

White Nose Syndrome: Impacts to DoD

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**US Army Corps
of Engineers®**

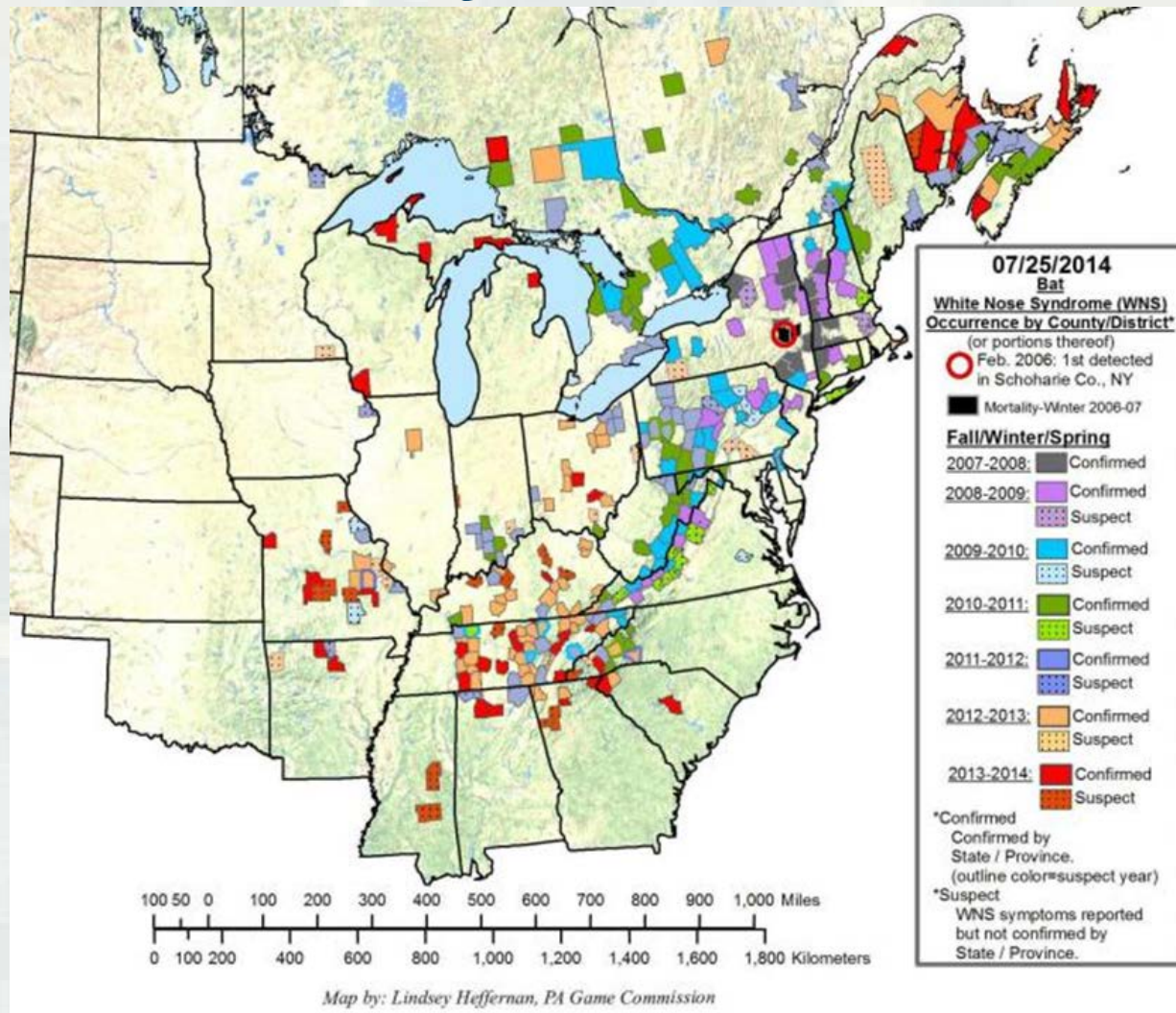


White Nose Syndrome

- First appeared in 2006 near Albany New York
- Caused by fungus *Pseudogymnoascus destructans* (Pd)
- Causes mortality of bats during hibernation



White Nose Syndrome distribution



Seven Species Confirmed With WNS



Little brown bat
(*Myotis lucifugus*)



Northern long-eared bat
(*Myotis septentrionalis*)



Eastern small-footed bat
(*Myotis leibii*)



Indiana bat *
(*Myotis sodalis*)



Tri-colored bat
(*Perimyotis subflavus*)



Big brown bat
(*Eptesicus fuscus*)



Gray bat *
(*Myotis grisescens*)



Additional species on which *P. destructans* has been detected

- Southeastern bat
(*Myotis austroriparius*)
- Virginia big-eared bat*
(*Corynorhinus townsendii virginianus*)
- Silver-haired bat
(*Lasionycteris noctivagans*)



Where did the fungus come from?



