura and Tom Finn of Fly by Night, Inc., to install the first three towers in Thomas County, Georgia. Each consisted of a pair of standard concrete culverts, 3 feet (0.9 meter) in diameter and 8 feet (2.4 meters) long, stacked one atop the other with a concrete cap on top and an opening cut into the side. A pregnant Rafinesque's big-eared female occupied the new roosts in May 2002, gave birth to a single pup and moved among the three culvert roosts.

Since then, BCI and its partners have installed 19 additional tower roosts of various designs in five other states. Early designs using concrete highway culverts and manhole shafts, while simple in concept, required cranes or other heavy equipment for installation. This was not only expensive, but limited locations to areas accessible by roads that could handle large trucks. Experiments continued with lighter aluminum culverts, concrete-fiber drainage pipes and cinder blocks.

Each of these designs attracted Rafinesque's big-eared bats during at least one season. The current cinder-block version, however, attracts more bats for longer periods and is much easier to install. Several other species, including big brown bats (*Eptesicus fuscus*), southeastern myotis (*Myotis austroriparius*), eastern pipistrelles (*Pipistrellus subflavus*) and Mexican free-tailed bats (*Tadarida brasiliensis*), have also used the artificial tree hollows.

Much work remains to perfect these alternative roosts, but we are constantly gathering critical data. Wildlife researchers from Stephen F. Austin State University, Texas A&M University and Texas Parks and Wildlife are collaborating on an East Texas study to identify in detail the habitat needs and distribution of Rafinesque's big-eared bats. And Trinity River National Wildlife Refuge biologists, with help from a Science Support Grant from the U.S. Geological Survey, are studying the local population.

Both studies are recording conditions inside current bat roosts (both natural tree roosts and artificial roosts) and defining habitat conditions around the roosts. Results from these studies will greatly aid BCI's Bat House Project in improving artificial roosts.

Artificial roosts are not a substitute for good habitat management, especially the preservation of snags, natural tree cavities and caves. They can, however, provide a solution where natural roosts have already been destroyed. Vast stretches of forest habitat along the Gulf Coast have been devastated by recent storms, dramatically increasing the need for artificial roosts.

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