Mapping the Spread of White-Nose Syndrome

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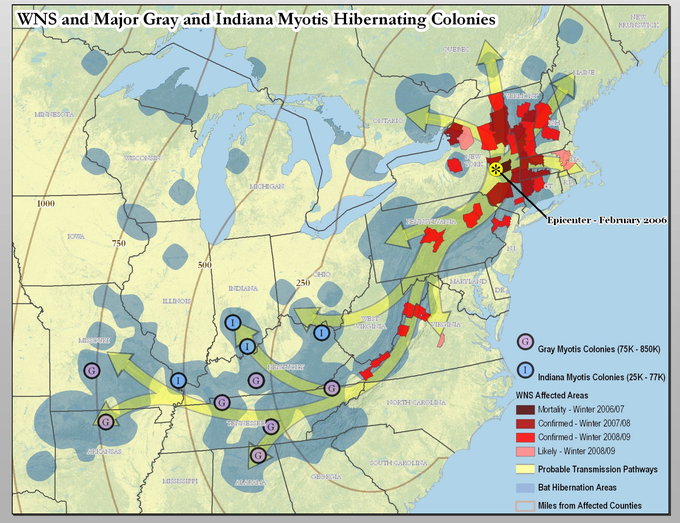
White-Nose Syndrome (WNS) is a North American Crisis!

WNS is a previously unknown disease among hibernating bats and is causing the most precipitous decline of North American wildlife in recorded history. When WNS was first discovered, many perceived the threat of WNS as a local or regional issue. It has already spread across at least nine states and at least six species have died from this disease. It is now widely accepted that it is an international threat as it has the potential to impact hibernating species across North America. The extent of the global threat remains unclear.

Photo Credit: Bat Conservation International

Named for the newly described cold-loving fungus (*Geomyces destructans*) growing on the affected bats, WNS is linked to damage on wing membranes, excessive loss of limited fat reserves during winter, and death from starvation before spring -- mortality in some hibernation roosts approaches 100%. As of July 2009, WNS has killed an estimated 1,000,000 bats in the northeastern United States since it was discovered in New York in February 2006. Such losses alone are expected to have unprecedented consequences on ecosystem health throughout North America, with unknown economic consequences.

Photo Credit: Jonathan Reichard

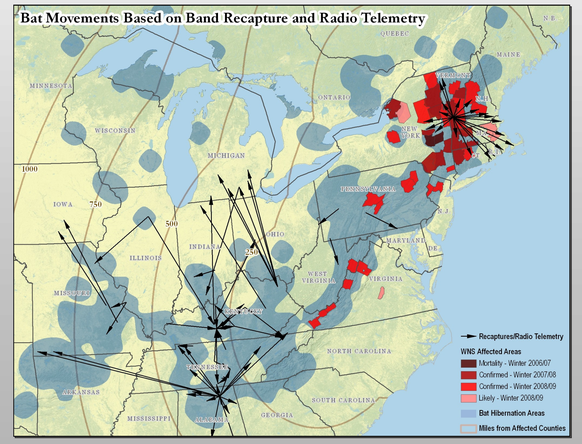


GIS—An Essential Tool for Understanding the Threat

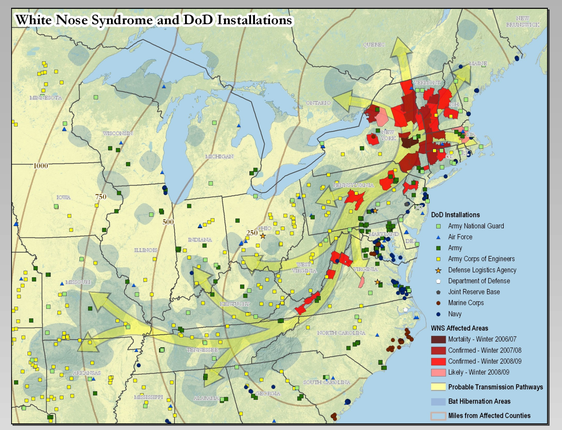
Geographic Information Systems (GIS) are essential tools for understanding the spread of WNS. Spatial analysis of currently affected areas and potential future spread is necessary for focusing efforts to raise awareness and promote preparedness. Applying geospatial perspectives to WNS will greatly enhance the capacity of all organizations that have land management and environmental programs, including the Department of Defense.

Some example spatial analyses based on available data that could enhance awareness for Department of Defense managers include:

- Calculating the proximity of each DoD installation to WNS affected areas.
- Compiling the ranges of bat species that intersect with the location of DoD installations.
- Prioritization of WNS management and monitoring resources for DoD installations in bat hibernation areas.
- Modeling future spread of WNS to increase the awareness of land managers and to help direct the flow of resources to combat WNS.