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European Connection?

White-Nose Syndrome Fungus (*Geomyces destructans*) in Bats, Europe

Gudrun Wibbelt, Andreas Kurth, David Hellmann, Manfred Weishaar, Alex Barlow, Michael Veith, Julia Prüger, Tamás Görföls, Lena Grosche, Fabio Bontadina, Ulrich Zöphel, Hans-Peter Seidl, Paul M. Cryan, and David S. Blehert

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 16, No. 8, August 2010

White-Nose Syndrome Fungus in Bats, Europe

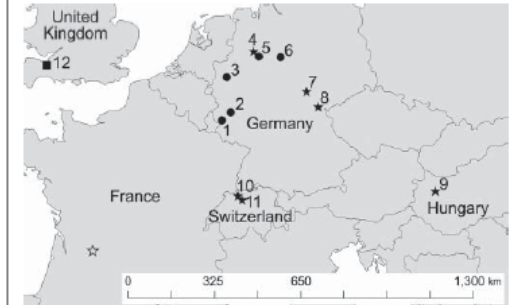


Figure 2. Locations in Europe of bats positive for *Geomyces destructans* by PCR alone (circles) or by PCR and culture (solid stars) and bats negative for *G. destructans* but positive for other fungi (square). Numbers for locations correspond to those in Table 2. Sites 7, 8, and 9 had additional bats that were positive for *G. destructans* only by PCR. Location of a bat positive for *G. destructans* in France (16) is indicated by an open star. Some sites had >1 bat species with evidence of colonization by *G. destructans*.

Hungary



Rene Guttinger

Switzerland

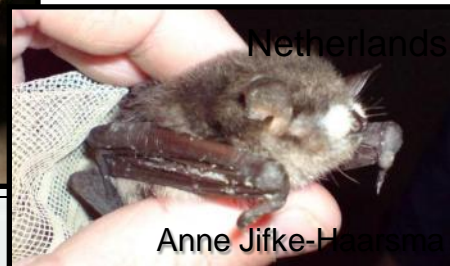


Tamas Gorfol

White-Nose Syndrome Fungus (*Geomyces destructans*) in Bat, France

Sébastien J. Puechmaille, Pascal Verdeyroux, Hubert Fuller, Meriadeg Ar Gouilh, Michaël Bekaert, and Emma C. Teeling

Netherlands



Anne Jifke-Hoogstraal



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Impacts of White Nose Syndrome



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Bat Populations in NY, PA, VT, VA, WV from 42 sites w/ 2+ yrs of mortality

Species	Sum	Sum	Change
	Pre-WNS	Post-WNS	
Little brown bat	384,277	30,260	-91%
Northern bat	1,706	31	-98%
Tri-colored 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%



Mis net results Fort Drum

	2007 (n = 81)	2008 (n = 41)	2009 (n=85)	2010 (n= 85)	2011 (n= 60)*
Big Brown Bat	574 (7.09)	215 (5.24)	311 (3.66)	486 (5.72)	364 (6.07)
Little Brown Myotis	440 (5.43)	104 (2.54)	35 (0.41)	51 (0.6)	14 (0.23)
Northern Myotis	260 (3.21)	37 (0.90)	5 (0.06)	5 (0.06)	1 (0.02)
Eastern Red Bat	62 (0.77)	14 (0.34)	32 (0.38)	89 (1.05)	72 (1.2)
Indiana Myotis	18	2	0	2	1
Hoary Bat	7	5	3	6	2
Silver-Haired Bat	4	3	4	5	2
Tricolored Bat	4	0	1	1	0
Small-footed Myotis	0	0	0	2	0
TOTAL BATS	1369 (16.9)	380 (9.27)	391 (4.6)	647 (7.6)	456 (7.6)

* 30 Sites Repeated Twice
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Little brown bat population model

