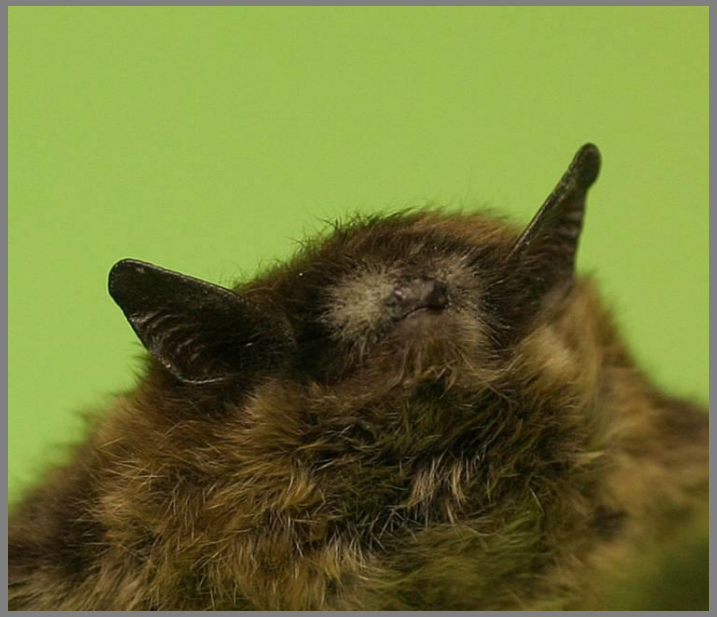
White Nose Syndrome & Northern Long Eared Bat Listing

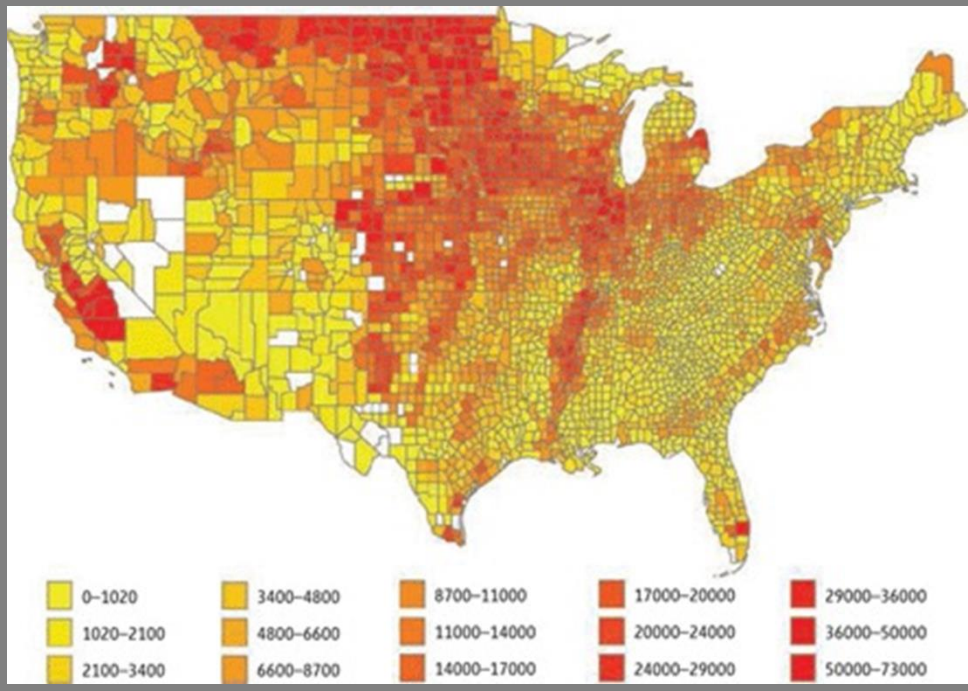


Bill Scullon,
Wildlife Division
Michigan Department of Natural Resources
April 21, 2016

Why should we care about bats?

- Economic Importance
  - Pest control benefits $3.7 – $53 billion / year nationally
  - **Michigan agriculture $528 million to $1.2 billion annually (2011)**
    - **$74 per farmed acre**
  - Gypsy moth, tent caterpillars, cutworms (codling moths), pecan nut casebearer, fruit worms, forest cone worms, hickory shuckworm, corn ear worm moth

The worth of insectivorous bats.



