

**TESTIMONY BEFORE THE HOUSE SUBCOMMITTEES ON
NATIONAL PARKS, FORESTS AND PUBLIC LANDS AND INSULAR
AFFAIRS, OCEANS AND WILDLIFE
WHITE-NOSE SYNDROME: WHAT'S KILLING BATS IN THE NORTHEAST?**

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On behalf of the
Vermont Fish and Wildlife Department**

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Thank you, Chairman Grijalva and Chairwoman Bordallo, and Subcommittee Members for the opportunity to come before the subcommittees to testify on this critical environmental issue of increasing national import. My name is Scott Darling, certified wildlife biologist for the Vermont Fish and Wildlife Department. I have served in several capacities towards the Department's mission of wildlife conservation and management during my 27-year career with the organization, including big game species management, wildlife habitat management, wildlife division director, and management of endangered species such as the Indiana bat. I come before you today representing the Vermont Fish and Wildlife Department, my experience serving as its sole bat expert, and my personal response to witnessing first-hand the devastation of a critical suite of species for which so many of us have worked so hard to conserve. My testimony has also been reviewed and is supported by the Association of Fish and Wildlife Agencies (AFWA). I will share with you the current threats and challenges that the Vermont Fish and Wildlife Department is confronted with because of White-Nose Syndrome (WNS), and I will also offer the shared perspective of the challenges before other state fish and wildlife agencies as this crisis unfolds across the country.

Understanding the role of state fish and wildlife agencies in addressing WNS is essential to working toward a comprehensive, collaborative resolution to the crisis. Unless otherwise federally listed, the conservation of all bat species is the authority and responsibility of state fish and wildlife agencies. For example, of Vermont's nine species of bats, only the federally endangered Indiana bat is eligible for federal protection and oversight. The remaining eight species are the sole authority of the Vermont Fish and Wildlife Department. The separation of state and federal authorities is appropriate under most conservation efforts; however, such distinctions add complexity for species such as bats that migrate across state boundaries, if not regions, and for highly infectious wildlife diseases such as WNS that can sweep across the country in a matter of a few years. While this scenario is relatively new in the wildlife conservation field, recent threats such as Chronic Wasting Disease (CWD), Avian Influenza Virus, and the chytrid fungus affecting amphibians both nationally and globally suggest that WNS is yet another chapter, albeit more dramatic, in the increasing complexity of today's wildlife conservation issues.

Vermont's Experience with White-Nose Syndrome

In the winter of 2007, Allan Hicks, a veteran New York Department of Environmental Conservation (DEC) biologist distributed what is now the most widely published picture of a cluster of eight hibernating little brown bats, each exhibiting a white substance surrounding their muzzles. His inquiry asking bat experts if they had ever observed such a phenomenon yielded no results. Ensuing observations of extensive bat mortality at caves in the Albany, New York region heightened concerns over this discovery of unknown significance.

On Sunday night, January 21, 2008, this New York DEC biologist called me at home, saying, "This is a phone call you will wish you never got." He advised me that a recreational caver (i.e., spelunker) had just photographed the very same white substance on the nose of a bat in a cave in Mt. Tabor, Vermont. This is the date that a successful bat conservation program in Vermont turned into an environmental crisis for the state.

Little did I know that WNS had already spread to several caves in southern Vermont. The next four months can only be described as a triage response of surveillance of caves and mines across the state, specimen collection for cooperating labs such as the USGS National Wildlife Health Center, multi-state and federal coordination as WNS quickly expanded into Massachusetts and Connecticut, and outreach to Vermont's recreational caving community, the general public, and the media. The desperate need for surveillance was weighed against concerns of potential, unknown human health risks and the prospects that we, ourselves could be contributing to the spread of the disease by moving from site to site or by making the bats more vulnerable to the deadly disease by disturbing their hibernation patterns.

