

**STATEMENT
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**BEFORE THE
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REGARDING

Impacts and Management Implications of White Nose Syndrome

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to testify before you today on bat white-nose syndrome. The subject of white-nose syndrome is important to forest managers, wildlife managers, agricultural producers, and members of the public. This hearing is timely because white-nose syndrome is an emerging disease of cave dwelling species of bats that is both perplexing and devastating.

The Forest Service is very concerned about white-nose syndrome and the future of bats in the United States and North America. White-nose syndrome (WNS) is a disease believed to be caused by a fungus recently identified as *Geomyces destructans*, which is associated with mass mortality of several bat species at hibernation sites in the New England, Mid-Atlantic and northern Appalachian States. Since our previous testimony on June 4, 2009, WNS has continued to spread to the north, south, and west. WNS has now been confirmed in 16 states stretching from Maine to west Tennessee, and 4 Canadian provinces. DNA from *Geomyces destructans*, the fungus that is associated with WNS, has been confirmed on a bat in Western Oklahoma, although the bat lacked the pathological invasion of the skin that is characteristic of the disease.

Once introduced into a cave or abandoned and/or inactive mine, WNS has the potential to kill more than 90 percent of the hibernating bats (Bleher et al. 2009 Science Vol. 323 pg. 227). It is estimated WNS has killed more than 1 million bats during the last four years. Since 2007, when WNS was first documented in New York, populations from six bat species, including little brown, big brown, northern long-eared, eastern small-footed and tri-colored bats, as well as the endangered Indiana bat, have suffered mortality from WNS. DNA from the fungus has also been identified on three additional species, the southeastern bat, the cave bat, and the endangered gray bat, but no mortality or pathology has been documented among these species to date.

The Forest Service can contribute towards the larger effort to better understand WNS, and can play a role in controlling the spread of WNS to hibernation sites in caves and abandoned and/or inactive mines. The mission of the Forest Service is, *“to sustain the health, diversity and productivity of the Nation’s forests and grasslands to meet the needs of present and future*

generations.” This mission includes sustaining the health, diversity, and productivity of the many species that use the Nation’s forests and grasslands as habitat, including bats.

Declining bat populations diminish the integrity of our forest and grassland ecosystems. The continued loss of bats in forested ecosystems could have ecological and economic impacts. Because bats are primary predators of night-flying insects, a significant decline in bat populations could contribute to larger insect pest populations, a possible decrease of agricultural crop production, and a potential decline in forest health. Increases in insect pest populations could lead to an increase in the perception of the need for pesticides, which would have both environmental and economic consequences (Kunz et al. 2011). The value of bats to agriculture was recently estimated to be \$23 billion per year (Boyles et al. 2011, Science Vol 332 pages 41-42). The strategy to prevent WNS must be a multi-pronged one and involve strategies in both affected and currently unaffected regions.

Coordination and cooperation among all parties involved in addressing WNS are critical to arrest the spread of WNS. The Forest Service is committed to full partnership and cooperation under the National Plan for Assisting States, Federal Agencies, and Tribes in Managing White-Nose Syndrome in Bats, along with the Department of the Interior (U.S. Fish and Wildlife Service, National Park Service, U.S. Geological Survey, and Bureau of Land Management), State and Tribal wildlife management agencies, universities, industrial and non-industrial private forestland owners and non-governmental organizations, such as Bat Conservation International and the National Speleological Society. The Forest Service has been a cooperator in the development of the National WNS Response Plan and is actively involved in several parts of the implementation plan. We will continue to assist in the cooperative effort. Cooperative efforts include monitoring the spread of WNS, , epidemiology and isolation procedures to better understand and control the disease, and cave and mine management in order to reduce the spread of WNS to unaffected areas and regions of the United States.

THE ROLE OF THE NATIONAL FOREST SYSTEM

The Eastern and Southern Regions of the National Forest System have adopted an appropriately aggressive response to the threat posed to bats by WNS. This includes, starting with the FY2009 Budget, specific budget direction to address bat species conservation relative to WNS in the Forest Service. There are approximately 24 million acres of National Forest System lands in the Eastern and Southern Regions of the Forest Service with approximately 2,000 caves and abandoned and/or inactive mines that serve as bat hibernation sites. Several species of bats listed as endangered by the U.S. Fish and Wildlife Service under the Endangered Species Act use these sites, including the Indiana bat, gray bat, Virginia big-eared bat, and Ozark big-eared bat. It is in these sites where WNS mortality is most evident. White-nose syndrome has not yet been documented in populations of migratory bat species that hibernate in trees or forest leaf litter.

