

WHITE-NOSE SYNDROME MANAGEMENT: AREA 3 IMPLEMENTATION GUIDE

U.S. Fish and Wildlife Service and State Natural Resource Agencies
November 2009

INTRODUCTION

This guide provides a starting point for implementing the management strategy outlined in “White-Nose Syndrome: Report on Structured Decision Making Initiative” (Szymanski et al. 2009). The recommended management strategy calls for various cave closure measures in areas that, although not yet affected by white-nose syndrome (WNS), are susceptible to its arrival and spread within the near future. Together, these areas have been termed “Area 3”, as explained in the report and the Description of Area 3, below. The Area 3 management recommendations complement the management actions that are anticipated for Areas 1 and 2*, which are already affected by WNS.

The guidelines suggest approaches for implementing the recommended management strategy while taking local considerations into account. Although neither the WNS report nor this guide is meant to limit the discretion of managers in exercising their responsibilities, the U.S. Fish and Wildlife Service (USFWS) views consistent application of the recommended strategy as essential to any prospect of slowing the spread of WNS. It is also important to remember that applicable state and federal permitting requirements will remain in effect.

This implementation guide has been prepared as a companion document to the WNS report, but it can also be used as a stand-alone guide. Both the report and this guide will be incorporated, as appropriate, into a plan to manage the national response to white-nose syndrome. The national plan is being prepared through the collaborative efforts of the U.S. Fish and Wildlife Service, U.S. Geological Survey, National Park Service, U.S. Forest Service, and State agencies, based up the framework laid out in USFWS et al. (2009).

* Areas 1 and 2 are described as follows:

Area 1: In this area, many of the caves are already infected and the spread of the disease has largely stabilized. This currently includes all areas north and east of New York and possibly the northeast corner of Pennsylvania.

Area 2: At the leading edge of the disease, there is very active transition of sites from susceptible to infected within a mosaic of many uninfected caves and many infected caves. Currently, this area includes most of Pennsylvania, New Jersey, West Virginia, Virginia, eastern Tennessee, eastern Ohio, eastern Kentucky.

PURPOSE AND INTENDED USERS

The sole purpose of this implementation guide is to help shape on-the-ground management responses to any novel occurrence of WNS within Area 3. It provides for some variation in response based on site-specific conditions while conforming to the general strategic approach.

The guidelines are applicable only to the 2009-2010 migration (including swarming and emergence) and hibernation season. Use of these guidelines in future years is wholly contingent upon what is learned about the syndrome itself and the effectiveness of management efforts through the upcoming season. The guidelines are subject to change at any time, based upon new information and insights.

This implementation guide is intended for use by biologists from State wildlife agencies and the U.S. Fish and Wildlife Service, who will work with land owners/managers if and when action needs to be taken to stem the spread of WNS in Area 3. It will also be provided to all federal and state agencies with management responsibilities for migrating and hibernating bats within the known potential range of WNS, and to organizations concerned with cave-mine access. These agencies and organizations are encouraged to participate in WNS response efforts coordinated by their state. Preliminary contact information for USFWS and State offices involved with WNS response is provided in Attachment 1; further contact information will be provided as it becomes available.

DESCRIPTION OF AREA 3

Area 3 includes caves and mines that are 250 miles or more from the nearest known occurrence of WNS. Although the boundaries of Area 3 may shift as newly affected sites are confirmed, for the coming hibernation season the area includes western Ohio, western Kentucky, Indiana, Michigan, Illinois, Iowa, Wisconsin, Minnesota, Missouri, western Tennessee, Arkansas, Georgia, and Alabama.

To date, no site in this area has yet shown signs of WNS, but there is a good chance of infection in the near future. Area 3 is therefore characterized as “susceptible.” In contrast, the parts of the range of WNS delineated in the report as Areas 1 and 2 are already affected by WNS. It is highly important to note that the susceptibility of Area 3 to the spread of WNS hinges to a large extent on control measures taken in Areas 1 and 2.

