



White-Nose Syndrome at Mammoth Cave National Park: Actions Before and After Its Detection

Rickard S. Toomey, III¹, Steven C. Thomas², Shannon R. Trimboli¹, Joel Gillespie³, Vickie Carson³

¹ Mammoth Cave International Center for Science & Learning, ² Cumberland Piedmont Inventory & Monitoring Network (NPS), ³ Mammoth Cave National Park

Visitor Screening and Intervention

Approximately 400,000 visitors participate in cave tours at Mammoth Cave each year. WNS-related visitor screening and intervention began in June 2009.



At the WNS information booth, rangers answer questions, screen visitors for risks of spreading WNS, provide intervention to keep potentially contaminated items from being taken into the cave, and assist with cleaning of items such as shoes.



Announcements about WNS are made at regular intervals over the Visitor Center's PA. Any visitors who have been in a cave or mine since 2006 are asked to visit the WNS information booth. Guides make a final announcement to their group before leaving the Visitor Center.



Since May 2010, visitors participating in wild cave tours are required to use park-supplied equipment. Visitors' boots are cleaned at the end of the tour. All park-supplied equipment is washed after each use.



Since WNS was found in Kentucky, all visitors are required to walk across a bio-security mat at the end of their cave tour. This is to prevent WNS from being spread to other caves. Signs are posted at the Visitor Center to let visitors know about the mats.



Education

The park uses a variety of communication tools to educate the public about bats and WNS. Educational groups and classes visiting Mammoth Cave National Park also learn about bats and WNS.



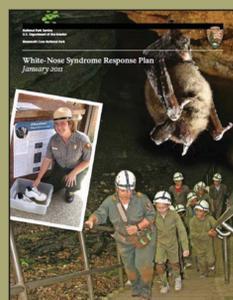
The WNS Station, located in the Visitor Center, provides visitors with information and an opportunity to ask questions about WNS.



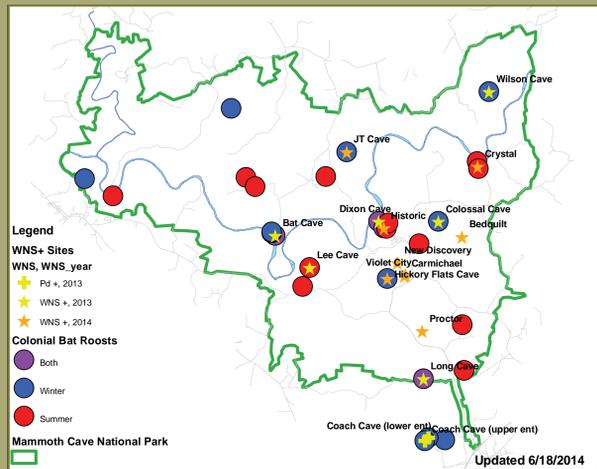
Information about WNS is provided on the Mammoth Cave website. Each visitor who purchases a ticket receives information about WNS and Mammoth Cave's bio-security requirements.

Response Plan

Mammoth Cave National Park began formally writing its White-Nose Syndrome Response Plan in February 2010. It borrowed heavily from the state of Kentucky's response plan and was reviewed by state and federal agency partners. The plan is currently being revised.



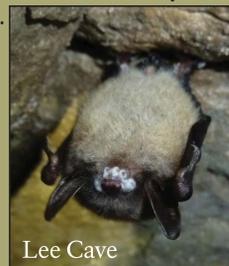
The Mammoth Cave response plan is available online.



As of June 18, 2014, bats with WNS symptoms have been found in six Myotis and two Rafinesque big-eared bat hibernation caves. Those caves are: Long Cave, Lee Cave, Colossal Cave, Wilson Cave, Dixon Cave, Bat Cave, Hickory Flat Cave and JT Cave. In addition, we have found bats with symptoms in seven entrances of the Mammoth Cave system, including three toured entrances. Four species, little brown bat (*Myotis lucifugus*), northern long-eared bat (*M. septentrionalis*), Indiana bats (*M. sodalis*) and tricolored bat (*Perimyotis subflavus*) have been found to have the disease. We have started to see some WNS-related mortality. Park staff continues to monitor the situation.



This northern long-eared bat from Long Cave was the first bat with WNS identified on the park (Jan. 4, 2013). Note the white along the ear and forearm.



Lee Cave



Wilson Cave



Colossal Cave



Bat Cave

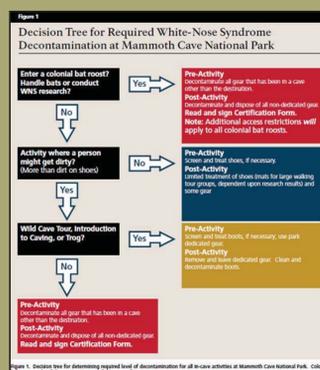
This little brown bat from Lee cave, little brown bat from Colossal Cave, and the tricolored bats from Wilson Cave and Bat Cave all show more classic symptoms of WNS.

Research Requirements

Research requirements allow cave, bat, and WNS research and monitoring activities to continue while minimizing the risk of human-caused spread of WNS due to those activities.



Since August 2010, researchers have been required to certify that they have followed proper WNS decontamination protocols for all of their gear and equipment.



A decision tree has been developed to outline levels of decontamination required for various cave-related activities.

Bat Population and WNS Research, Monitoring, & Surveillance

As WNS spreads, Mammoth Cave National Park recognizes the need to continue researching and monitoring its bats. The park is also actively involved in research and surveillance for WNS.



Beginning in Winter 2010, Anabats were stationed at selected hibernacula entrances. Pre-WNS recordings provide researchers with a baseline of "normal" winter bat activity. Recordings since the discovery of WNS will track changes due to the disease.



Mammoth Cave National Park conducts Tier 1 surveys of hibernating bats every two years. Additional Tier 2 and 3 surveillance surveys are conducted to search for signs and effects of WNS.



Since 2004, summer emergence counts have been conducted at 15 caves and 7 artificial structures.



Two summer mobile acoustic transects have been established in the Mammoth Cave National Park area. These routes are part of a larger multi-state project occurring in the eastern U.S.

Researchers are collecting soil samples from Mammoth Cave to look for evidence of *P. destructans*, swabbing bats to study the fungi found on bats, and monitoring the foraging activities of bats in burned and unburned areas of the park.



Access Restrictions

All 400+ caves in Mammoth Cave National Park are closed to human access except via ranger-led tours, research permit, or special use permit.

Appendix B

WNS Cave Access Table
Mammoth Cave National Park

Cave Area Class	Activity Categories									
	Pre-Activity	Post-Activity	Pre-Activity	Post-Activity	Pre-Activity	Post-Activity	Pre-Activity	Post-Activity	Pre-Activity	Post-Activity
Current Developed Trails	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Former Bear Trails	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Cave Areas With Colonial Bats	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Restrictions on cave-related activities depend on the type and location of the activity.



Many of the caves within the park are gated with bat-friendly gates to prevent unauthorized human entrance. "Caves closed" signs are posted at the entrances to most winter colonial bat roosts.