The Department of Defense Can Help Fight WNS



WNS cuts across all boundaries and jurisdictions. It is an ecological crisis for all management, conservation, and research organizations. WNS has already hit many military installations in the northeastern United States -- some species of bats commonly captured in the past are now rarely detected and the situation is only expected to worsen. Installations throughout the United States will be impacted as more species are affected by WNS. There are discussions underway for possible listing of new endangered species and for establishing a captive colony of the federally endangered Virginia Big-eared Bat.

How the Department of Defense can help fight WNS:

- Call for and support a comprehensive National Plan to combat WNS.
- Partner Beyond the Boundaries
  - + Integrate military installations into a comprehensive WNS Surveillance and Monitoring Strategy, including implementing monitoring of priority sites on installations. This will lead to early detection of WNS and measure the progression of WNS once it is established in a roost.
  - + Partner on broader regional research projects tackling priority WNS research questions.
- Proactively enhance management of known roosts sites (e.g., caves, mines, bunkers, buildings, etc.) – MINIMIZE UNNECESSARY AND EXCESS DISTURBANCE IN ROOSTS, ESPECIALLY HIBERNACULA
- Support the development of new technologies that will enhance management of bat conservation and management (e.g., remote monitoring)
- Establish and support actions to foster greater awareness of WNS and bat conservation and management throughout the Department of Defense.

Twenty-five Species of Hibernating Bats Are At Risk

Although six hibernating species (including the federally endangered Indiana Myotis) have been affected by WNS to date, another five (including the federally endangered Gray Myotis and Virginia Big-eared Bat) are on the firing line as they hibernate within 80 miles or less of the current WNS front. If left unchecked, WNS could advance across North America simply from bat movement between summer and winter roost and trigger unexpected cascades of consequences.

Photo credit: Marvin Moriarty/USFWS

Hibernating bat species and current WNS status

Species/Subspecies Name	Common Name	WNS Status
Antrozous pallidus	Pallid bat	Not yet impacted
Corynorhinus rafinesquii	Rafinesque's big-eared bat	Front line
Corynorhinus townsendii	Townsend's big-eared bat	Not yet impacted
Corynorhinus townsendii ingens	Ozark big-eared bat	Front line
Corynorhinus townsendii virginianus	Virginia big-eared bat	Front line
Eptesicus fuscus	Big brown bat	Currently impacted
Euderma maculatum	Spotted bat	Not yet impacted
Idionycteris phyllotis	Allen's big-eared bat	Not yet impacted
Myotis auriculus	Mexican long-eared myotis	Not yet impacted
Myotis austroriparius	Southeastern myotis	Front line
Myotis californicus	California myotis	Not yet impacted
Myotis ciliolabrum	Western small-footed myotis	Not yet impacted
Myotis evotis	Western long-eared myotis	Not yet impacted
Myotis grisescens	Gray myotis	Front line
Myotis keenii	Keen's myotis	Not yet impacted
Myotis leibii	Eastern small-footed myotis	Currently impacted
Myotis lucifugus	Little brown myotis	Currently impacted
Myotis occultus	Occult myotis	Not yet impacted
Myotis septentrionalis	Northern long-eared myotis	Currently impacted
Myotis sodalis	Indiana myotis	Currently impacted
Myotis thysanodes	Fringed myotis	Not yet impacted
Myotis velifer	Cave myotis	Not yet impacted
Myotis volans	Long-legged myotis	Not yet impacted
Myotis yumanensis	Yuma myotis	Not yet impacted
Nycticeius humeralis	Evening bat	Front line
Parastrellus hesperus	Canyon bat	Not yet impacted
Perimyotis subflavus	Tricolored bat	Currently impacted

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Map Information: Probable transmission pathways are based on band recapture data and WNS occurrence data. Bat Hibernation Areas are based on known hibernacula from best-available data for Little Brown Myotis, Big Brown Bat, Indiana Myotis, Southeastern Myotis, Gray Myotis, Rafinesque's Big-eared Bat, Northern Myotis, Eastern Small-footed Myotis, and Tri-colored Bats. Some hibernacula are not represented.

Map Sources: Department of Defense Legacy Program, Pennsylvania Game Commission, U.S. Fish and Wildlife Service, West Virginia Division of Natural Resources, Bat Conservation International, National Atlas, North American Atlas, Natural Earth

For more information on bats and WNS visit:

http://www.bci.org

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