Because the defining characteristic of Area 3 is its current lack of affected sites, management is contingent upon detection of new occurrences and the proximity of unaffected sites to these occurrences. As described in the report (Szymanski et al. 2009), all sites within Area 3 fall into one of three general “profiles” based upon proximity considerations:

1. Affected site (“affected”) = Any cave or mine within Area 3 affected by WNS as shown by confirmation of the *Geomyces destructans* fungus on either the bats or in the cave/mine.
2. Unaffected caves near the affected site (“near affected”) = All Area 3 caves or mines within 75 miles of any affected site, which are believed to be more susceptible to becoming infected with WNS.
3. Unaffected caves far from the affected site (“far from affected”) = All Area 3 caves or mines more than 75 miles from any affected site. These sites are believed to be less susceptible to becoming infected with WNS through transmission from the affected site.

AREA 3 MANAGEMENT STRATEGY

The overriding management objective for Area 3 is to prevent the arrival of WNS by effectively controlling transmission from already-affected areas. This is reliant on management within Areas 1 and 2* that is conducive to preventing further spread of WNS, including continuing the closure of caves and mines to human access except for commercial and approved research uses, as well as other possible containment measures. Management measures in Areas 1 and 2 that focus on minimizing mortality and building resistance to WNS will also become highly pertinent for Area 3 should prevention or containment prove to be difficult to achieve.

Recognizing, however, that the spread of WNS to Area 3 may be unavoidable*, management for the upcoming winter season is predicated primarily on the need to contain any novel infection discovered within the area. In addition to this primary objective (Objective 1), five other management objectives are identified for Area 3: minimizing impacts on cave biota (Objective 2), minimizing risks to public health (Objective 3), minimizing restrictions on the public (Objective 4), minimizing direct bat mortality (Objective 5), and providing WNS-related research opportunities (Objective 6).

Based on these objectives and as reported in Szymanski et al. (2009), a cave closure strategy has been adopted for the 2009-2010 hibernation season. This strategy (“Alternative 10”, which ranked highest of the 23 alternatives explored) includes the following provisions:

As a pre-emptive strategy, unless and until WNS is detected within Area 3, access at all Area 3 hibernacula and caves should be confined to commercial and approved research uses only. Non-commercial recreational access to caves/mines should be avoided. In addition, it is recommended

* According to expert input (albeit with a high degree of uncertainty), if the recommended management strategy is implemented in Area 3 and partial or full closure is implemented in Areas 1 and 2, the probability of WNS arriving in Area 3 this winter is projected at 0.50. However, if open access is allowed in Areas 1 and 2, the estimated probability of arrival of WNS in Area 3 increases to 0.65.

that partial access (for commercial and research uses only) be continued in Areas 1 and 2. Partial access is allowable if appropriate decontamination and gear dedication procedures, described in Disinfection Protocol for Bat Field Research/Monitoring (USFWS 2009b), are followed. This protocol is posted at: <http://www.fws.gov/northeast/whitenose/FINALDisinfectionProtocolforBatFieldResearchJune2009.pdf>. Note that throughout Area 3, researchers engaged in activities involving federal permits are required to follow the protocol.

If WNS is detected this winter, the following year-round measures should be taken:

Affected site(s): For any hibernaculum or mine that shows definitive signs of WNS infection, no human access should be permitted. If full, year-round closures are implemented, decontamination and gear dedication procedures are not applicable, unless the need for emergency access arises and dictates such procedures.

Near affected site(s): For any hibernaculum or mine that occurs within 75 miles of an affected cave or mine, human access should be restricted to approved research only, and appropriate decontamination and gear dedication procedures should be implemented. No commercial or non-commercial recreational use of caves/mines should be allowed.

Far from affected site(s): For any hibernaculum or mine that occurs more than 75 miles from an affected site, research and commercial access is allowable contingent upon following appropriate decontamination and gear dedication procedures. No non-commercial recreational access to caves/mines should be allowed.

In implementing this management strategy, it may be helpful to understand why it outranked other management alternatives. A brief explanation is provided below, and a fuller rationale can be found in Szymanski et al. (2009).

All alternatives that focused on restricting access (Alternatives 7-10) ranked moderately in terms of preventing spread of WNS (Objective 1), but they were superior on other objectives, with Alternative 10 being the top-ranked. Conversely, alternatives focused on eradication of bats at affected sites performed best on Objective 1 but much worse on most other objectives. Overall, the more aggressive treatment options (fungicides and culling) performed poorly when all the objectives were taken into account.