J G Boyles et al. Science 2011;332:41-42

Science
AAAS

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White-Nose Syndrome

"White-nose Syndrome (WNS) is a devastating disease of hibernating bats that has caused the most precipitous decline of North American wildlife in recorded history."

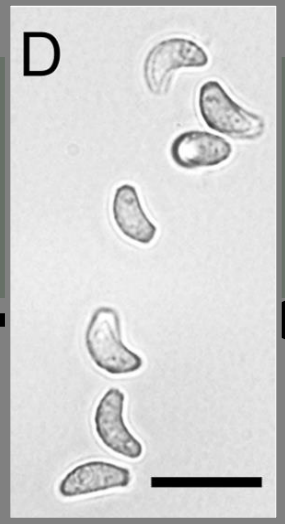
What is the cause of WNS?

- Named for the White fungus (*Psuedogymnoascus destructans*) that Invades skin tissue of hibernating bats causing lesions / necrosis
- introduced from Europe, in all likelihood by human transport, responsible for entire outbreak (Rajkumar et al., 2011, *Emerg. Infect. Dis.* 17:1273-1276)
- Associated with large die-offs of bats in North America

Photo by D. Berndt, NWHC

Photo by AL Hicks NYDEC

WNS: The fungus



- *Pseudogymnoascus destructans* is proven causal agent (Lorch et al. 2012, *Nature* 480:376)
- *Cryophillic fungus* - Optimal growth at 5-14° C
- Invasive spores or Conidia persist indefinitely as an infectious pathogen in the environment

WNS: Bats as hosts

- Long-lived: 20-30+ years
- Longevity generally inversely related to ability to reproduce
  - Bats typically raise only 1 or 2 pups / year
- Naive species, no natural resistance
- Sensitive to environmental stimuli
- Consequence is that bat populations are ill-equipped to absorb and recover from a mass mortality event

Why are cave & mine hibernating bats so vulnerable?

Photo by A. Hicks, NYSDEC

- Clustering behavior promotes transmission
- Multiple species in direct contact
- ***Limited energy resources during hibernation***
- Immuno-suppressed during hibernation

WNS: Vulnerable Bats

5 colonial species native to MI and Northern WI known to be affected

- Little brown bat (*Myotis lucifugus*)
- Northern long-eared bat (*M. septentrionalis*)
- Indiana bat (*M. sodalis*; Fed. endangered)
- Tri-colored bat (*Perimyotis subflavus*)

- Big brown bat (*Eptesicus fuscus*)
- Susceptibility, progression differ by species and/or microclimate (Langwig et al., 2012, *Ecol. Lett.* 15:1050-1057)

What other animals are affected?

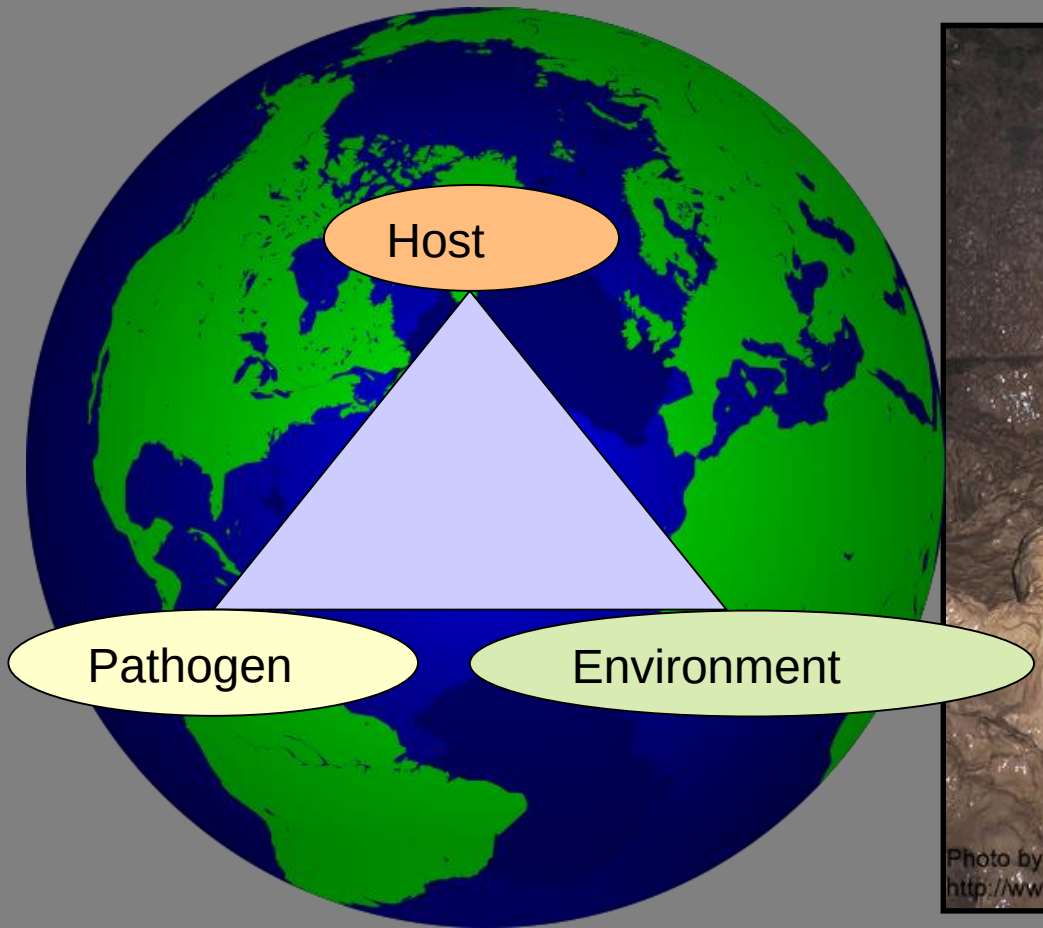
Only bats have been affected:

no other wildlife species
no domestic animals
no pets
no people

Credit: Craig Stihler, WV DNR

How does it spread?

- Bat to bat
- Anthropogenically - human assisted transportation



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WNS: Pathology/pathogenesis
Progression of the disease

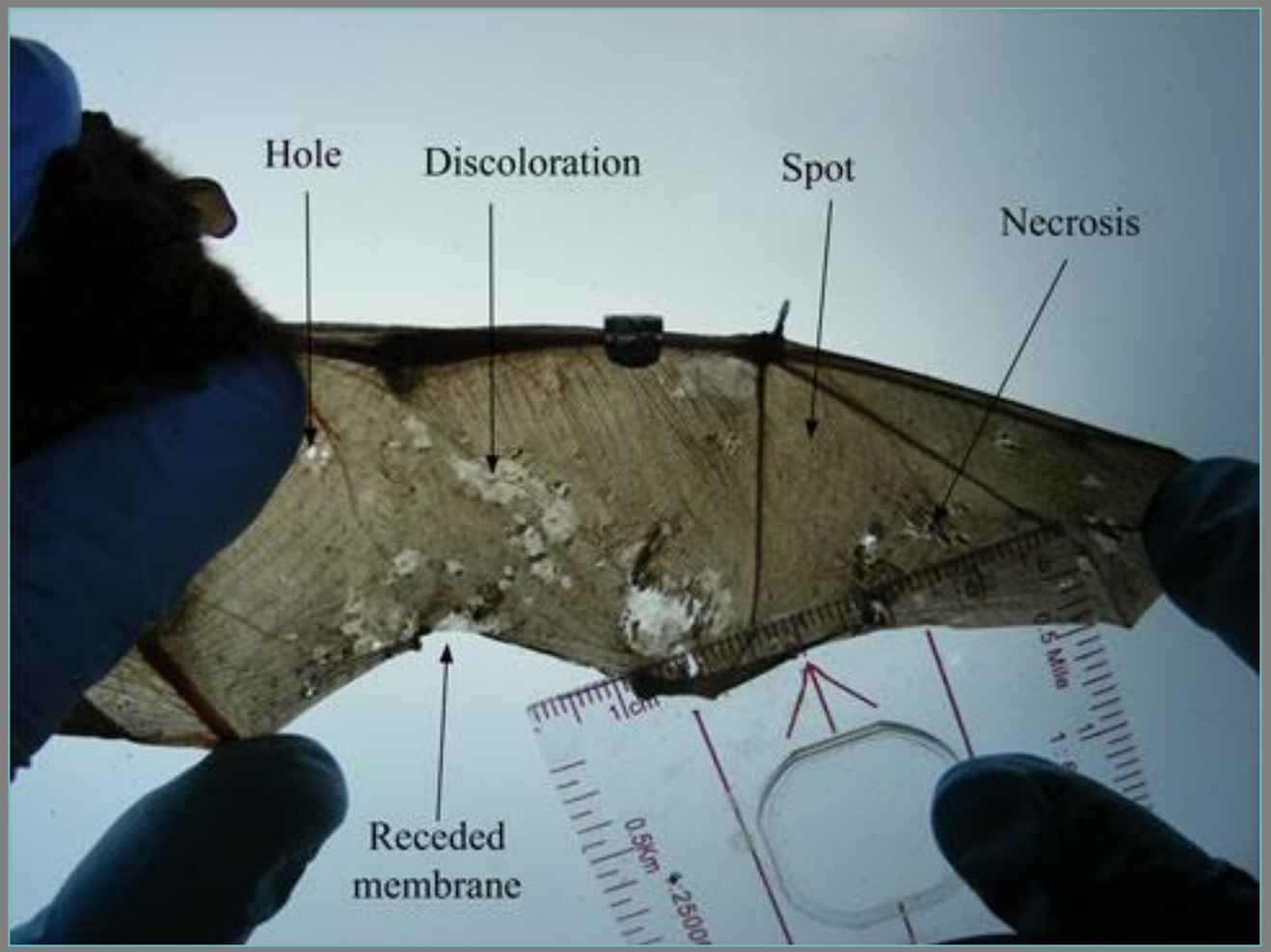


Photo: Fuller et al. 2011, *Ecohealth* 8:154-162, Fig. 1

WNS: The Disease

- Fungus invades skin
  - Irritation
  - Alters ability to regulate water balance
- Bats repeatedly arouse from hibernation, use up stored fat more rapidly than normal (Reeder et al. 2012, *PLoS One* 7:10)
  - Torpor bouts as short as 5 to 7 days (normal 23+ days)
- Eventually arouse permanently in late winter before food (insects) available, starve (or die of metabolic dysfunction)

Little brown bat from Alpena Co., 3/24/14.
Photo: D. O'Brien, DNR-WDL

Bat populations in NY, PA, VT, VA, WV

from 42 hibernacula w/ 2+ years of mortality

Species	Sum Pre-WNS	Sum Post-WNS	**Total decline**
Little Brown Bat	384,277	30,260	**91%**
N. Long-Eared Bat	1,706	31	**98%**
Tricolored Bat	3,107	783	**75%**
Indiana Bat	55,028	15,650	**72%**
E. Small-Footed Bat	1,303	1,142	**12%**
Big Brown Bat	2,919	1,713	**41%**
All bats	412,340	49,579	**88%**

Turner et al. 2011. *Bat Research News* 52:13-27.

How much mortality nationally?

- WNS confirmed in 28 states and 5 Canadian provinces
- *Pd* confirmed in 4 more states.
- An estimated > 7,000,000 bats have died due to WNS in North America since 2006 (2012 USFWS)
- Catastrophic mortality rate can exceed 95%
- Peer reviewed research predicts local extinction (extirpation) of little brown bats in the Northeast, possible Continental extinction within 14 years.
- Potential to impact 25 of the 45 N.A. bat species
- Unknown impacts on solitary species / theorized to be susceptible
  - Hoary bat / silver bat with Pd.

