

**TESTIMONY OF MARVIN MORIARTY, REGIONAL DIRECTOR, NORTHEAST REGION,
U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR
BEFORE THE HOUSE COMMITTEE ON NATURAL RESOURCES
SUBCOMMITTEE ON INSULAR AFFAIRS, OCEANS AND WILDLIFE AND THE
SUBCOMMITTEE ON NATIONAL PARKS, FORESTS, AND PUBLIC LANDS**

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Chairwoman Bordallo, Chairman Grijalva, and Members of the Subcommittees, I am Marvin Moriarty, Regional Director for the U.S. Fish and Wildlife Service's Northeast Region. Thank you for the opportunity to testify about an emerging wildlife disease, known as white-nose syndrome, which has spread rapidly through the Northeast and is posing a serious threat to bats.

Background

White-nose syndrome (WNS) is a term given to a disease first recorded in March of 2007 in bats hibernating in a cave near Albany, New York. WNS is associated with greater than 90% mortality of hibernating bats in affected caves throughout the Northeast, with close to 100% mortality in some locations. Thus far, six bat species have been affected, including the federally endangered Indiana bat. Other currently affected species are the little brown bat, northern long-eared bat, tri-colored bat, big brown bat, and small-footed bat. The sudden and widespread mortality associated with WNS has never been observed before in any of the more than 1,100 species of bats known to science.

Affected bats display a white, powdery substance on their faces and, on closer examination, many show tissue damage and scarring in their wings. Based on microscopic analysis, the powdery substance and tissue damage is a fungus from a group of fungi that is commonly found in the environment. However, this particular species of fungus has never before been described by scientists. This species grows only in cold temperatures, and unlike most fungi, it invades living tissues. When hibernating, bats lower their body temperature significantly, and they pack tightly together – two factors which seem to promote the spread of the fungus from bat to bat. Although the primary vector

of transmission is believed to be from bat-to-bat, WNS may be inadvertently spread from cave to cave by human activity in caves. WNS has spread into new areas farther away and faster than expected in typical bat migration patterns. Often when WNS affects a new area, it appears first in caves with high human visitation. Nearby caves that do not receive significant human traffic remain unaffected, at least initially. On March 26, 2009, The Service issued an advisory asking for a voluntary moratorium on caving in any state with confirmed WNS sites and in any adjacent states (available at <http://www.fws.gov/northeast/wnscaveadvisory.html>).

The exact cause of mortality of affected bats is not yet fully understood, but the newly identified fungus is considered a likely contributor. Dead bats are often found to be emaciated, and bats in affected caves have been observed exhibiting more activity than is normal during hibernation, including leaving caves on cold winter days. Since 2007, WNS has been documented in more than 65 caves with hibernating bats in nine Northeastern and Mid-Atlantic states.

There are gaps in our current scientific understanding of bat populations, ecology, biology, and life history. However, we can use existing information and our recently gathered knowledge about the newly-discovered fungus to piece together an initial assessment of the impacts of WNS on affected bats and potential impacts on their populations.

The species of bats thus far affected by WNS are insectivorous, and they all rely on hibernation as a strategy for surviving harsh winter conditions when their insect food is not available. Prior to hibernation, these bats build up fat reserves to sustain them through the winter. To survive winter months without food, bats slow their metabolism and hibernate, so that most of the time their body temperature remains just a few degrees above air temperature in the cave. This strategy allows them to survive the winter on their stored fat, which can be quickly depleted in only a few hours of activity.

The fungus has been observed to grow on and invades the skin and underlying tissue, particularly the wings of affected bats, where it causes swelling and scarring. Wing membranes represent about 85% of a bat's total surface area and play a critical role in balancing complex physiological processes, such as body temperature regulation, blood pressure, water balance, and gas exchange—not to mention allowing bats to fly and to capture insect prey. WNS may interfere with these critical functions and cause skin irritation, disturbing hibernating bats and causing them to expend more energy than their fat reserves can sustain.

For some small mammal species, a mass mortality event like that caused by WNS would not significantly affect the long-term sustainability of their populations. However, bats differ from most other small mammals in that they have long lives and reproduce slowly -- a combination that precludes rapid population growth and recovery. Most of the bat species currently affected by WNS live about 5-15 years and have only one offspring per year. Thus, biologists are concerned that, even if we are able to abate the situation, it will take many human generations for populations of WNS affected bat species to recover.