For the Eastern Region of the Forest Service, WNS is confirmed in an abandoned and/or inactive mine in the Green Mountain National Forest (Vermont), in the Wayne National Forest (Ohio), and in caves in West Virginia’s Monongahela National Forest and Indiana’s Hoosier National Forest. In the Southern Region, WNS has been confirmed in Virginia on the George Washington

and Jefferson National Forests, as well as in the National Forests in North Carolina. Of significant concern is the confirmation of WNS in the privately owned Hellhole Cave, in West Virginia, which is designated critical habitat for both the Indiana bat and the Virginia big-eared bat—both Endangered Species. Hellhole Cave is habitat for approximately 45 percent of the known population of Virginia big-eared bats and more than 100,000 little brown bats, the species hit hardest by WNS.

If we fail to contain WNS, there could be a rapid and precipitous population decline for many bat species. With discovery of WNS in three counties in Indiana, there is great concern about the fate of the endangered Indiana bat. Nearly 50 percent of Indiana bats hibernate in Indiana and all are susceptible to WNS. Two recent and independent studies in New England determined a 73 percent overall decrease in summer bat activity (Brooks 2011, Biodiversity and Conservation, 5-pages, online; Frick et al. 2010, Science 679 – 682). Therefore, it is critical that bat hibernation locations are isolated from *Geomyces destructans*. There is no known cure for WNS, so we must rely upon the basic principles of epidemiology, which includes trying to limit disease spread between geographic regions and using decontamination procedures when visiting hibernacula.

Forest Service Cave and Mine Closures

There is evidence to suggest humans can spread WNS from cave to cave on their gear and equipment (Blehert, et al. 2011, Microbe: 267 - 277). This includes cavers as well as resource managers. In an attempt to slow the spread of WNS, the Forest Service has closed nearly all caves and abandoned and/or inactive mines in the Southern, Eastern, and Rocky Mountain Regions. The Forest Service acted because we observed WNS jump from New York to southwest Virginia in one winter. The next winter, DNA from the fungus that causes WNS was detected in Woodward County, in the Oklahoma panhandle, a far greater distance than bats could travel in such a short time frame. The closure orders are crafted to reduce concerns that they would deny access for Tribal rights and ceremonies by allowing requests for Tribal ceremonies to be authorized by permit on a case-by-case basis. Our Tribal partners are supportive of our efforts to slow the spread of WNS.

Exceptions to the closure orders are for research and monitoring, law enforcement, search and rescue operations, and any cave specifically posted as open. The Forest Service has been coordinating with the National Park Service on decontamination protocols for sites that are not subject to the closure orders. We are implementing the same decontamination protocols as Mammoth Cave National Park to ensure that cave visitors, including researchers and managers, do not spread WNS. The protocols include the use of specific clothing and equipment for each individual cave and abandoned and/or inactive mine.

Because there are critical bat hibernating sites in the Midwest and West, we are very concerned about the continued western spread of WNS and what we can do, working with partners, to enact proactive measures now, rather than waiting until WNS spreads to currently unaffected areas in the western United States. Opportunities exist to implement proactive habitat management monitoring and surveillance activities now in areas to which WNS has not yet spread. The hope is that acting now will substantially delay the westward spread, in enough time for the science to

inform increasingly effective ways to manage and contain the fungus. In addition to the closures already mentioned, a response plan has been finalized for New Mexico which calls for targeted closure of caves determined to have significant bat roosts. In Arizona, a draft Response Plan has been prepared that would institute a similar approach. It is expected that the Arizona plan will be finalized sometime this summer. Closure decisions are also pending for the Northern and Intermountain Regions. These regions are working with other federal and state agencies to assess risk of WNS across the landscape, prioritize monitoring and surveillance activities, and adopt adaptive management approaches well ahead of WNS spread into those areas.

Management of National Forests

Bats need healthy forests and healthy forests need bats. Other than implementing the cave and abandoned and/or inactive mine closure order, the best thing we can do to conserve bats is to manage for healthy forests. While the national forests are approximately six percent of the forested lands in the Eastern and Southern U.S., they play a critical role in conservation of all species. We are using research findings to develop management strategies to benefit bats. The objective is to create suitable roosting and foraging habitat across the landscape in the quantities and patterns that mimic natural disturbance regimes, in the hopes of restoring habitat conditions for all species (Perry et al. 2008, *Journal of Wildlife Management* 72: 913 – 925; O’Keefe et al. 2009, *Forest Ecology and Management* 1757 – 1763; Hayes and Loeb 2007, pages 207 – 235 in Lacki et al. editors, *Bats in Forests: Conservation and management*, John Hopkins University Press 329 pp). The Eastern and Southern Region national forests are ideally suited to contribute to large forested landscape ecosystems. There is a significant but discontinuous corridor of national forests and parks from northern Georgia to New Hampshire. If we can retain healthy bat populations on national forests and parks, the corridor could serve as a conduit to repopulate bat populations in areas decimated by WNS. This assumes our ability to arrest the spread of WNS; that the bats develop some resistance to it; or a method is found to address the fungus that presumptively causes WNS.

