

**Resources for Mini-Tour #1:
Russell Cave, Bats, and White Nose Syndrome
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Exploration of Russell Cave for White-nose syndrome on bats

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It was a day we had been planning on for more than 3 years, but hoped would never arrive. White-nose syndrome (WNS) had been found on bats in Alabama. Although I gained some notoriety for discovering it in the State, I am sad to see it arrive, especially when I first saw it covering the bats. It reminded me of a spiderweb encasing its prey. It wasn't as thick as a fly entombed in a web, but some of them had it on their nose, around their mouth, in their ears, and on their wings, tail, and feet. The first bats that were detected had it surrounding their nose only, but it became worse as we tallied more and more bats with the deadly disease. Oddly, no bats were found dead in hibernation. None were on the floor of the cave. And yet, this disease has claimed more than 5 million bats already, achieving 100% mortality in some caves that have been affected for multiple years. White-nose syndrome was finally identified and given a name (*Geomyces destructans*) a couple of years ago, years after it was first detected in 2005. It's something that our Alabama Bat Working Group (ABWG) expected, planned for, and monitored in numerous caves for its symptoms for the past 3 winters. But we sure didn't want to see it show up.

Our group of federal and state wildlife biologists had been out to Little River Canyon National preserve in October to capture bats with mist nets in October as part of our annual fall bat "blitz", an intense survey effort in that part of the State prior to the hibernation season. We were invited back by Mary Shew at Little River NP to survey bats in Russell Cave for part of our WNS winter cave survey. Keith Hudson, with the Alabama Wildlife and Freshwater Fisheries Division of the Alabama Department of Conservation and Natural Resources, has coordinated this winter survey effort for 3 years to prepare for its eventual arrival. Of the bat biologists at the blitz, I lived closest to Russell Cave and volunteered to take part in this particular survey. Our trip into Russell Cave complex began on March 1st, 2012. We had already checked a few small entrances at Russell Cave National Monument earlier that day with no sign of WNS. I was assisted by two National Park staff members from Kentucky, Larry Johnson and Steven Thomas. We entered the Main cave entrance where some of the oldest signs of Native Americans in the Eastern US have been found for a 5-hour trip underground. Tri-colored bats at the entrance were not numerous, but all were free of the disease.

We walked upstream in a river that runs underground throughout most of the cave, ducking and crawling in places. We entered a few large rooms and counted dozens of bats, including a N. Long-eared bat. All were healthy and hibernating. The National Park has closed the cave for 9 years to caving, but some recent signs of human activity were found by NPS staff before we left the Park property. After passing the National Park boundary, there were several more large rooms where we counted hundreds of Tricolored bats still doing well. We were off of the National park land and still not half way to the entrance where we would exit. The cave narrowed in places and the underground river in the cave gradually decreased. Eventually, we left the river behind and navigated some low passages. I hadn't really been expecting to find WNS at Russell Cave and it looked like we were home free given the many healthy bats we had seen. We were within an hour of the exit when the first suspicious bat was detected hanging on the cave ceiling right at head height along our route. Steven gave a cry of "Uh-oh". He had recently collected an infected Tricolored bat in Kentucky and declared that this looked worse than that one. We would soon see many bats with worse conditions than the fuzzy white muzzle that the first bat possessed. As we approached the cave entrance where we would exit on private land, we tallied 35 bats we could see clearly had the same white fungus. At least that many more appeared to have WNS, but were higher up and/or harder to see. We encountered a lone N. long-eared bat that was not strongly covered, but had a couple of suspicious white spots on his nose. Other than that, we saw more tricolored bats and then four Big Brown Bats at the entrance. The big browns had wedged themselves into cracks in the ceiling, but we were close enough to see that none of them had visible signs of WNS. We euthanized a couple of tricolored bats from this trip with heavy WNS symptoms to have tested by a wildlife disease lab. As per our prior ABWG arrangement, Bill Gates with the US Fish & Wildlife Service at Wheeler NWR collected these bats and submitted them for testing with the lab. Several days later we had confirmation of WNS in Alabama. Later that night, we decontaminated our gear or unpacked near caving gear for more cave exploration at Russell Cave National Monument. On March 2nd, we entered more cave entrances on the Park and found a couple of Rafinesque big-eared bats hibernating in one entrance, along with more tricolored bats, but no signs of WNS.

The WNS irritates the bats and they keep arousing during the hibernation, expending their energy reserves. Ultimately it kills them from starvation. We are hoping that it doesn't completely wipe out our cave bats, but it will undoubtedly devastate this group of Alabama bats as it spreads across our state. This group of bats includes two endangered species, The Indiana bat and the gray bat. Our Alabama Bat Working Group will continue to monitor caves for WNS and seek ways to combat it. The spread has been slowed by voluntary cave closures and decontamination of clothing and caving gear. I had anticipated we would detect WNS in Alabama as early as last winter. Now that it is here, several of my University colleagues in Molecular Genetics are anxious to attack the fungus in their labs and study the genetic resistance in the bats. I pray that there will be a

treatment for our bats resulting from these and other investigations that have been conducted since WNS was first detected in New York in 2005. Did God include a few WNS resistant genes for bats when He was creating the fungus? There are numerous examples in nature of defensive strategies that have co-evolved as enemy species have developed new attack strategies. As I was sitting in the dark taking a break in one of the caves on March 2nd, I pondered what was in store for our Alabama bats. I have conducted research on them for over a decade since coming to Alabama A&M University. Like a tight cave passage, it looks grim. But I believe we will emerge on the other side of this bottleneck if we keep on moving. Fortunately, there is a great group of bat biologists in the State to continue monitoring and studying this disease.

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