

To: Natural Resource/Conservation Managers
From: Dr. Jonathan Sleeman, Center Director, USGS National Wildlife Health Center
Title: Universal precautions for the management of bat white-nose syndrome (WNS)
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Evidence suggests that white-nose syndrome is likely caused by the cold-growing fungus, *Geomyces destructans* (Blehert et al, 2009; Cryan et al, 2010; Blehert et al, 2011). This fungus infects bats and produces large numbers of reproductive structures (spores) that can persist and remain viable on the surfaces of caves and mines where bats hibernate (Puechmaille et al, 2011; Blehert et al, 2011). Thus, infested caves and mines are potential sources for disease spread by humans that enter these sites and come into contact with fungal spores.

Infectious diseases such as WNS spread rapidly when a pathogen can persist in the environment without the need for host organisms, abundantly reproduce itself, and readily infect large numbers of animals. Regardless of the infectious agent (fungus, bacterium, or virus), standard procedures known as universal precautions can be implemented to reduce disease transmission and spread (Thrusfield, 2005; USDA National Animal Health Emergency Management System Guidelines: Biosecurity). These standard disease management procedures as applied to WNS include decontamination procedures, equipment restrictions, and limitation of access to contaminated environments. The primary objective for implementing universal precautions is to prevent human-assisted movements of pathogens to unaffected locations.

Evidence suggests that human-assisted movement of the abundant spores produced by the WNS fungus plays a role in the spread of this disease. This evidence includes long-distance jumps in the occurrence of the fungus which exceed the known natural migratory distances of hibernating bats within North America (although surveillance bias cannot be ruled out). In addition, ongoing laboratory studies suggest the WNS fungus was introduced to North America from Europe (no bat species migrate between the continents), viable fungus has been found to persist in bat guano and on the floors and walls of contaminated hibernacula, and spores of the WNS fungus have been found on the surfaces of equipment removed from a contaminated site (Okoniewski et al, 2010; Puechmaille et al, 2011; Blehert et al, 2011). Other fungal pathogens that persist in the environment, such as *Cryptococcus* in the Pacific Northwest (MacDougall et al, 2007) and the chytrid fungus among amphibians globally (Daszak et al, 1999; Kriger and Hero, 2009) can likely be transported by humans, thus human-assisted movement of the WNS fungus is not unexpected.

Although both bats and humans likely contribute to the spread of WNS, reduction of risk for the accidental translocation of fungus by humans is an important management objective. Universal precautions relevant to the management of WNS and other diseases include implementing effective decontamination procedures prior to leaving potentially contaminated sites, prohibiting movement of clothing and equipment between contaminated and unaffected locations, and restricting unnecessary human access to sensitive habitats (Thrusfield, 2005; USDA National Animal Health Emergency Management System Guidelines: Biosecurity). These measures represent standard components of a disease management program in veterinary medicine and serve to reduce risk for both intra- and inter-continental spread of WNS.

A variation to the recommendation to implement management actions (decontamination procedures, equipment restrictions, and site closures) across all habitats suitable for maintaining viable WNS fungus is to develop a targeted or zoned disease management program. However, instituting management actions only at locations known to be contaminated by the WNS fungus may increase risk for disease spread, because: 1) there is currently no diagnostic method to rapidly and routinely screen environmental samples (e.g., cave soil) to identify contaminated sites (Lindner et al, 2010); and 2) identifying contaminated sites based solely upon the observation of sick bats is unreliable. Furthermore, as the WNS fungus has been found in environmental samples collected in caves and mines where WNS occurs (Puechmaille et al, 2011; Blehert et al, 2011), universal precautions indicate that presence of fungus must now be assumed unless absence can be proven.

Decontamination procedures, equipment restrictions, and site closures are currently in place to reduce the potential for humans to transfer the WNS fungus. These guidelines are based upon scientific standards routinely employed for the management of animal diseases and represent a responsible approach to minimize risk to important natural resources. We cannot yet rapidly screen sites for the presence of WNS fungus when visibly infected bats are absent, we cannot safely and effectively treat wild bats for WNS, we cannot decontaminate fragile cave ecosystems upon which bats rely, nor can we limit the natural movements of bats. Modifying human activity by implementing decontamination procedures, equipment restrictions, and site closures are the options currently available for managing the spread of WNS; these procedures will be reviewed as indicated by additional scientific findings.

References:

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More information on WNS in bats can be found at:

- ❖ U.S. Fish and Wildlife Service: <http://www.fws.gov/whitenosesyndrome/>
- ❖ USGS National Wildlife Health Center: http://www.nwhc.usgs.gov/disease_information/white-nose_syndrome/
- ❖ USGS Fort Collins Science Center: <http://www.fort.usgs.gov/WNS/>

To report or request assistance for wildlife mortality events or health issues, visit

http://www.nwhc.usgs.gov/mortality_events/reporting.jsp or contact Dr. Anne Ballmann, 608-270-2445, aballmann@usgs.gov; Dr. LeAnn White, 608-270-2491, clwhite@usgs.gov; Barb Bodenstein, 608-270-2447, bbodenstein@usgs.gov; Dr. Thierry Work, 808-792-9520, thierry_work@usgs.gov (Hawaii and Pacific Islands); or Jennifer Bradsby, 608-270-2443, jbradsby@usgs.gov (single mortality events nationwide).

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