Unexpectedly, hibernating bats afflicted with WNS were being observed flying out of caves and mines in the middle of the winter and landing on people's residences, driveways, and lawns. The animal's evolutionary adaptation that has allowed it to survive Vermont's harsh winter weather, with its deep snows and sub-freezing temperatures, no longer applied. Residents living near caves and mines arrived home from work with a few to dozens of dead or dying bats on or inside their homes. The Vermont Fish and Wildlife Department and the Vermont Health Department viewed these events as significant potential rabies exposures requiring immediate public outreach and response. We established a hot-line with the Animal and Plant Health Inspection Service's (APHIS) Wildlife Services Program in Vermont to take phone calls to screen rabies exposures, track dying bats, and notify the Department of opportunities to collect specimens for lab analyses. Additional citizen calls to my direct line ranged from 10 to 30 per day. By the end of June, 2008, citizen reports had been submitted from across two-thirds of Vermont. In 2009, the Department was able to relieve itself of a majority of the citizen response work by establishing an on-line reporting form and database to handle the more than 600 submissions to date.

We had anticipated that bats surviving the winter hibernation season (November through mid-April in Vermont) would have ready access to insects for food and would regain their body weight and healthy condition. However, bats captured in May and June

exhibited significant necrosis of their wing tissue. Consequently, many of these bats continued to die on the landscape well into the summer.

In all, after four months of tireless work, assistance from the over-extended U.S. Fish and Wildlife Service (USFWS) New England Field Office endangered species biologist, and handcuffing shared and temporary Department staff to assist in the surveillance, the Vermont Fish and Wildlife Department had expended every remaining dollar in its \$50,000 State Wildlife Grant for bat conservation. Additional surveillance work would have required 100% state funding and the money simply was not there. White-Nose Syndrome surveillance halted in Vermont until a cooperative agreement using the USFWS Extinction Prevention grant funds was made available.

WNS Impacts to Vermont's Bat Populations

Initial estimates of bat mortality from four WNS-affected caves in New York ranged from 81% to 97% mortality over a two-year period. Such estimates highlighted the significance of this threat, but many scientists, myself included, could not fathom the ability for any pathogen to sweep so rapidly and thoroughly through a wildlife population in its natural habitat.

Vermont's surveillance work during the winter of 2008 indicated that WNS had afflicted four large bat hibernacula in the state. Citizen reports of bat observations across the landscape along with Department surveillance of observed mortality at these sites indicated that a large number of bats would die from that year's affliction.

One site, Aeolus Cave in Dorset, Vermont now serves as the poster-child for the effects of WNS on a bat population. Although only a fraction of this cave is accessible to researchers, the large chamber at its entrance has been studied since the 1930's and research in the 1960's documented the significance of this cave to the region's bat population. Band returns from this work indicated that thousands of bats hibernating at Aeolus Cave every winter migrate out to their summer maternity colonies in New York, New Hampshire, Massachusetts, Connecticut, and Rhode Island. Simply put, Aeolus Cave has served as winter refuge for many of the bats in the entire New England region for the past 10,000 years.

In the winters of 2008 and 2009, Aeolus Cave quickly became a morgue. Surveillance reports, photographs (see Attachment), and video footage documented bats freezing to death in clusters just outside the cave entrance, streaming out of the cave all winter long and, if they did not cling to the trees outside the cave or flop onto the snow-covered ground, flying out onto the landscape, perhaps in response to their instincts to return to summer colony sites. Those that could not take flight or dare risk Vermont's freezing winter temperatures dropped to the cave floor. In 2008, the mortality was such that the mere stench of the carcasses precluded surveillance inside the cave entrance. In 2009, I estimate the number of carcasses littering the cave floor to between 10 and 20 thousand. Total mortality at Aeolus Cave must be in the hundreds of thousands. I fear that the final measure of the biological significance of Aeolus Cave now lies in the 500 little brown bat

specimens that we picked off the cave floor and shipped to be archived at the American Museum of Natural History in New York.

Despite the grave situation at Aeolus Cave, the true impacts of WNS might best be quantified from surveillance efforts at some of the smaller, better accessible caves and mines where complete bat counts can be conducted. One research site in Vermont, Greeley Mine on the Green Mountain National Forest, is a gated abandoned talc mine that has been surveyed for bats for the past 20 years. Consistently this site overwinters over 1000 hibernating bats. This site, now infected with WNS, declined to 615 bats in November 2008 and to just 33 bats in March 2009 – a decline of 95% of the population. Of the remaining 33 bats, all exhibited the fungus and a few of which were euthanized merely to put an end to their suffering. This very same scenario played out at other sites in New York and Massachusetts.