Among the 25 species of bats in the United States that rely on hibernation to survive winter, four species and subspecies are federally listed as endangered through the FWS, and several other species are identified by other federal and state agencies as in need of conservation.. All four endangered species and subspecies of hibernating bats in the U.S. rely on caves or mines for successful overwintering and are at risk from WNS.

Although much of the scientific understanding of bat population ecology and dynamics necessary to make a precise determination is lacking, biologists estimate that between 500,000 and 1 million bats have died so far as a result of WNS. The Department is concerned about its potential impact on bat

populations, especially those species currently listed as federally endangered, because of the high mortality associated with WNS and its rapid spread.

White-nose syndrome was found in West Virginia and Virginia caves for the first time late last winter, indicating its potential spread from Northeastern and Mid-Atlantic states to Southeastern and Midwestern states. These states support much larger caves and populations of hibernating bats, including millions of individuals of several species, including the federally endangered Virginia big-eared bat, of which there are only about 20,000. Ultimately, it is possible that other federally listed bat species may be impacted if the disease spreads further south and west, including the gray bat and the Ozark big-eared bat. Also, significant mortality of more common species may threaten the stability and health of these populations.

The role of bats in larger ecosystems is not well understood, but bat species comprise about one-fifth of all mammal species in the world, making their loss potentially significant to the sustainability of other animals and the plants that share their landscapes. One million bats can consume up to 8,000 lbs of flying insects per night, including some pests like mosquitoes and moths. As predators of these insects, bats may play an important role in protecting agriculture crop and forest health and in reducing risk of human disease transmitted by flying insects.

In addition to impacts on biological resources, WNS will have impacts on some local economies. The closure of caves reduces opportunities for recreational caving and impacts many caving organizations, clubs, and local grottos that rely on access to these resources. Drastically reduced bat populations likely will also impact the enjoyment of visitors who come to federal lands to see them. For instance, caves and bats are the primary attractions at some of the National Park Service (NPS) units. These include Mammoth Cave National Park (Kentucky), Carlsbad Caverns National Park (New Mexico), and Timpanogos Cave National Monument (Utah). Caves with bats are a

secondary attraction at numerous other units such as Cumberland Gap National Historical Park (Kentucky) and Ozark National Scenic Riverways (Missouri). WNS has been detected in one national park unit—Delaware Water Gap National Recreation Area (Pennsylvania and New Jersey). As caves and bat populations in these national park units and other federal lands are affected, outdoor recreation guides, gateway communities, and outfitters may experience loss of visitors and income.

Department of the Interior Response

The Department of the Interior (Department) is leading a cooperative and coordinated response among its bureaus, including the U.S. Fish and Wildlife Service (FWS), the National Park Service, and the U.S. Geological Survey; as well as the U.S. Department of Agriculture and other affected agencies; affected states; the academic community; private nonprofit organizations; and other stakeholders. Through the FWS, the Department has assembled a team of experts from these stakeholders to address this disease. Today, more than 50 partner agencies and organizations are working together to identify the mechanisms by which WNS is transmitted and mortality in affected bats, monitor its spread, and develop management and containment options for federal and state wildlife managers.

Currently, the Department is planning on providing resource managers with management recommendations, based on the best available science, to control the spread and minimize the effects of WNS in 2010. To this end, the Department is engaged in a structured decision making process, in which bat experts from multiple agencies are weighing the various management alternatives against much uncertainty. We expect to have management recommendations in place by September of this year.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (FWS) is coordinating the Department's response to WNS, and is currently collecting and distributing critical information to other federal agencies, states, partners, and the public; administering several working groups focused on specific elements of the problem; and working with stakeholders to identify and carry out collaborative investigations, monitoring, and management actions. The FWS serves as the primary resource for up-to-date information and recommendations for all partners, such as important decontamination protocols and a March 2009 cave access advisory that requested voluntary moratorium on activities in caves in affected states to minimize the potential spread of WNS.

The Department has and will continue to invest resources to address to WNS, including coordination with states and other partners to improve our understanding about this disease , to take appropriate actions, and to monitor for its spread. As the potential for spread increases, the need for and complexity of this coordination increases. Through the FWS, the Department will continue to monitor federally listed species and, because states have primary jurisdiction over bats not federally listed under the Endangered Species Act, to support state monitoring and management efforts through State Wildlife Grants and other programs.

