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GAME COMMISSION TRACKS WHITE-NOSE SYNDROME IN BATS
Three years later, hibernating bats continue to fall to this disorder

HARRISBURG – White Nose Syndrome (WNS) has caused cave bat population reductions in New York and New England over the past three winters. It surfaced near Albany in 2006. Pennsylvania Game Commission officials say that they are expecting cave bat mortalities this winter, if the disorder spreads through hibernacula as it did New York and New England over the previous winters. To track the effects of WNS, the Game Commission is asking the public to report winter-flying bats or dead and dying bats on the landscape.

"If you're outside this winter and observe bats, we really need to hear from you," said Lisa Williams, Game Commission biologist. "While an occasional dead or disoriented bat is not unheard of in winter, we need residents to let us know if they find multiple bats outside of buildings this winter. White Nose Syndrome causes bats to fly out of their winter shelters and die on the landscape. By assisting us with surveillance, you can help us identify new die-offs so we can conduct a site investigation. Of course, commonsense safety rules apply: do not go in caves or mines or underground; do not handle bats – dead or alive; and keep children and pets away from dead or grounded bats."

There are two quick and easy ways to report sick-acting or dead bats this winter. The first is by calling the nearest Game Commission region office. The second is by using the Game Commission's "Report a Sick Bat" form that can be accessed in the right-hand column of the agency's homepage (www.pgc.state.pa.us) by clicking on "Report a Sick Bat" in the "Quick Clicks" section.

WNS was first observed in Mifflin County in December 2008. Today it is known to exist in 11 locations in Bucks, Centre, Mifflin, Lackawanna and Luzerne counties. It affects all six species of cave bats found in Pennsylvania: little brown bat, big brown bat, Indiana bat (federally endangered), eastern pipistrelle; small-footed bat (state threatened) and northern long-eared bat. The disorder has killed 750,000 to a million bats in Connecticut, Massachusetts, New York, New Jersey, New Hampshire, Pennsylvania, Vermont, Virginia and West Virginia since 2006.

"The trail from New York marching down the Appalachians into West Virginia and Virginia was unexpected," explained Cal Butchkoski, Game Commission biologist. "It's been our experience that migrating bats do not follow landscape features when migrating from hibernacula to summer habitats. Rather, they radiate out from these winter roosts in various directions. Given the unexpected pattern, and the fact that the southern sites were

all popular recreational caves, it's probable that transmission by people has contributed to the southerly spread."

Butchkoski noted that federal decontamination protocols and a moratorium on bat cave entries are now in place to reduce the possibility that WNS is hitch-hiking on cave visitors and caving gear.

The cause and source of spread have been the greatest mysteries of WNS since it first appeared in underground New York three years ago. Evidence is mounting that WNS is caused by a cold-loving Geomyces fungus. Scientists recently named this fungus Geomyces destructans, given its destructive effect on bat populations. The National Wildlife Health Center (NWHC) reported recently, "Histopathological examination indicated that Geomyces destructans infection of skin causes characteristic epidermal erosions and ulcers that can also progress to invade underlying connective tissue." It's a finding that strongly suggests this fungus would arouse a hibernating bat – and once aroused from hibernation bats quickly burn through their fat reserves and die.

Preliminary data from WNS infection studies conducted at NWHC indicate Geomyces destructans can be transmitted from bat-to-bat in a controlled environment. This finding suggests that WNS transmission may occur during the fall bat swarm, as well as during hibernation. Once WNS appears in hibernacula, whether it got there on an infected bat or hitchhiking on a human, it passes through a hibernating bat colony quickly.

WNS is so devastating to bats because hibernating bats have an extremely high rate of contact as they cluster together, and it strikes when a bat's immune response capabilities are minimized to conserve the energy needed to support hibernation. Since bats are huddled in hibernation for more than five months with suppressed immune systems, they are perfect targets for WNS. That's why it has been so destructive.

"I expect a majority of the bat hibernation sites in eastern Pennsylvania to have WNS by the end of April," explained Greg Turner, Game Commission endangered mammals biologist. "To date, WNS has not appeared west of the Route I-99 corridor, where some of our largest bat populations hibernate. We have our fingers crossed that WNS won't clear the Allegheny Front this winter, which may be a barrier to bat and WNS movement, but only time will tell. If anyone observes flying or dying bats in western Pennsylvania this winter, we definitely want to hear about it. Reports from areas west of Centre and Mifflin counties will be treated as extremely high priority."