Although restricting human access to caves and mines is not likely to be the full solution to WNS management over the long term, in the short term the potential costs (e.g., impacts on cave biota) of more aggressive treatments appear to outweigh their potential benefits (e.g., decreasing the likelihood of WNS spreading to Area 3). To a large extent, this is because the costs of such treatments are believed to be more certain than the benefits. Given the uncertainty about these outcomes, however, the cave-closure management strategy needs to be coupled with research to verify underlying assumptions (e.g., humans are an important transmission vector) and explore more direct methods for control of the disease.

It is important to note that Alternative 10 is favored only slightly over alternatives 7-9 (the table below shows the contrasts among these alternatives). This is particularly true for alternatives 7 and 8, which allow access for approved research at affected sites; in fact, all these alternatives are essentially tied in score. Some latitude may, therefore, be allowed in terms of providing access for approved research at affected sites.

ALTERNATIVE	AFFECTED SITE	NEAR AFFECTED SITE	FAR FROM AFFECTED SITE
Alternative 10	<u>Full Closure</u> : Prohibit all types of human access year-round at affected sites. Implement decontamination and gear dedication procedures if need for emergency access arises	<u>Research Access</u> : Allow research access, implementing appropriate decontamination and gear dedication procedures. Prohibit commercial and non-commercial recreational use of caves/mines year-round.	<u>Research and Commercial Access</u> : Allow research and commercial access, implementing appropriate decontamination and gear dedication procedures. Prohibit non-commercial recreational use of caves/mines year-round.
Alternative 7	<u>Research Access</u>	<u>Research Access</u>	<u>Research Access</u>
Alternative 8	<u>Research Access</u>	<u>Research Access</u>	<u>Research and Commercial Access</u>
Alternative 9	<u>Full Closure</u>	<u>Research Access</u>	<u>Research Access</u>

IMPLEMENTATION OF THE AREA 3 MANAGEMENT STRATEGY

Overview: Although consistent implementation of the Area 3 management strategy is strongly urged, certain site-specific conditions may need to be considered. The guidelines below apply only to cave access restrictions during the 2009-2010 season. Additional considerations would become pertinent if more aggressive measures, such as bat culling or fungicide treatments, become part of a future management strategy*, in which case this user guide will be modified.

* Considerations inapplicable to a closure strategy but potentially applicable to other management strategies include: movement behavior of the bats, number of bats present, other sensitive cave biota present, whether the site is a cave or mine, number of visitors to the site, current accessibility for research, recreational, and/or commercial uses, number and size of cave/mine openings, size and complexity of the cave/mine, site microclimate, and site hydrology.

General implementation guidelines:

Points of contact

State natural resource agencies will be the first points of contact for landowners, land managers, and organizations/individuals seeking information about local WNS management. Initially, information may be offered through USFWS and State websites and/or via individual contacts; see Attachment 1 for a preliminary contact list. Over time, a central means of providing information for Area 3, including updates and local contact information may be preferable. If federally listed bats, including Indiana bats, Virginia big-eared bats, gray bats, or Ozark big-eared bats are known to be present at the site(s) in question, the local USFWS field office should also be contacted.

Alerts and outreach

Informing involved parties and the general public about new WNS occurrences within Area 3 will be largely accomplished through media alerts/advisories and contacts with caving organizations. Information included in media alerts should include the location and status of the affected cave or mine, an explanation of the Area 3 management strategy (including differences among the three site profiles), site-specific considerations (see below), and contact information. The urgency of the issue should be made clear.

In conjunction with media alerts/advisories and information targeted specifically to the Area 3 management strategy, the USFWS Cave Advisory (USFWS 2009a; see Attachment 2) could be consulted for more information on applicable closure measures (the current Cave Advisory does not apply to Area 3). The public can also be directed to the primary WNS website at http://www.fws.gov/northeast/white_nose.html.

The purpose of these activities should be to engender cooperation from all partners and the public in the effort to control the spread of WNS. In particular, agency biologists should continue to encourage national and local caving organizations to continue their outreach and education efforts to spread the word about WNS and about responsible resource stewardship.