At this time, Vermont has observed only four of its 30 known bat hibernacula that appear not to be affected with WNS. All of the major bat hibernacula in Vermont are now infected. We also now know that six of Vermont's nine species of bats are susceptible to the effects of WNS. I estimate that Vermont has lost as many as 400,000 bats the past two winters. While Vermonters continue to report observations of live bats, far more numerous are reports of declines in the number of bats in a barn, bat house, or flying around the deck at night. Night-time bat capture surveys using mist-nets now being conducted in Vermont are capturing one to two bats per night at sites that typically would have caught an average of five to ten. This past weekend, biologists returned to an earlier survey site and captured only one bat - the same bat captured and banded a few nights before. More research is being conducted to quantify the changes in bat populations, but the initial evidence is bleak.

Perhaps more troubling is the reality that the very low reproductive rate of bats (i.e., a single pup born to a female each year) precludes their ability to rebound from a drastic event like WNS. Bats cannot produce the numbers of young like birds, rodents, or amphibians. Because of this, I fear that the next generation of Vermonters will never see bats, as we have, in their lifetime.

Vermont, like an increasing number of states, is experiencing this environmental crisis first-hand. We are the beginning of this ecological experiment on the importance of parts of an ecosystem to the whole.

State Fish and Wildlife Agency Response to WNS

My testimony is greatly informed by the experiences of the Vermont Fish and Wildlife Department in its effort to address WNS in our state. However; my direct working relationships with other state fish and wildlife agency biologists working on WNS provide a broader perspective on state fish and wildlife agency responses, responsibilities, and capabilities.

It is the state fish and wildlife agencies that provide on-the-ground local knowledge of bat populations, historic survey results, locations of caves and mines where bats hibernate,

and information on key summer colony habitat. State fish and wildlife agencies are often the most credible, familiar voice in providing public outreach and education. In addition, state wildlife biologists play a role in implementing or assisting in much of the research activities associated with WNS. Therefore, any strategies to contain WNS or slow its progression across the country will require an increased level of effort from state fish and wildlife agencies.

I am hopeful that Vermont's brief history with WNS provides an example of the activities and demands needed to respond to the crisis once it enters a state. From New York to Virginia to Wisconsin, state fish and wildlife biologists are deeply entrenched in the battle to confront WNS. Like Vermont, most state bat conservation programs are conducted by a total of less than one full-time equivalent staff position. These biologists have numerous other duties and species that they oversee. Their ability to adequately respond to immediate, unanticipated crises such as WNS is severely limited by staffing, funding, and at times, simply the hours in a day. In addition, many state fish and wildlife agencies do not staff their own wildlife veterinarian or have access to a state or university disease laboratory.

Currently, state fish and wildlife agency WNS-related activities extend across the full range of responsibilities, including:

- monitoring caves and mines for WNS symptoms
- monitoring the progression of the disease where confirmed
- collecting specimens for lab analyses
- participating in priority research at WNS-affected states and control sites such as studying arousal patterns of hibernating bats, body fat composition, immune systems
- conducting pre and post-WNS monitoring of bat populations
- outreach and coordination with the caving community
- outreach and educating of citizens about WNS
- outreach to media

As WNS now threatens bat populations in the southeastern and central United States, the role of state fish and wildlife agencies will be expanded to include participation in activities designed to contain WNS or, more likely, slow its spread from region to region. This will require a much greater ability to respond swiftly and decisively to try and contain the disease to new sites and to preclude the potential for human transmission to additional sites. The staffing and funding necessary to respond in this manner is not currently available.

Lastly, after WNS marches through states such as Vermont, it is highly likely that state fish and wildlife agencies will be working in concert with federal agencies such as the USFWS to work toward the slow, but essential recovery of bat populations. Many of the bat species once common may very well become state or federally listed as threatened or endangered. Let us not repeat this process across the nation.