U.S. Geological Survey

Investigation into the disease and the implicated fungus species has been conducted at the U.S. Geological Survey (USGS)-National Wildlife Health Center, in collaboration with multiple partners, including the USGS-Fort Collins Science Center, the FWS, Symbiology LLC, Cornell University, and conservation agencies from all WNS-affected states. Much of this work was summarized in a paper published in the journal *Science*. USGS has also lead efforts to publish two additional studies that

define criteria for diagnosing WNS and that describe and name the fungus that causes the skin infection characteristic of WNS. These papers will be released in June, 2009.

To close gaps in scientific understanding of affected bat populations, this fungus, and its affect on bats, the Department has funded research through USGS into several lines of investigation. Data collected during a WNS infection trial are being analyzed to identify mechanisms by which WNS is transmitted. Additionally, an environmental survey is underway to determine the prevalence of the WNS fungus in the eastern U.S. and to evaluate the potential role of the environment in maintaining the WNS fungus. The USGS is preparing to conduct epidemiological studies to determine the origin of the WNS fungus, ecological studies to ascertain whether bats are surviving the disease, and modeling studies to determine the potential for further WNS spread.

National Park Service

The National Park System contains 391 units comprising approximately 84 million acres. Nearly one in four national park units have caves, and one in three units contain mines that can provide habitat for bats. System-wide, all 45 species of bats in North America occur in national park units, including seven species that are federally listed as threatened or endangered, and numerous others that are listed through state laws as threatened or endangered.

NPS is fortunate to have both wildlife health professionals and public health professionals working together to provide “One Health” recommendations that consider the health of humans, animals, and the environment in addressing disease issues. This infrastructure, which is being applied to the NPS response to WNS, has been useful and successful in addressing a variety of disease threats in national park units.

The NPS has established a working group comprised of managers from across the entire national park system under the leadership of one of our Washington Office veterinarians. This group facilitates coordination within NPS and with the Department and its partners. Such national coordination is critical because the impacts of WNS are already nationwide as evidenced by cave restrictions and closures from Great Smoky Mountains National Park (Tennessee and North Carolina) to Sequoia-Kings Canyon National Park (California).

Limiting Potential for Human Transmission

The Department is working closely with the recreational caving and cave research communities to develop decontamination protocols and cave access recommendations to prevent potential spread of the fungus through human activities. In March 2009, the FWS issued an advisory recommending voluntary suspension of caving activities in the states with affected bats, as well as in the adjoining states. In addition, the FWS has developed guidelines for scientists working in hibernacula to take precautions to avoid contributing to the spread. The NPS has closed “wild” caves and mines in several units of the National Park System, although large, commercial caves in national park units remain open at this time. More closures will occur in response to any spread of WNS. Several states have closed caves on lands under their management, including Indiana and Kentucky, although WNS has not yet been recorded in these states. The National Wildlife Refuge (NWR) System under FWS management includes lands with significant bat hibernacula, including those of the federally listed gray bat. Fern Cave NWR, Suata Cave NWR, Key Cave NWR, and Logan Cave NWR have been closed to public entry to protect wildlife from human disturbance, including bats.

Conclusion

Madame Chairwoman and Chairman Grijalva, the Department is dedicated to continuing its coordination of research and response to white-nose syndrome and its impact on bat populations. The rapid onset and high mortality associated with this disease is unprecedented, making WNS the greatest challenge to bat conservation we have ever faced. To successfully combat this disease, we are employing an approach that combines the unique strengths of each of our bureaus and our partners.

As globalization continues to increase the incidence of disease and exotic species invasions, and climate change impacts our landscapes, significantly altering habitats and introducing other stressors to native fish and wildlife, we may experience similar population changes to fish and wildlife populations in the U.S. The ultimate cause of WNS has yet to be confirmed, but the wildlife conservation community's response to WNS may serve as a model for how we respond to other emerging diseases with wide-ranging ecological impacts in the future.

The Department appreciates the interest of the Committee and your respective Subcommittees in WNS and our efforts to address it. We look forward to working with you to effectively slow the spread of this disease, and to mitigate its impacts on bat populations.

Thank you for the opportunity to testify before you today. I would be happy to answer any questions that you or the committee members might have.