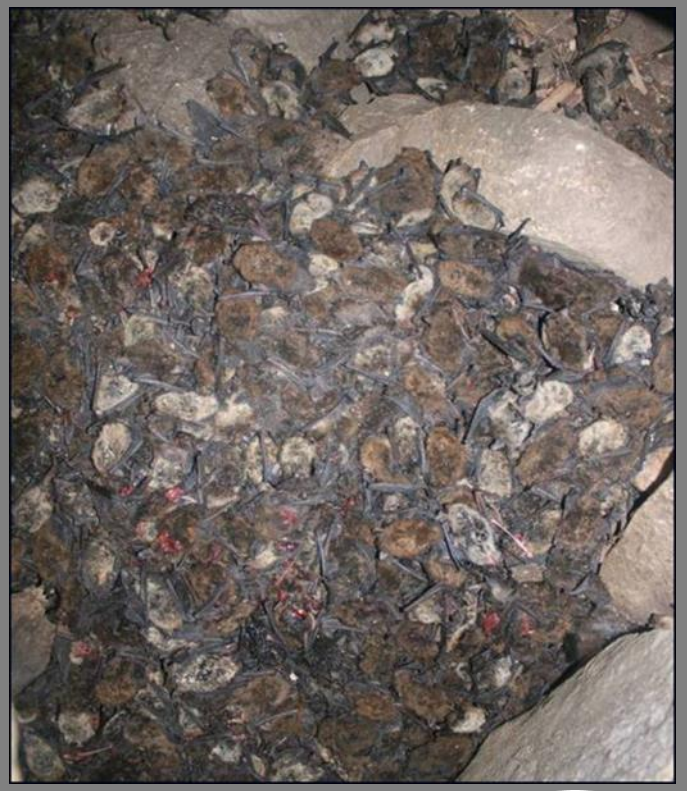
Credit: Andrew King, USFWS

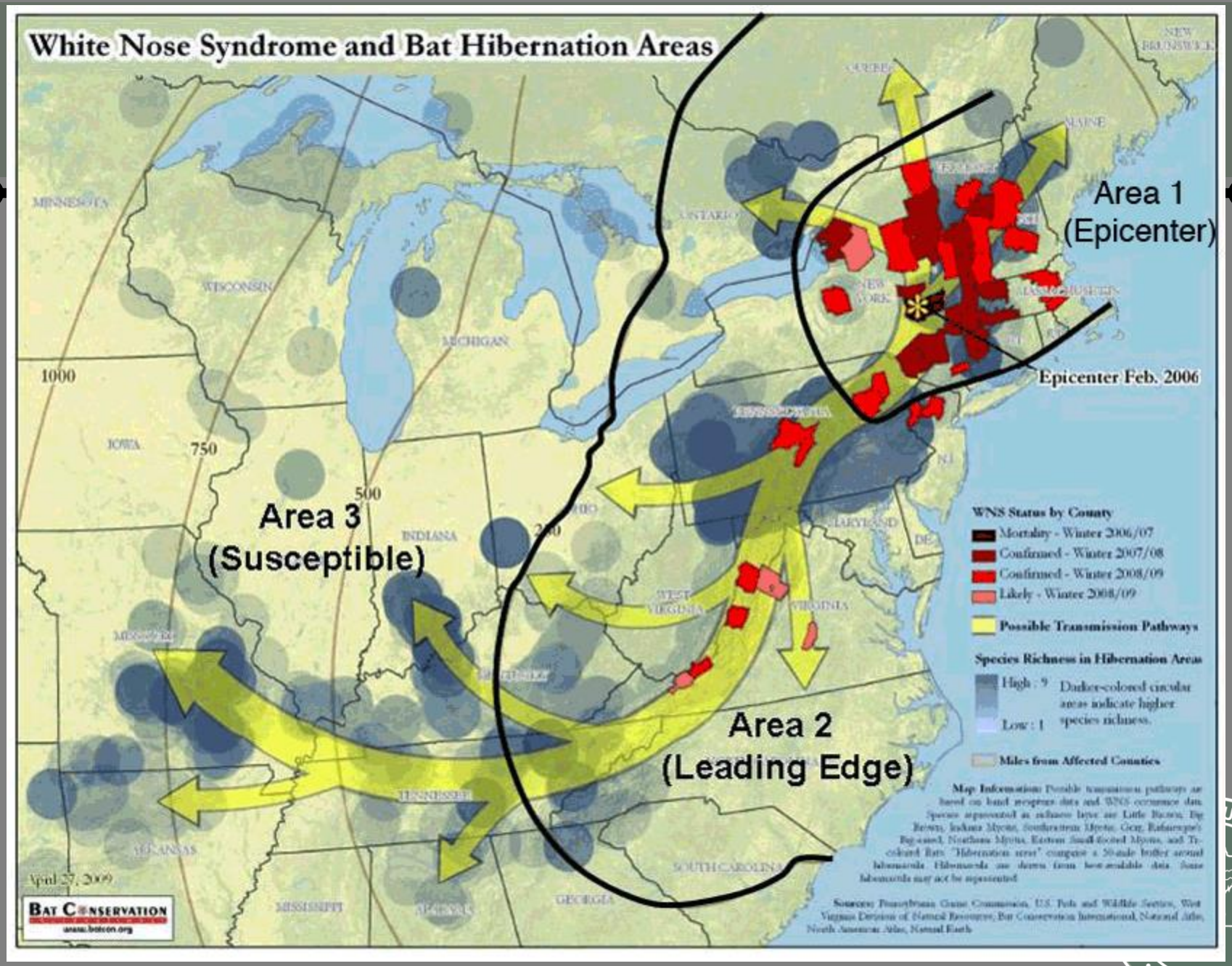
Why is WNS impact so severe?