Coordinating a National Response to WNS

May I first commend the USFWS for stepping up to the plate and taking on WNS coordination responsibilities when that niche was clearly needed. In particular, their regional staff in the New England and New York field offices were instrumental in such critical components as multi-state coordination, the development of WNS protocols, and assistance in conducting WNS surveillance. USGS staff at the National Wildlife Health Center in Madison, Wisconsin also availed their expertise, their lab, and themselves in the race to determine what was killing the bats.

Given the rapidity at which WNS has spread from New York to Virginia in the past three winters, the responsiveness of state, federal, academic, and non-profit agencies/organizations has been nothing short of superb. Unfortunately, it is not enough.

We need to improve our coordination efforts to be more decisive and responsive. To date, over 50 organizations are involved in determining the cause, monitoring the disease's progression, and attempting to contain the effects of WNS. This level of coordination is extremely complex and cannot be successfully conducted using existing federal staff maintaining additional non-related duties.

State fish and wildlife agencies involved in WNS concur that the USFWS should play a leadership role in coordinating a national response to WNS. WNS is no longer just a regional issue. The USFWS, in concert with its sister agency, the USGS, are the appropriate management and research arms of the Department of Interior to oversee this task. Furthermore, the level of coordination, commitment, access to expertise, and responsiveness warranted for WNS is very likely similar to what has been or will be needed to address future highly infectious wildlife diseases in this country.

One or both of the agencies should assign a national coordinator to oversee the rapid development and orderly implementation of a national plan to address WNS. The national coordinator position(s) must be beholden to the priorities of the national plan, and not to any particular department, program, or region. A national plan must provide for the opportunity for significant participation, review, and comment by state fish and wildlife agencies, academic institutions, and disease experts and laboratories. The 2006 *Plan for Assisting States, Federal Agencies, and Tribes in Managing Chronic Wasting Disease in Wild and Captive Cervids* can serve as a model for organizing the effort using a task force of state, federal, academic, and non-profit representatives to approve a plan, portions of which can be developed by working groups. This CWD plan allows the federal agencies to provide the tools and financial assistance to states to implement consensus-based strategies. Given the state of our knowledge about WNS; however, the plan must be flexible enough to readily accommodate new information and hypotheses. This planning exercise must be expedited in order to be ready for 2010.

Like all federal agencies, the USFWS is procedurally constrained by Federal Advisory Committee Act (FACA) requirements that impede its ability to accept recommendations from outside entities such as states, academic institutions, and non-profit organizations.

While a structure or process that is compatible with FACA requirements is necessary, in my opinion, developing a centrally coordinated effort led by the USFWS that provides for adequate input from state fish and wildlife agencies, participation by individuals or agencies representing a full array of expertise, and the promotion of consensus opinions on priority research and activities is imperative to a well-coordinated effort. A more formalized structure needs to be put in place that allows for a centralized decision-making entity representing those partnerships. We can no longer continue to coordinate efforts through conference calls of 25 to 50 participants. In the case of WNS, the importance of decisiveness and responsiveness in implementing a national plan cannot be understated.

Federal Actions to Address WNS

The need for federal action can be organized into three separate components. First, the USFWS and the USGS must be provided the funding and the staffing to coordinate the development and implementation of a national plan to address WNS. Inherent in this task is the need to establish a structure that provides for state fish and wildlife agency and other expert opinions and recommendations into the product. The implications of WNS are far too serious, rapid, and complex to continue to patch together a coordinated framework of existing personnel. Requiring the National Wildlife Health Center's existing limited personnel to serve as the lead federal agency directing WNS lab testing, analyses, and reporting has never been adequate. Funds and hiring authority are essential to both the USFWS and the USGS if we are to take WNS head-on. Hiring practices that consume nearly a year to complete are futile.

Second, an infusion of federal dollars to WNS research, surveillance, and management is critical. Bats could not have picked a worse time to fall victim to an infectious disease. Not unlike this nation's deep recession, we do not get to choose when a crisis requires our attention and commitment. To date, the USFWS has been very responsive to redirecting existing appropriations and awarding grants such as Extinction Prevention funds and Regional Competitive State Wildlife Grants to WNS research and management. However, taking from other existing programs is no long-term solution. A supplemental budget appropriation and increases in the Department of Interior's FY2010 budget is needed. More long-term, stable funding is a must.