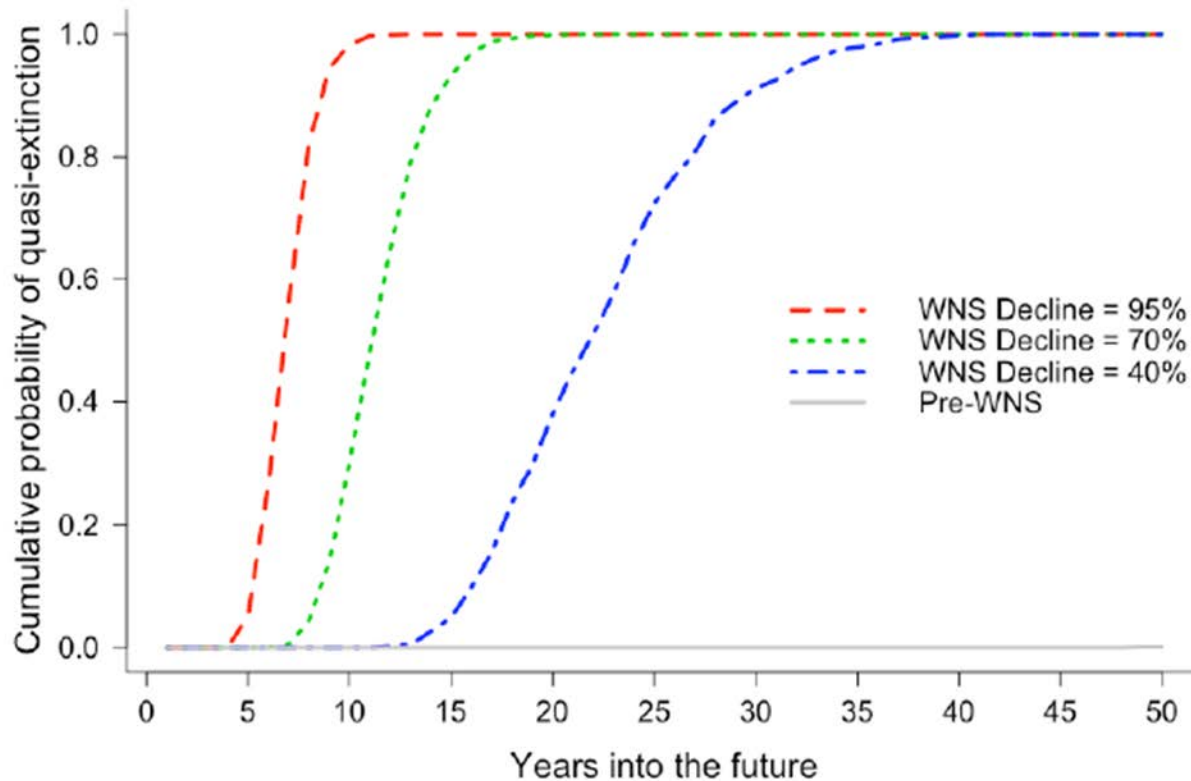


Figure 4.



Immediate Impacts of WNS

- Increased regulatory scrutiny for already listed species
- Cessation of the effort to de-list the gray bat
- Petitions for listing additional bat species



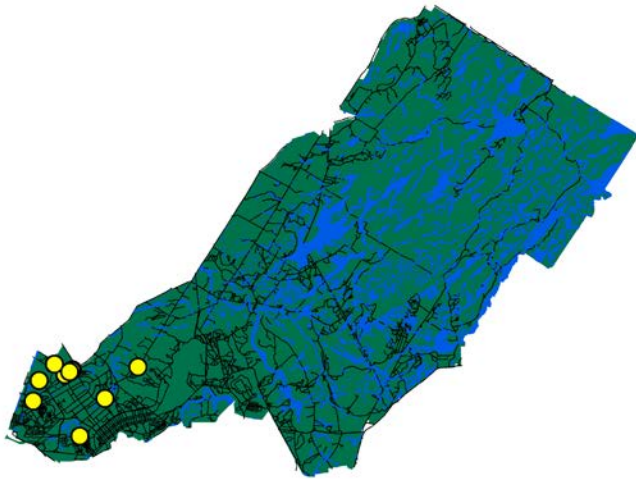
Bat Species Being Evaluated for Listing

- Northern long-eared bat
 - ▶ FWS determined listing was warranted
 - ▶ Listing decision expected by April 2015
- Little brown bat
 - ▶ FWS is currently conducting a status review
- Tri-colored bat
 - FWS is currently conducting a status review