- Whole suite of species impacted
- Bats have a very slow reproductive rate
- Possible recovery to pre-WNS population levels is unknown, may take centuries

WNS Signs: Abnormal Behavior, Mortality, etc.

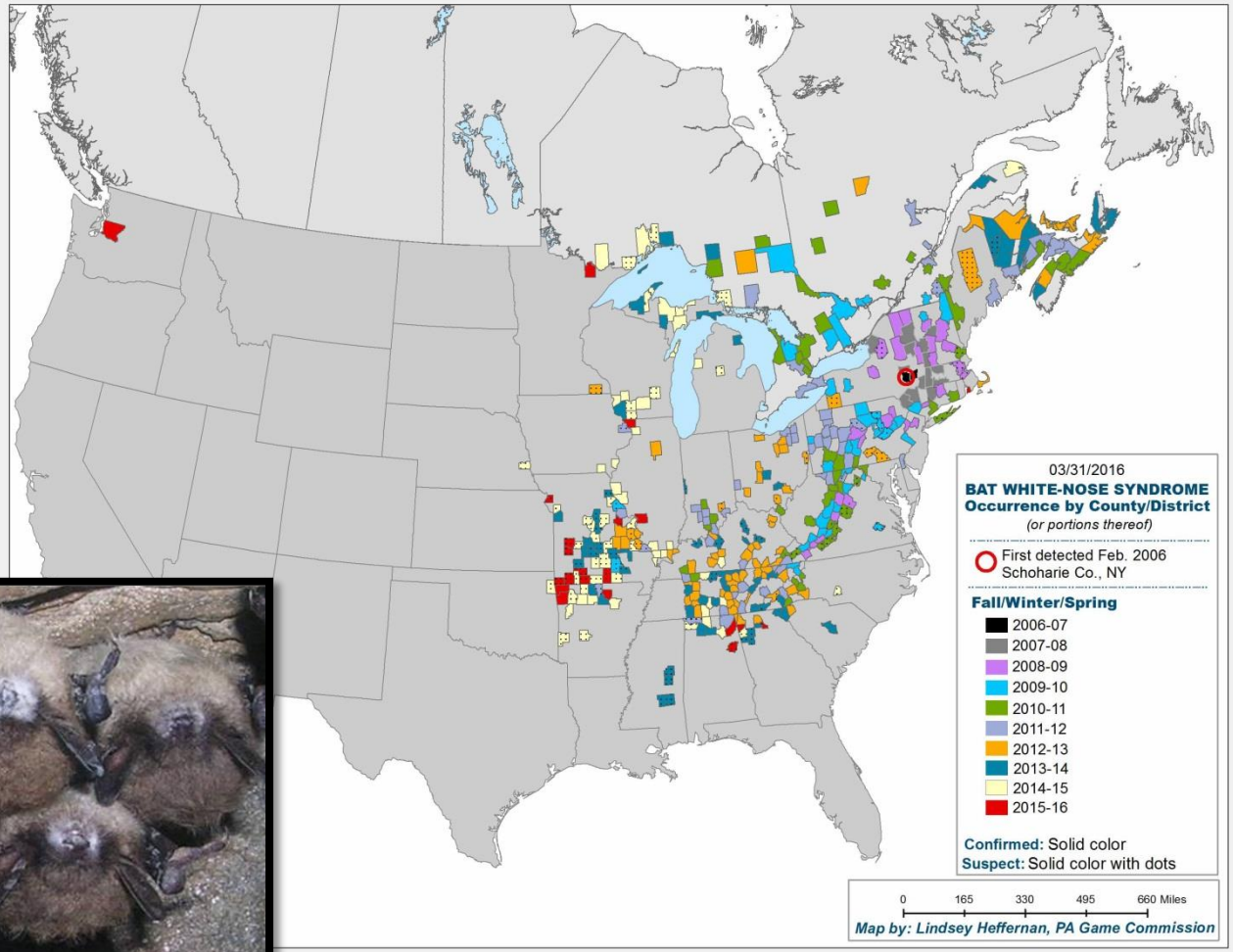
- Mortality events at / near hibernacula
  - Mid winter emergence
- Not all WNS bats show clinical fungal growth
  - Fungus is groomed off
  - Wing scaring remains present
- Changes in behavior, bats roosting near entrances, cooler parts of mine
- Daytime activity
- Bats arousing more than normal during hibernation.
- Death due to starvation / dehydration