Pennsylvania has more than 5,000 known abandoned mines and about 1,500 natural caves beneath its surface, and plenty more unexplored subsurface nooks and crannies that hibernating bats occupy. The Game Commission can confirm that WNS has appeared in less than one percent of that total, but that number is small because the state's wildlife biologists can physically check and monitor only so many hibernacula in a given winter. That is why public assistance in WNS surveillance is so important.

"Pennsylvania bat hibernacula have wintered more than a million bats annually in recent

years," noted Greg Turner. "That will change when WNS infiltrates and spreads through these mines and caves. The population losses bats experience may take a century or more to recover from, given their low reproductive rate of one pup per female per year. The losses also could be ultimately irreversible if WNS lingers in hibernacula and bats don't develop some sort of natural defense or immunity to it. Once WNS infiltrates bat hibernacula throughout the Commonwealth, recovering these populations will be a long term challenge."

Ok, so maybe you're thinking, "So what. I don't care about bats anyway." But let's do some math and inject a little science into it. If Pennsylvania is home to more than a million bats that eat about 2,000 mosquito-sized insects a night during those seven months when you like being outdoors, imagine what it'll be like when they're not working the nightshift in your neighborhood.

Bats have been hanging around since the dawn of mammals in North America some 50 million years ago. Their small size, appetite for insects and nocturnal movements kept them out of harm's way for centuries upon centuries. But over the last 100 years or so, bats have become more and more vulnerable to impacts to hibernacula, maternity roosts and summer habitat. The emergence of WNS couldn't have come at a worse time for bats. Their population collapse is poised to be one of the largest ever to hit North American wildlife unless WNS mortality slows or stops.

Figuring out how to slow or stop the spread of WNS tops every bat biologists' 2010 wish list. Investigating and responding to WNS is the focus of a multi-state effort lead by the Pennsylvania Game Commission that includes 11other state wildlife agencies and research partners working collaboratively to shed further light on WNS and develop management solutions.

In April 2009, the Pennsylvania Game Commission and its project partners were awarded nearly a million dollars by the US Fish and Wildlife Service to support research and management activities. The multi-state approach enables biologists to conduct research at a scale rarely undertaken. One focal point of this research in Pennsylvania and Kentucky centers on monitoring WNS-affected and clean sites with acoustic bat call detectors to measure and compare bat activity levels and to identify the timing of major emergences. New York and Vermont placed Wisconsin bats in two previously-affected sites with no surviving bats to see if the new bats develop WNS symptoms. This work will shed light on whether sites remain contaminated after bats are gone, which is unknown.

Ongoing research in Pennsylvania continues to monitor hibernating bat arousal patterns at Barton Cave in Fayette County to ascertain if arousal patterns change before and during WNS. Other partners are working to install cameras in clean and WNS-affected sites to monitor behavioral activity of bats aroused from hibernation and investigating the temperature/humidity preferences of hibernating healthy and WNS-affected bats in affected and unaffected sites and states.

In other WNS-related projects, Dr. Hazel Barton, a professor of microbiology at Northern

Kentucky University; Dr. DeeAnn Reeder, assistant professor of biology at Bucknell University and Turner will conduct a treatment experiment at Bucks County's Durham Mine in which a substance is placed in a petri dish below clustering bats. As the substance evaporates, the vapors will rise to the ceiling and potentially kill the fungus on bats roosting above it. This treatment has been shown to kill Geomyces without harming captive bats, and this will be the first time it is tried in a natural setting. If affected bats are treated and recover, the experiment could help confirm once and for all that Geomyces destructans is the WNS causative agent. Such a treatment option could also be used to protect the highly-endangered Virginia big-eared bat and gray bats in the southern WNS states. There is little hope that it has large-scale application across the entire range of WNS, however, due to the extreme difficulty of applying it large-scale.

The Game Commission will continue to participate in vital WNS research and control studies, and will monitor conditions at Durham Mine and other affected sites. Periodic updates will be reported to media if change occurs. However, the Game Commission reminds residents that they can help the agency in the fight against WNS by reporting sick-acting or dead bats they find while out and about this winter.

For more information on bats, visit the Game Commission's website, select "Wildlife" in the dropdown menu, then Mammals, and then click on "Bats Home." To learn more about WNS, visit the U.S. Fish and Wildlife Service's website at www.fws.gov/northeast/white_nose.html.