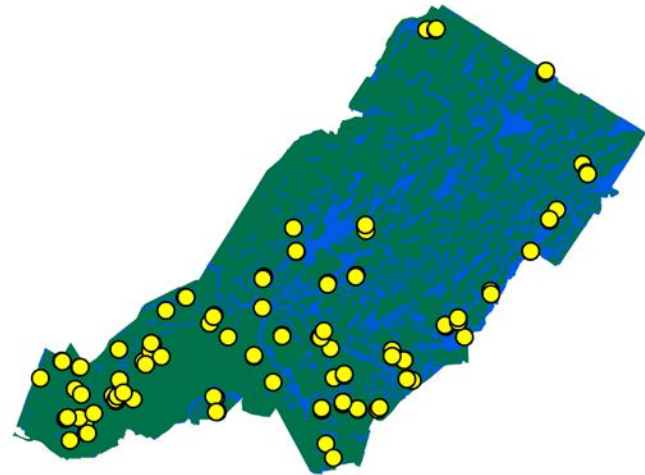


Recent Capture Locations at Fort Drum, NY

Indiana bat



Northern long-eared bat



Bat Species in the U.S. & Canada

MIGRANTS OR SPECIES NOT KNOWN TO HIBERNATE

Species name	Common name
1 <i>Mormoops megalophylla</i>	Ghost-faced bat
2 <i>Choeronycteris mexicana</i>	Mexican long-tongued bat
3 <i>Leptonycteris nivalis</i>	Greater long-nosed bat
4 <i>Leptonycteris yerbabuenae</i>	Lesser long-nosed bat
5 <i>Macrotus californicus</i>	California leaf-nosed bat
6 <i>Lasionycteris noctivagans</i>	Silver-haired bat
7 <i>Lasiurus blossevillii</i>	Western red bat
8 <i>Lasiurus borealis</i>	Eastern red bat
9 <i>Lasiurus cinereus</i>	Hoary bat
10 <i>Lasiurus ega</i>	Southern yellow bat
11 <i>Lasiurus intermedius</i>	Northern yellow bat
12 <i>Lasiurus seminolus</i>	Seminole bat
13 <i>Lasiurus xanthinus</i>	Western yellow bat
14 <i>Eumops floridanus</i>	Florida bonneted bat
15 <i>Eumops perotis</i>	Greater mastiff bat
16 <i>Eumops underwoodi</i>	Underwood's mastiff bat
17 <i>Molossus molossus</i>	Pallas' mastiff bat
18 <i>Nyctinomops femorosaccus</i>	Pocketed free-tailed bat
19 <i>Nyctinomops macrotis</i>	Big free-tailed bat
20 <i>Tadarida brasiliensis</i>	Brazilian free-tailed bat

SPECIES THAT HIBERNATE

Species name	Common name
1 <i>Myotis auriculus</i>	Mexican long-eared bat
2 <i>Myotis austroriparius</i>	Southeastern bat
3 <i>Myotis californicus</i>	California bat
4 <i>Myotis ciliolabrum</i>	Western small-footed bat
5 <i>Myotis evotis</i>	Western long-eared bat
6 <i>Myotis grisescens</i>	Gray bat
7 <i>Myotis keenii</i>	Keen's bat
8 <i>Myotis leibii</i>	Eastern small-footed bat
9 <i>Myotis lucifugus</i>	Little brown bat
10 <i>Myotis occultus</i>	Occult bat
11 <i>Myotis septentrionalis</i>	Northern long-eared bat
12 <i>Myotis sodalis</i>	Indiana bat
13 <i>Myotis thysanodes</i>	Fringed bat
14 <i>Myotis velifer</i>	Cave bat
15 <i>Myotis volans</i>	Long-legged bat
16 <i>Myotis yumanensis</i>	Yuma bat
17 <i>Nycticeius humeralis</i>	Evening bat
18 <i>Parastrellus hesperus</i>	Canyon bat
19 <i>Perimyotis subflavus</i>	Tricolored bat
20 <i>Corynorhinus townsendii</i>	Townsend's big-eared bat
21 <i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat
22 <i>Eptesicus fuscus</i>	Big brown bat
23 <i>Antrozous pallidus</i>	Pallid bat
24 <i>Euderma maculatum</i>	Spotted bat
25 <i>Idionycteris phyllotis</i>	Allen's big-eared bat



Why is WNS so Detrimental?

- Bat congregate in large numbers during hibernation
- During hibernation, bats are unable to mount an immune response to invading pathogens
- Recovery will be difficult due to the low reproductive rate
- Fungus can live in the environment without bats



What can be done?



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WNS National Plan

Purpose:

To guide the response of Federal, State, and Tribal agencies, and partners to WNS

- Coordination at multiple levels
 - National Oversight Committees
 - National Coordination Team
 - FWS Coordinators
 - Cross-border coordination with Canadian WNS plan
- Integrates with State and regional WNS plans
- Establishes 7 working groups



U.S. Fish and Wildlife Service

**A National Plan for Assisting
States, Federal Agencies, and
Tribes in Managing White-Nose
Syndrome in Bats**

May 2011



Bat affected by white-nose syndrome

March 2011/10/11/11

NA Bat

North American Bat Population Monitoring Program
- USFS, USFWS, USGS, NPS, DoD, WCS Canada, BCI



Coordinated bat monitoring to support multi-scale inferences about trends in bat populations & abundances

- **Continent-wide sampling grid**
- **Acoustic Surveys - Vehicular transects & stationary points**
- **Colony Counts – Hibernacula & maternity**
- **Data Management – Bat Population Data Project (USGS)**