White Nose Syndrome and Bat Hibernation Areas
Area 1
(Epicenter)
Epicenter Feb. 2006
Area 3
(Susceptible)
Area 2
(Leading Edge)
1000
750
500
250
WNS Status by County
Mortality - Winter 2006/07
Confirmed - Winter 2007/08
Confirmed - Winter 2008/09
Likely - Winter 2008/09
Possible Transmission Pathways
Species Richness in Hibernation Areas
High : 9
Low : 1
Darker-colored circular areas indicate higher species richness.
Miles from Affected Counties
April 27, 2009
BAT CONSERVATION
www.batcon.org
MINNESOTA
WISCONSIN
MICHIGAN
IOWA
INDIANA
ILLINOIS
OHIO
WEST VIRGINIA
VIRGINIA
MARYLAND
NEW YORK
MAINE
ONTARIO
QUEBEC
NEW BRUNSWICK
MASSACHUSETTS
NJ
DE
TENNESSEE
ARKANSAS
MISSISSIPPI
ALABAMA
GEORGIA
SOUTH CAROLINA

White-Nose Syndrome 2016

State of Washington 3/31/16

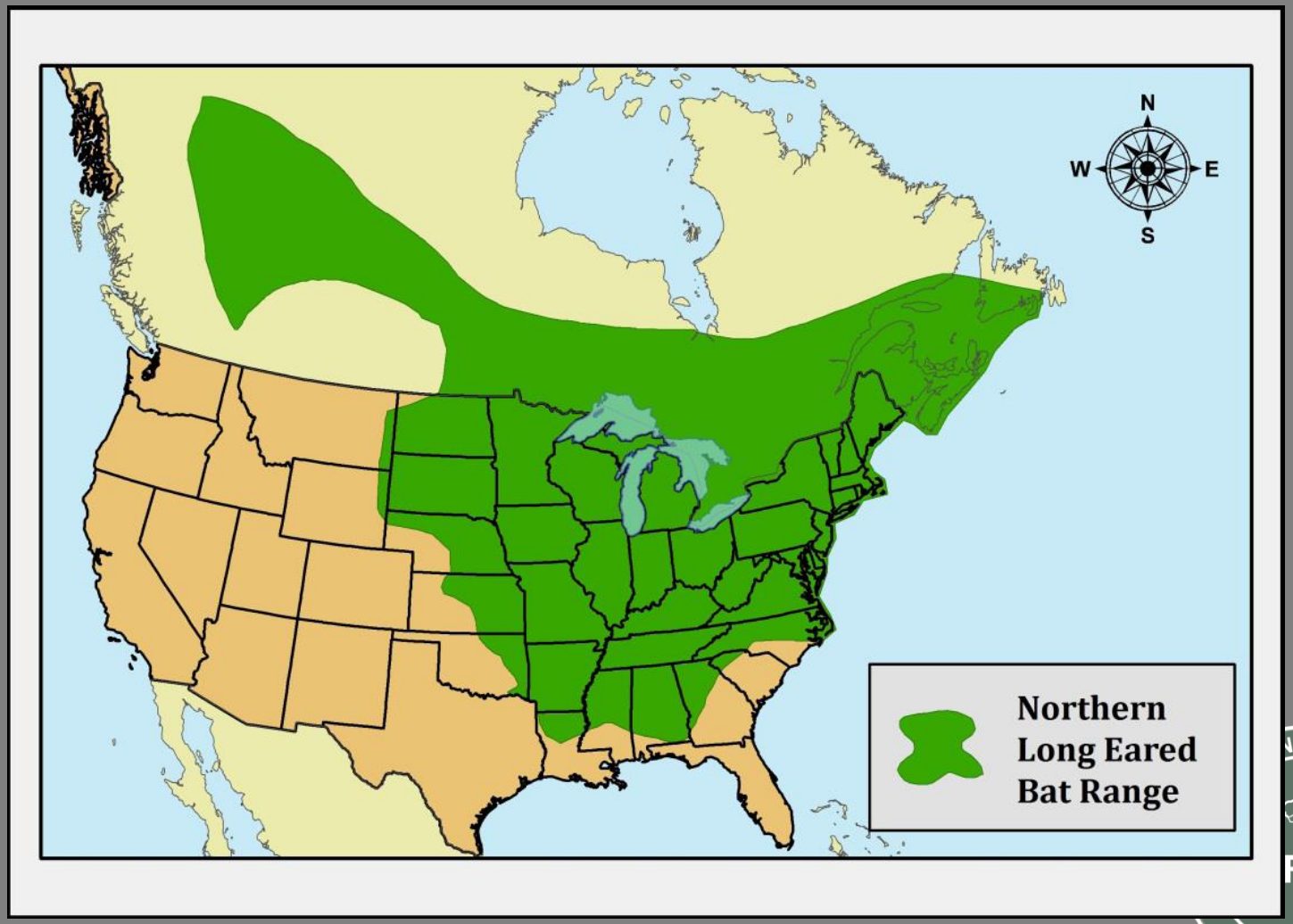


Northern Long-Eared Bat Proposed Listing and Next Steps

What is the Issue?

- The northern long-eared bat (NLEB) is suffering significant declines in the northeastern and Midwestern states from WNS.
- Because of this decline, the U.S. Fish and Wildlife Service has listed the NLEB as a threatened species and finalized a 4(d) rule.

Species Range



Why is this a big issue?

- Initially, USFWS recommended “no cut” times for Michigan between April 1 – September 30.
- Since NLEB is associated with mature interior forests.
- If NLEB was listed as endangered the following Department activities would have been affected:
  - Sustainable forest management
  - Wildlife habitat management
  - Oil, gas and mineral extractions

Where are we today?

- The NLEB is a federally threatened species.
- Final NLEB 4(d) rule announced January 13, 2016.
- 4(d) rules only apply to threatened species

Where are we today?

- Final 4(d) rule designed to protect NLEB during hibernation and pup-rearing.
- The final 4(d) rule identifies
  - Exemptions for Purposeful take
  - Prohibitions for Incidental take
- Final 4(d) rule does not apply to Indiana bat

Purposeful Take Exempted if:

- Protection of human health and safety
- Removing NLEB from human structures only if action complies with state law
- Capture, handling and related activities until May 3, 2016
- Take by an employee of the USFWS, National Marine Fisheries Service, or a State conservation agency that is operating under a Cooperative Agreement with the USFWS

Prohibits Incidental Take if:

- From activities that cut down or destroy known occupied maternity roost trees, or any other trees within 150 feet of that maternity roost tree, during the pup-rearing season (June 1 through July 31).
- Occupied roost trees may be removed when necessary to address a direct threat to human life and property.

Prohibits Incidental Take if:

- If it occurs within or alters a hibernation site for the NLEB
- If it results from tree removal activities within a quarter-mile of a hibernaculum

Next Steps

- High degree of uncertainty with federal listing status of all cave dwelling bats, including NLEB.
  - WNS continues to spread and decimate bat populations
  - USFWS has been sued over NEPA process and likely will be sued over NLEB listing decision and final 4(d) rule
  - Law suit would result in federal court making final decision
  - 4(d) rule does not apply to endangered species

Next Steps

- MI, MN and WI DNRs have decided to draft a Habitat Conservation Plan for cave dwelling bats
  - Proactive and strategic approach
  - Minimize potential impacts to natural resource management, including sustainable forest management

What is a Habitat Conservation Plan (HCP)?

- A Incidental Take Permit (ITP) is required to legally proceed with an activity that would otherwise result in illegal take.
- A HCP is required to by the USFWS to obtain and Incidental take permit (ITP).
- The purpose of an HCP is strategically identify ways to minimize and mitigate incidental take
- The overall impact of the HCP must be considered a conservation benefit to the covered species
- An HCP can be for 30-50 years.

What is a Habitat Conservation Plan (HCP)?

- By drafting the HCP now the States will have greater flexibility than waiting until other cave dwelling bats are listed or NLEB is up-listed.
- HCP process was started in September 2015
  - Hired contractor to draft HCP for the States

MI DNR Supports NLEB Decision and Drafting HCP

- Michigan DNR supports USFWS's decision to develop and finalize a 4(d) rule:
  - biologically sound
  - addresses NLEB conservation needs
  - provides regulatory flexibility
- This decision represents a new paradigm for collaboration among states and the federal government for finding positive solutions to conservation challenges.
- The Michigan DNR will continue to work with other States and USFWS to develop an HCP to help conserve cave dwelling bats.

Thank You

www.michigan.gov/wildlifediseases