State fish and wildlife agency budgets and hiring constraints are a major limitation to conducting the necessary planning and implementation for WNS. Currently available USFWS federal aid funds such as State Wildlife Grants include 50% match requirements that now preclude most states from seeking new grants to conduct this work or enhancing existing ones. State fiscal constraints are so severe at this time that their respective bat experts cannot receive state-funded approval to travel to meetings to formulate priority strategies, coordinate work, or exchange information on WNS. The current framework of cobbling together portions of federal and state fish and wildlife employees' time to address WNS is unacceptable and doomed to fail.

Because addressing WNS is, in part, a race against time, funding is essential to our ability to respond swiftly to conduct research, test priority hypotheses, conduct surveillance, and implement containment measures. Specifically, funding is needed for:

- National coordination within USFWS and USGS in order to develop the national plan and to organize and coordinate research priorities, response protocols, information exchange, and funding of priority WNS-related activities
- Staffing for the USGS National Wildlife Health Center in order to expedite lab analyses and conduct appropriate tests
- High priority research that ranges from testing the infectious nature of the *Geomyces* fungus to additional investigations into the broad array of alternative potential causes
- Development of potential captive-propagation programs for vulnerable federally endangered species
- Staffing and implementation of management activities such as surveillance and potential containment work by state and federal agencies
- The implementation of species recovery strategies in those regions where bat populations have been impacted

This crisis requires developing creative means to get people on the ground now. Federal funds directed at establishing inter-agency agreements to hire staff to serve within state fish and wildlife agencies may be a suitable alternative in the near term. Such employees would serve as a vital link between state and federal agencies and be able to assist both agencies in their duties. Such employees can also potentially comprise a USFWS response team, albeit much smaller and less formal than what exists within APHIS. This response team could assist state fish and wildlife agencies in containment and surveillance activities as WNS expands its range into the jurisdictions of states having limited resources and experience in responding to WNS.

Third, federal action may be necessary to grant the USFWS the authority to implement necessary surveillance and containment measures on private lands, particularly on privately-owned caves with bats. Actions such as outbreak surveillance, collection and testing of WNS-suspect bats, management of WNS-positive bats, decontamination requirements, or temporary cave quarantines are critical potential management tools that are not necessarily available to state or federal agencies at this time, but have proven to be essential in addressing CWD. Creative and sufficient financial incentives for landowners for such purposes may also be a tool worth developing and funding. The movement of bats across state lines demonstrates the importance of being able to respond to WNS threats decisively and immediately, without which the ramifications extend well beyond individual state borders.

Closing Remarks

It has been stated by some that bats are not particularly popular and are in need of a good marketing agent. I beg to differ. In rural America, people do have a connection to the land and the parts that function as a whole. Vermonters know bats are important, they know they are in trouble, and they know something is terribly wrong. At the end of one of my recent speaking engagements in Manchester, Vermont, an elderly woman raised

her hand and said, “Bats have been going to Aeolus Cave for ten thousand years, and now they are all dead. That’s not right.” The outpouring of support from Vermonters wishing us success, offering their own theories for the disease, or wanting to donate to the cause are verification that WNS is not just about bats. It is about our responsibility as stewards of the environment.

The time for my professional, tempered response to the significance of the implications of WNS is over. In a matter of two years, I have witnessed the devastation of a bat population my Department had worked so hard to conserve. In my 27 years in this profession, I could never have imagined such a swift and dramatic decimation of an entire suite of species. I dare say, the Green Mountains of Vermont have never witnessed such an event as well.

May I reiterate that the battle against WNS is a race against time. Vermont’s role in WNS has quickly shifted to serving as a study site for the role of bats in our ecosystem and the strategies needed to recover the species. Much of the country; however, is at a tipping point, watching to see if we can muster the energy, resources, and public will to address this national environmental crisis.