Closure techniques

There are a variety of techniques available to minimize or prevent human access to caves and mines. Some of the more common techniques include signs, pamphlets, and gates. As needed, pamphlets will be made available as through the points of contact (see above). Information for the manufacture and use of signs will also be provided through the points of contact. Unless gates are already in place at a cave or mine in Area 3, plans should not be made for their use this winter; instead, USFWS or State biologists should be contacted for further guidance about appropriate siting, construction, and installation of cave gates.

Other innovative techniques that may be considered for implementing access restrictions include placement of signs right in the cave entrance (e.g., on sawhorses) and alarm systems. Information

should be made available (see points of contact, above) to landowners or managers who want to pursue these options.

Other precautionary measures

No equipment or clothing that has been used in any cave or mine in a WNS-affected or adjacent state should be used in a cave or mine in an unaffected state. Within an affected state, no equipment or clothing that has been used in a WNS-affected county should be used in an unaffected or unknown county. As an added precaution, cave visitors should decontaminate all clothing and gear, using protocols available from the USFWS or a local State agency, when exiting any hibernacula. Noting that within Areas 1 and 2 the USFWS Cave Advisory (USFWS 2009a) focuses decontamination measures on scientific activities, the Area 3 management strategy makes these precautions applicable to all cave users. Agency biologists should work with commercial cave owners/managers toward implementing appropriate decontamination and/or gear dedication procedures for non-scientific activities.

Information sharing

Examples of signs and other closure materials should be shared among agencies for distribution to landowners and managers as appropriate. Examples of outreach materials should also be shared. The most efficient means of doing this may be to forward such examples to the USFWS for posting on the WNS website http://www.fws.gov/northeast/white_nose.html. Other factual information should be shared among agencies in a timely manner, and research, surveillance, and monitoring protocols should be shared as they are developed.

Site-specific implementation guidelines:

One or more of the following considerations may influence implementation of the closure management strategy at a given location.

Is the site located close to a novel occurrence of WNS?

Proximity of a cave or mine to a site newly affected by WNS may be relevant in terms of bat-to-bat and bat-to-cave transmission of the disease. However, the rapid spread of WNS has also occurred in a discontinuous pattern, indicating the need for human access precautions over a much larger area. Because of this, if WNS appears anywhere in Area 3, the measures in each of the three area profiles, described above, should be implemented throughout the profile to the extent as possible. The cooperation of land owners and managers as well as the caving community should be sought through the media alerts and organizational contacts as described above.

The ability to notify individual cave/mine owners and land managers of the proximity of their site(s) to a site newly affected by WNS is contingent on existing landowner contacts, density of caves in the area, and other practical constraints. In a practical sense, individual contacts may be more important for sites in closer proximity to a new occurrence of WNS within Area 3 and to sites that experience regular human use. Until such time as nearby parties have been directly alerted to the presence WNS and the need to implement the Area 3 management strategy, access restrictions will be promoted throughout Area 3 primarily through the means described above.

Do bats use the site?

This consideration has two components: the effects of WNS on bat survival and the likelihood of spread once bats show signs of the disease. The Area 3 management strategy applies to sites showing any bat presence. Insofar as known, this appears to apply to virtually every cave and mine in Area 3 (i.e., almost all caves/mines have at least limited bat use for either swarming and/or hibernation). Based on this presumption of bat presence, the protective measures in the management strategy are applicable to all cave/mine sites in the area unless clear evidence can be shown on a case-by-case basis that the site does not support any bat activity.

Is the cave or mine part of a hibernacula complex?

As defined in the draft revised Indiana bat recovery plan (USFWS 2007), “hibernacula complex” refers to a group of hibernacula that are geographically clumped with documented or presumed exchanges of bats. In terms of the Area 3 profiles, all caves that are part of a hibernacula complex will be considered part of the “affected” profile if WNS is detected at one or more of the caves within the complex. Measures should thus be taken in accordance with the “affected” profile of the management strategy. Likewise, if any cave or mine that is part of a hibernacula complex that falls within the “nearby” profile, all caves or mines within the complex will be considered to be within the same profile and managed accordingly.

Is the landowner or manager able and willing to implement the measures in the management strategy?

