

Diagnostic Categories for Reporting Cases of Bat White-Nose Syndrome (WNS) Including a Summary of revisions to WNS case definitions for the 2014/2015 season

Revision Summary

1. There are now separate categories to differentiate between WNS diagnoses and detection of *Pd*.

This change allows for easier tracking of *Pd* distribution by including surveillance samples (i.e., swabs collected from bats without clinical signs of WNS) and environmental samples (i.e., sediment and environmental swabs collected from hibernacula). Detection of *Pd* only (without histopathologic confirmation of characteristic lesions or field observation of clinical signs of WNS) is now categorized as 'Pd present' rather than 'WNS suspect'.

2. A WNS-positive diagnosis now requires both confirmation of WNS lesions by histopathology AND detection of *Pd*.

Previously, only histopathologic evidence of WNS was required for a positive diagnosis. The added criterion of *Pd* detection was added due to identification of skin infections in hibernating bats caused by other fungi that induce lesions that may resemble WNS and due to occasional ambiguous histopathologic presentations of *Pd* infection.

3. UV fluorescence can be used to assist with a WNS-suspect diagnosis, but assignment of a WNS-suspect designation also requires that *Pd* is detected at the site of fluorescence or that other clinical signs of WNS are observed in the field.

As a new method that was designed to serve as a screening tool (not as a diagnostic test), UV screening alone is not sufficient to make a diagnosis if there are no other indications of *Pd* infection. Instead, UV screening should be used to inform the collection of samples for laboratory testing. Absence of characteristic fluorescence on bat skin does not equate to the individual being free of infectious *Pd* spores.

Diagnostic Categories for Reporting Cases of Bat White-Nose Syndrome (WNS)

1. Positive for WNS – Histologic lesions of bat WNS are present **AND** *Pseudogymnoascus* (formerly *Geomyces*) *destructans* (*Pd*) is detected (either by the Muller et al. PCR or by fungal culture).

2. Suspect for WNS – (one of the following criteria must be met)

a) Histologic lesions of WNS are present but *Pd* is not detected (either by the Muller et al. PCR or by fungal culture)

b) One or more clinical/field signs (visible fungal growth on skin, characteristic UV fluorescence, unusual mortality, roost shifting, premature egression from the hibernaculum) are observed **AND** *Pd* is detected (either by the Muller et al. PCR, fungal culture, or a tapelift performed directly on visible fungal growth on bat skin).

c) **MULTIPLE** clinical/field signs (visible fungal growth on skin, UV fluorescence, unusual mortality, roost shifting, premature egression from the hibernaculum) are observed within the currently recognized range of WNS but no samples are collected for diagnostic workup.

d) Individual bats that are part of a confirmed WNS morbidity/mortality event are submitted to, but not tested by, a laboratory. This criterion is for instances in which multiple samples from the same site are submitted, but only a subset of those samples is tested. The untested samples may be classified as suspect for WNS if the subset of tested samples is positive and consists of the same species as the untested samples. Representatives of all species involved in the disease event should be tested.

3. Negative for WNS – Histologic lesions are not present **AND** *Pd* is not detected (either by the Muller et al. PCR or fungal culture).

Categories for Reporting Detection of *Pd*

1. *Pd* Present – *Pd* detected (by Muller et al. PCR* or fungal culture) in an environmental sample or on an individual bat with no other clinical or field signs of WNS observed in the population at the hibernaculum. Bat carcasses submitted for diagnostic testing may be placed in this category if *Pd* is detected on the carcass but there were no clinical/field signs of WNS observed at the collection site and histopathology is negative.

2. *Pd* not detected – *Pd* not detected (either by Muller et al. PCR* or fungal culture) in an environmental sample or on an individual bat [NOTE: A negative PCR result indicates that the amount of *Pd* is below the level of detection for the test but cannot guarantee that the hibernaculum or bat population is free of *Pd*. A lack of observed field signs in the resident bat population is also not sufficient for assuming that a hibernaculum is *Pd*-free. All negative results from a statistically robust sample size can, however, increase confidence that *Pd* is absent from the sampled population or environment.]

* When screening for the presence of *Pd*, PCR is preferred over fungal culture due to the greater sensitivity of PCR.

For management purposes, hibernacula should be considered contaminated with *Pd* if they contain at least one sample (bat or environmental) that tests positive for the fungus by the Muller et al. PCR or fungal culture regardless of whether field signs of the disease were observed within the hibernaculum. A contaminated hibernaculum retains this designation indefinitely. The ability of *Pd* to persist long-term outside of hibernacula is not currently well understood.

Field Signs Associated with WNS in Bats

Winter/Spring – excessive or unexplained mortality at or near a hibernaculum; visible fungus on flight membranes, muzzle, or ears of live or fresh dead bats; abnormal behaviors including daytime activity or population shift to entrance of the hibernaculum; moderate to severe wing damage in nontorpid bats* [Reichard et al.]; thin body condition*; yellow-orange fluorescent pattern of non-haired skin under UVA light [Turner et al.]

Summer/Fall – There are not consistent field signs associated with WNS during summer/fall.

* considered a nonspecific field sign when observed by itself

Citations

Muller, L.K., J.M. Lorch, D.L. Lindner, M. O'Connor, A. Gargas, and D.S. Blehert. 2013. Bat white-nose syndrome: a real-time TaqMan polymerase chain reaction test targeting the intergenic spacer region of *Geomyces destructans*. *Mycologia* 105: 253-259.

Reichard, J.D. and T.H. Kunz. 2009. White-nose syndrome inflicts lasting injuries to the wings of little brown myotis (*Myotis lucifugus*). *Acta Chiropterologica* 11: 457-464.

Turner, G.G., C.U. Meteyer, H. Barton, J.F. Gumbs, D.M. Reeder, B. Overton, H. Bandouchova, T. Bartonička, N. Martínková, J. Pikula, J. Zupal, and D.S. Blehert. 2014. Non-lethal screening of bat-wing skin with the use of UV fluorescence to detect lesions indicative of white-nose syndrome. *Journal of Wildlife Diseases* 50: 566-573.