White Nose Syndrome Update
March 2014

White Nose Syndrome (WNS) first appeared in New York in 2006 and was first observed in West Virginia in 2009; in that year it was documented in four caves in Pendleton County. Since that time, it has been found in additional counties and by 2012 was present throughout the major karst regions of the state. On a continental scale, WNS has now been confirmed as far west as western Missouri, south to northern Alabama and Mississippi, and north to southern Canada.

WNS, a disease which affects bats during hibernation, is caused by the fungus *Pseudogymnoascus destructans*. This fungus is not native to North America. The fungus is cold-loving and grows on the bats' skin while they hibernate. The skin of an active bat is too warm for the fungus to grow on it, but the fungus thrives on hibernating bats which are cooled to cave temperatures. Unlike most fungi that attack skin, this fungus does not just colonize the skin surface, but grows into and erodes the skin. This leads to tissue damage, especially to the wings. The damage affects a bats ability to fly, but it also results in water balance problems (such as dehydration) and changes in electrolyte balance. Bats with WNS also arouse from hibernation more frequently than do non-affected bats resulting in early depletion of fat stores they need to survive the winter. Mortality rates from WNS often exceed 90%.

The impact of WNS varies with bat species (See Table 1). The species which appear to be hit the hardest are: little brown bats, northern long-eared bats, and tricolored bats (formerly eastern pipistrelles). These were among the most common bats in the state prior to the arrival of WNS. However, northern long-eared bats were never abundant in caves in West Virginia, so we have little winter data on which to base population trends. Endangered Indiana bats are declining almost as dramatically as little brown bats.

Big brown bats appear to be less affected than the other species, and numbers are staying at near pre-WNS levels. The number of eastern small-footed bats has increased in recent years. While this is encouraging, it is based on a small number of bats seen in winter surveys. The one bit of good news is that endangered Virginia big-eared bats appear not to be affected by the fungus, and their numbers have actually increased significantly since 2009 (the increase in winter numbers indicates an increase of 39%, but for this species, our summer counts are believed to be more accurate and put the increase at around 25%). To date, no Virginia big-eared bat has been observed with the fungus or the associated wing damage. Migratory bats species, such as the red bat and hoary bat, move south in winter and do not hibernate, so they not affected by WNS.

WV Division of Natural Resources biologists and others have been monitoring bats in caves for decades. Prior to WNS, the little brown bat was the most abundant bat hibernating in caves in West Virginia. Declines of little brown bats at most sites have been over 90% and sometimes over 99%. Overall mortality rate for this bat in West Virginia is 96.3%. Of all our sites that had 100 or more little brown bats prior WNS, our sites with the "best" survival still exhibited a decline of 91.2%. Tricolored bats have declined nearly 90%. Our "best" site for tricolored bats had a decline of "only" 77%. Declines for Indiana bats have been around 80%, but populations of this species were quite low before WNS appeared, so the total number of this species is quite low. At most sites, the number of remaining Indiana bats is lower than counts in

the early 1980s when most of these surveys began. As bad as these numbers are, at this time we do not know if the remaining bats are likely to be survivors or if declines will continue.

When we conduct a bat survey in a cave that has been affected by WNS for a few years, nothing looks wrong. Without knowledge of how many bats used to hibernate there, one would not think there was a problem. In general, most bats affected with WNS left the caves in winter to die somewhere on the landscape; the WVDNR received many reports of bats flying in the daytime in mid-winter when WNS first started to take its toll. Carcasses of bats that died in the caves have likely been scavenged by raccoons. Inside the cave there are no large piles of bat bones or other signs of the bats that are missing other than scattered guano on the cave floor. The few bats that remain show little or no sign of the fungus, and the fungus-covered muzzles so characteristic of WNS during the first two winters of infection are rarely seen these days. We are hoping this is a good sign, and the WVDNR is working with researchers to monitor the amount of fungus on the bats in the years following the population crash. For now, we like to think that the surviving bats have some ability to fight the fungus and hope they will produce a new generation of WNS-resistant bats. Only time will tell.

Where do we go from here? Our first concern should be to ensure we do not spread the fungus. Any gear (boots, coveralls, lights, etc.) that is potentially contaminated with the fungus should not be used in WNS-free areas. Cleaning and decontaminating gear between trips is probably something we should have been doing before WNS and should continue to do. There is no silver bullet to fight WNS looming on the horizon, so we need to focus on what we can do to help the remaining bats survive. Now more than ever it is important to limit disturbance during the winter. This may mean not scheduling winter trips into caves that have even small numbers of bats; most cave trips can be done during other times of the year. During the summer, some species could benefit from having a bat house provided for them; this will give them a home they can use for years without getting evicted. Land managers can provide a water source for bats in areas where water is scarce as even small water holes on ridges receive a great deal of use by bats and other wildlife. However, even if all the bats that remain today and all their offspring were to survive, recovery will take decades. Most bats produce only one “pup” each year, and many young bats do not make it to their second year. A slow recovery, however, is better than no recovery, and the fact that there are still bats in New York provides a glimmer of hope for West Virginia’s bats. For more information on White Nose Syndrome visit www.whitenosesyndrome.org.

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Table 1. Percent change in numbers of hibernating bats in 40 caves in West Virginia pre and post arrival of White Nose Syndrome (WNS). Changes are based on bat numbers during the last survey before White Nose Syndrome (WNS) was confirmed or suspected to have arrived at the site compared to post-WNS surveys conducted two to five years after WNS arrived. If more than one post-WNS survey was conducted, the most recent survey data were used.

Common Name	Scientific Name	% Change
Little brown bat	*Myotis lucifugus*	-96.3
Indiana bat	*Myotis sodalis*	-80.1
Northern long-eared bat	*Myotis septentrionalis*	-90.7
Eastern small-footed bat	*Myotis leibii*	+8.3
Tricolored bat	*Perimyotis subflavus*	-87.2
Big brown bat	*Eptesicus fuscus*	-8.2
Virginia big-eared bat	*Corynorhinus townsendii virginianus*	+39.2