There may be potential to increase our management efforts to develop suitable habitat at an accelerated rate. There is potential to increase adaptive management strategies in cooperation with research to enhance suitable habitat while monitoring the effectiveness of these treatment strategies. As mentioned earlier, the Forest Service is also exploring, with several other federal and state agencies, the potential for a broad-scale collaborative effort in the West to prioritize monitoring and implement management aimed at slowing and halting the westward spread of WNS.

FOREST SERVICE RESEARCH & DEVELOPMENT (R&D) ROLE IN BAT HABITAT RESEARCH

Given growing concerns over the viability of bat populations and awareness of the role of bats in maintaining healthy ecosystems, the Forest Service Research and Development Deputy Area has established bat research throughout the United States. In the past three years, Forest Service has expanded this research to address the challenges posed by WNS in four areas:

- WNS-related declines, assessment, and control;
- Population genetics and population viability;
- Basic habitat requirements and effects of forest management on bats: and
- Economic and ecological importance of bats.

Forest Service scientists are internationally recognized for their expertise in identifying fungi through DNA fingerprinting. Their expertise was responsible for development of DNA detection methods for screening cave soils and debris for the pathogen. These scientists are currently developing genetic techniques that can be used in the field to detect the pathogen in the environment or in infected bat tissue more accurately. This advance will save weeks in response time by enabling scientists and managers to identify the pathogen on site in the field.

Forest Service scientists are also evaluating the potential for biological controls of the fungus. By testing naturally occurring microflora from healthy bats, they hope to find a microbial species that will reduce the ability of *G. destructans* to destroy bat skin cells.

As part of Forest Service population viability research, scientists are developing viability models for Indiana bat to estimate population-wide impacts of current and potential future mortality. To date there is no indication of innate bat immunity to the disease. Modeling the possible trajectories of declining populations should provide information needed to identify management options for conservation or recovery of this species.

Our research to understand habitat needs and inform management practices has identified optimal roosting requirements of bats during the maternity season. In general, this research has shown that bats prefer large trees or snags, often in relatively open areas. However, there is still considerable unexplained variation within and among bat species that requires further study. Additional research on the effects of forest management has shown that forest management practices, particularly thinning, prescribed fire, and creation of small canopy gaps or openings, generally do not reduce habitat attributes for bats and may be very beneficial. Forest Service scientists, in collaboration with agricultural economists, have also initiated development of models to quantify the ecological and economic importance of bats to agriculture and forest ecosystems.

Forest Service Research and Development works closely with managers, partners, and the public to ensure our research informs management strategies for the National Forest System and other public and private lands in the future. Information gained from Forest Service R&D studies on habitat requirements, bat response to forest management, and the consequences of human development on bat habitat and populations will be critical to understanding the direct, indirect and cumulative effects of WNS and other stressors on bat populations.

THE ROLE OF STATE AND PRIVATE FORESTRY AND CONSERVATION EDUCATION

Another approach for the management of healthy and resilient forests is to implement efforts with State Foresters through the State and Private Forestry arm of the Forest Service. The Forest Stewardship Program provides financial and technical assistance to State Forestry organizations

for private forestland management consultation and plans. Targeting private forest management efforts to implement prescriptions that would enhance or develop attributes for bat foraging, roosting or maternity habitat in privately owned forests in and near areas affected by WNS could help bat populations recover once WNS is controlled.

Conservation Education

We know that the public is a critical partner in the effort to help save the bats. The Forest Service is actively involved in educating people regarding WNS, bat species conservation, and the ecological and economic importance of bats. Children find bats fascinating and are a key part of our education programs. We are informing people why Eastern and Southern National Forest System caves and abandoned and/or inactive mines are closed to the public until more is learned about the pathology of WNS.

CONCLUSION

The Forest Service is in the process of responding to the serious threat to bat populations posed by WNS. The Forest Service Deputy Areas for the National Forest System, Research and Development and State and Private Forestry are contributing to this vital cause. To further the conservation management of the vast and diverse habitat and fauna on National Forest System and other lands, the Forest Service is committed to cooperation and partnerships with Federal, State, Tribal and nongovernmental organizations interested in the conservation and preservation of bats. Mr. Chairman, this concludes my testimony. I am pleased to answer any questions that you or the Members of the Subcommittee may have.