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 and mid-western 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 has been continued as far west as the state of Washington.

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 is estimated to have killed more than 6 million bats in the Northeast and Canada. In some sites, 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 destructans*, has been demonstrated to cause WNS. Scientists are investigating the dynamics of fungal infection and transmission and are developing 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 and one threatened federally listed species, have been confirmed with WNS. The fungus has been detected on an 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*) **threatened**
- Tri-colored bat (*Perimyotis subflavus*)

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

In Europe, 13 bat species have been confirmed with WNS or the fungus, but there has been no mortality associated with these observations.
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 microbiota of bats have led to new lines of research for treatments using biological or biologically derived agents for bats at risk of WNS infection. Some of the potential treatments are moving to limited field testing.

Other treatments under consideration include altering climate in hibernation areas to slow fungal 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 \( P. \text{destructans} \) to cause disease.

**Research Funding**

From 2008 to 2015 the Service has allocated $32 million to meet high priority needs for research and field support. This includes more than $24 million in grants to other federal agencies, academic institutions, non-governmental organizations and state natural resources agencies.

For more information on recent research developments see www.WhiteNoseSyndrome.org

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