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## White-Nose Syndrome The devastating disease of hibernating bats in North America

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# White-Nose Syndrome

*The devastating disease of hibernating bats in North America*

*August 2014*

## What is white-nose syndrome?

White-nose syndrome (WNS) is a disease affecting hibernating bats. Named for a white fungus that appears on the muzzle and other parts of bats, WNS is associated with extensive mortality of these animals in eastern North America. First documented in New York in the winter of 2006-2007, WNS has spread rapidly across the eastern and midwestern United States and eastern Canada, and evidence of the fungus that causes WNS has been detected as far south as Mississippi.

Bats with WNS act strangely during cold winter months, including flying outside during the day and clustering near the entrances of caves and other hibernation areas. Bats have been found sick and dying in unprecedented numbers in and around caves and

mines. WNS has killed more than 5.5 million bats in the Northeast and Canada. In some areas, 90 to 100 percent of bats have died.

Many non-governmental organizations, universities and state and federal agencies are investigating the cause of the bat deaths. A newly discovered fungus, *Pseudogymnoascus* (formerly *Geomyces*) *destructans*, has been demonstrated to cause WNS. Scientists are investigating the dynamics of fungal infection and transmission and are searching for ways to control it.

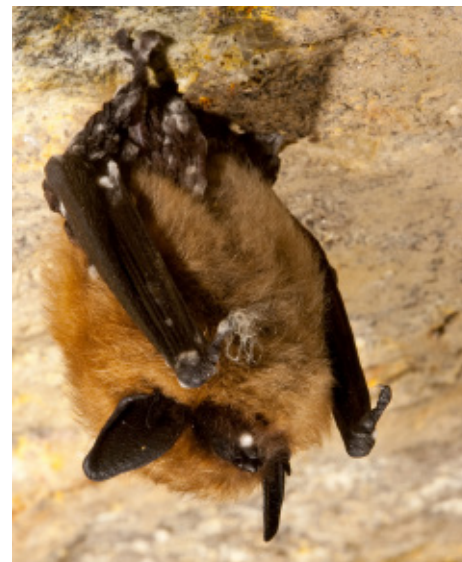
## What bats are being affected?

More than half of the 47 bat species living in the United States hibernate to survive the winter. Seven cave-hibernating bats, including two endangered species and one species recently proposed for listing, are confirmed with WNS. The fungus has been detected on additional five species, including one endangered species, with no confirmation of disease.

Bat species confirmed with WNS:

- Big brown bat (*Eptesicus fuscus*)
- Eastern small-footed bat (*Myotis leibii*)
- Gray bat (*Myotis grisescens*) **endangered**
- Indiana bat (*Myotis sodalis*) **endangered**
- Little brown bat (*Myotis lucifugus*)
- Northern long-eared bat (*Myotis septentrionalis*) **proposed for listing**
- Tri-colored bat (*Perimyotis subflavus*)

Bat species on which *Pseudogymnoascus destructans* has been detected with no confirmation of disease:



Ryan von Linder/NYDEC

*Eastern small-footed bat with white fungus on nose, arms and wings*

- Eastern red bat (*Lasiurus borealis*)
- Southeastern bat (*Myotis austroriparius*)
- Silver-haired bat (*Lasionycteris noctivagans*)
- Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)
- Virginia big-eared bat (*Corynorhinus townsendii virginianus*) **endangered**

Federally listed species found in the affected area that have not yet been confirmed with WNS or fungal infection:

- Ozark big-eared bat (*Corynorhinus townsendii ingens*) **endangered**

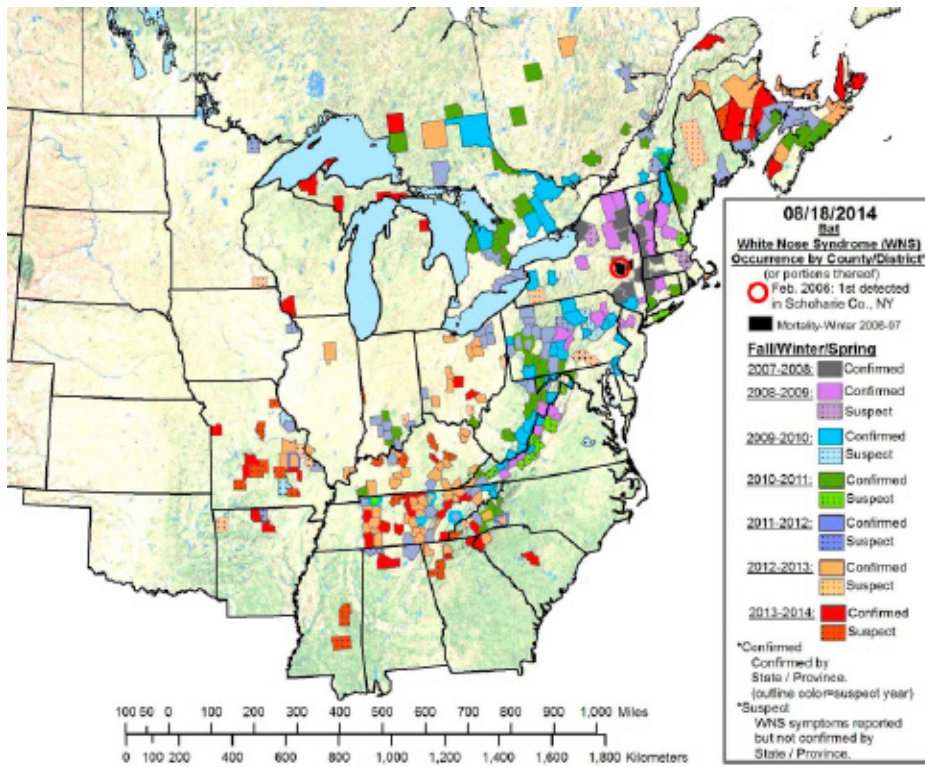
## Where is it now?

White-nose syndrome has continued to spread rapidly. As of August 2014, bats with WNS were confirmed in 25 states and five Canadian provinces:



Jeremy Coleman/USFWS

*Vermont Fish and Wildlife Department biologists remove the gate to conduct a winter survey at Plymouth Cave*



- Alabama
- Arkansas
- Connecticut
- Delaware
- Georgia
- Illinois
- Indiana
- Kentucky
- Maine
- Maryland
- Massachusetts
- Michigan
- Missouri
- New Brunswick, Canada
- Nova Scotia, Canada
- Ontario, Canada
- Prince Edward Island, Canada
- Quebec, Canada
- New Hampshire
- New Jersey
- New York
- North Carolina
- Ohio
- Pennsylvania
- South Carolina
- Tennessee
- Vermont
- Virginia
- West Virginia
- Wisconsin

### WNS National Plan

In 2009 and 2010, the Service led a team of federal and state agencies and tribes in preparing a national white-nose syndrome management plan to address the threat to hibernating bats. The plan is a framework for coordinating and managing the national investigation and response to WNS. *The National Plan for Assisting States, Federal Agencies, and Tribes in Managing White-Nose Syndrome in Bats* outlines the actions necessary for state, federal and tribal coordination, and provides an overall strategy for investigating the cause of WNS and finding ways to manage it.

### What have we learned?

- Biologists in New York and Vermont have found up to 50 percent of marked little brown bats at test sites surviving from one winter to the next in recent years, giving some hope that this species might one day be able to recover. Little brown bat populations at these sites remain at less than 10 percent of their pre-WNS size, however.
- Scientists have developed new ways to detect *Pseudogymnoascus destructans* on bats and in the environment, including using UV light and molecular analyses.
- Because of WNS investigation, researchers have discovered new unrelated bat disease agents.
- Researchers have made significant strides in understanding disease

response of hibernating bats and factors that influence bat vulnerability to WNS.

- Studies of natural bacteria and skin chemistry of bats have led to new lines of research for treatments using biological or non-chemical agents for bats at risk of WNS infection.
- Other treatments under investigation include changing temperature and humidity in hibernation areas to slow fungus growth or improve bat survival, and vaccines to boost resistance to WNS.
- Researchers are looking into molecular and genetic tools to reduce the ability of *P. destructans* to cause disease.

### 2014 Research Funding

In 2014 the Service awarded research and state response grants totaling \$4.5 million.

Projects funded by these grants will improve and expand surveillance of the disease and *Pseudogymnoascus destructans*; help to develop a standardized monitoring program for bat populations in North America; and identify and develop non-chemical control options for treatment and prevention of spread of *P. destructans*.

2014 funding builds on approximately \$14 million that the Service has dedicated to WNS research and state capacity between 2008 and 2013.

For more information on recent research developments see [www.WhiteNoseSyndrome.org](http://www.WhiteNoseSyndrome.org)

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Evidence of the fungus that causes WNS, *Pseudogymnoascus destructans*, has been detected in three additional states:

- Iowa
- Minnesota
- Mississippi

### What is being done?

#### Partnerships

The U.S. Fish and Wildlife Service leads an extensive network of state and federal agencies, tribes, organizations, institutions and individuals in working cooperatively to investigate the source, spread and cause of bat deaths associated with WNS and develop management strategies to minimize the impacts of WNS.