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Restoring Coach Cave

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by Mari Murphy

This summer workers completed installation of three bat-friendly gates at Coach Cave in southeastern Kentucky. The cave, also known as Hundred Dome, was once winter home to over 100,000 Indiana bats (*Myotis sodalis*), now one of America's most endangered bats. By 1975, however, their numbers had plummeted to about 4,500 bats, and in the winter of 1993, biologists found only 27.

What happened? Even historically, the cave had been seriously disturbed by humans. It had been mined for saltpeter during the War of 1812, and portions had been shown to tourists since 1860. Because of its large size and complexity, Coach Cave remained an important hibernation site for several species of bats. The largest recorded decline began in the early 1960s when it lost most of its bats.

A gift shop for a resort was built over the upper cave entrance, and an artificial entry was blasted into the cave about 250 feet from the shop. A short self-guided cave tour began at the new entry and exited through the gift shop at the site of the original upper cave entrance. In addition, the lower entrance was covered by concrete and a heavy steel door with only small holes for the bats to enter. Even if all the bats could have gotten back in, the construction had altered the cave's air flow, drastically warming the temperature and making it largely unsuitable for bat hibernation.

The tragedy was swift. When the bats returned to their traditional roost, most were unable to enter. Instead, they clung to the outer walls of the new tunnel and building where, according to the resort manager, the bats became torpid and were scraped off and carted out by the thousands in wheelbarrows. Most apparently died. The few bats that were able to enter the lower entrance were further disturbed by tours through the portion of the cave where the bats traditionally hibernated. Although one of the first bat species to be declared endangered, the Indiana bat was not yet on the federally protected list. And back then, there were few who cared about what happened to bats anyway.

In the late 1970s the gift shop burned, and the structure was not rebuilt; much of the debris was later pushed into the natural upper entrance to the cave. Without the gift shop directly over the entrance, however, the possibility existed for the cave to be reopened for bats.

In the 1980s several attempts were made by state and federal agencies to gain control and protection of the site, but negotiations failed when legal restrictions regarding the cave's future could not be agreed upon. Last year, as a private organization, Bat Conservation International was able to bridge the gap with the negotiating help of U.S. Fish and Wildlife Service biologist Robert Currie and funding from the Chapman Foundation. The current management of Park Mammoth Resort, on whose property the cave lies, permitted conservationists to install bat-friendly gates at all three entrances, alterations that will help restore the cave's original air flow, temperature, and humidity levels.

Many individuals and several agencies and organizations donated their expertise and labor, some workers driving hundreds of miles to help. Most important among these were the U.S. Fish and Wildlife Service, the Kentucky Department of Fish and Wildlife Resources, the American Cave Conservation Association, the Coach and James Cave Mapping Group, and the National Speleological Society and its member Grottoes.

Work began last October when the door to the lower entrance was repaired to prevent people from disturbing the remaining bats during winter, pending the door's final removal this summer. In December workers removed the larger debris from the upper entrance, as well as the cover over the stairwell leading down into the natural cave. They then constructed a gate over the top of the upper entrance and stairwell, an open space five feet wide and 42 feet long. In addition, the Kentucky Department of Fish and Wildlife Resources paid for a fence around the upper gate.

This summer the stone wall and steel door were removed from the lower entrance, and an angle-iron gate was installed. Indiana bats have accepted similar gate designs at other protected sites. The artificial entrance was also gated and, for the time being, allowed to remain. Biologists will monitor the effect it may have on the cave's microclimate and determine whether it helps or hurts. If the latter proves to be the case, the artificial entrance will be sealed.

Because of their penchant for forming large aggregations, Indiana bats are extremely vulnerable. They hibernate in dense mats of some 300 bats per square foot in caves or mines with stable winter temperatures between 39 and 46 degrees Fahrenheit. Fewer than 3 percent of available caves provide for the highly specialized needs of Indiana bats, and most return to the same winter roosts year after year, even occupying the same spots on cave walls.

Indiana bats are found throughout the northern Midwest and the middle and upper New England states, but the largest hibernating populations of these bats occur in only three states—Indiana, Missouri, and Kentucky. Some 85 percent of the entire known species population winters in only seven caves, and as many as half may hibernate in just two of these. Loss of a single hibernaculum, especially one containing many thousands of bats, such as Coach Cave, therefore can have a major effect on the entire species. Human disturbance or alteration of overwintering caves, loss of summer habitat to deforestation, and pesticide poisoning all have contributed to the decline of Indiana bats.

One of the greatest mysteries about Indiana bats has been where they went in summer. Biologists are just beginning to find out. Although these bats form dense aggregations in their winter caves, they disperse widely in summer, males apparently remaining solitary and females forming comparatively small maternity colonies, typically beneath loose tree bark or occasionally in tree cavities. Recent research shows that Indiana bats prefer riparian habitat, especially floodplain forests, putting them in direct conflict with humans who value floodplain habitat for different reasons.

Despite federal listing, and increasing protection of their overwintering caves, Indiana bats have continued to decline throughout much of their range. Conservation biologists can only speculate why. Since the species was first recognized only as recently as 1928, we may never know how abundant Indiana bats were historically.

One thing we do know is that, where cave microclimates have been altered by humans, restoring an Indiana bat hibernating cave to its original state has, over time, brought about a marked increase in the cave's bat population. This bodes well for the Coach Cave bats and, conservationists hope, for the entire species. It will take some time before their numbers can build again, but the reopening of one of their most important historic hibernacula is a first step.

(Bio)

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The new gate over the upper entrance to Coach Cave will help restore the cave's microclimate and, conservationists hope, the cave's bats. This site once was home to one of the largest hibernating populations of Indiana bats known.



After the cave's lower entrance was blocked off with a concrete wall and door to accommodate cave tours (left), few bats could enter. Workers built a bat-friendly gate inside the entrance (right) this summer; the obstruction will be removed before the bats return.

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