The Area 3 WNS management strategy is based on the best expert analysis available for this effort and on management objectives that represent the fundamental concerns surrounding WNS, particularly the probability of spread. Landowners and managers are, therefore, highly encouraged to follow the approach outlined in the strategy to the maximum extent practicable, and State and USFWS biologists should strongly advocate its implementation. If any element of the strategy is deemed impracticable at a particular site or if a landowner is unwilling to adopt the recommended strategy, State and/or USFWS biologists should work closely with the landowner/manager to implement an alternative approach. For instance, the following measures, although less effective in achieving the management objectives, may be recommended to reduce the likelihood of spread: (a) requiring that gear dedication and/or decontamination protocols be followed, and/or (b) restricting bat access to the cave/mine.

Is access to the site important for ongoing or proposed research?

For the most part, research that is unrelated to WNS should be discontinued at caves and mines in Area 3. After careful evaluation, exceptions may be made for research that is shown to be critical to human health or protection of natural resources.

As noted in the USFWS Cave Advisory (USFWS 2009a), much of the research currently underway in bat hibernacula is related to WNS and/or monitoring. Within Area 3 (as in Areas 1 and 2) each ongoing and proposed research activity should be evaluated in terms of its

importance for advancing our understanding of WNS, and the potential benefits of the research should be weighed against any risk it poses to bats, particularly in the “affected” and “near affected” profiles. If the objectives and/or methodology of the research are not clear, or if risks cannot be adequately addressed, the research should not be conducted. All approved WNS-related research activities in Area 3 should be conducted in accordance with the Area 3 management strategy, as discussed in Szymanski et al. (2009), and in close coordination with the appropriate federal and state agencies.

GUIDELINES FOR SURVEILLANCE AND MONITORING

A number of different documents outlining protocols for surveillance and monitoring are being developed by various federal and state groups, including, for instance, the WNS Surveillance Group and the USFWS Midwest Region. In addition, a task force associated with the WNS national response planning process is preparing a template for these activities.

Current concerns with regard to surveillance and monitoring are conveyed in Attachment 3, prepared by the USFWS’s Midwest Region (USFWS 2009c). Effort should be given to making the various protocols as consistent as possible, incorporating these concerns.

As the protocols become available, they should be shared with all involved federal and state contacts in Area 3; whenever possible, drafts should be shared. Completed documents should be provided to the appropriate USFWS Regional and Field Offices.

DOCUMENTS CITED

Szymanski J.A., M.C. Runge M.J. Parkin, and M. Armstrong. 2009. White-nose syndrome management: Report on structured decision making initiative. U.S. Fish and Wildlife Service, Fort Snelling, MN. 51 pp.

U.S. Fish and Wildlife Service. 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. USFWS, Fort Snelling, MN. 258 pp.

U.S. Fish and Wildlife Service. 2009a. White-Nose Syndrome in bats: Cave Advisory, March 26, 2009. Advisory for suspending activities in caves to protect bats from white-nose syndrome. Hadley, MA. Accessed at <http://www.fws.gov/northeast/wnscaveadvisory.html>.

U.S. Fish and Wildlife Service. 2009b. Disinfection protocol for bat field research/monitoring, June 2009. Hadley, MA. Accessed at <http://www.fws.gov/northeast/whitenose/FINALDisinfectionProtocolforBatFieldResearchJune2009.pdf>.

U.S. Fish and Wildlife Service. 2009c. Concerns regarding transmission of WNS during fall swarming and spring emergence trapping, September 21, 2009. Minneapolis, MN.

USFWS, USGS, NPS, USFS, and State Agencies. 2009. A plan for assisting states, federal agencies, and tribes in managing white-nose syndrome in bats: Draft framework. Preliminary document presented at a meeting of the Association of Fish and Wildlife Agencies, September 13-16, Austin, TX. Accessed at http://www.fws.gov/northeast/whitenose/PDF/DRAFT_OUTLINE_WNS_National_Plan_090908.pdf.

ATTACHMENT 1: State and USFWS Contact Information for Area 3 – Preliminary List

Alabama Department of Conservation and Natural Resources

Game and Fish Division
<http://www.dcnr.state.al.us/agfd/>
64 N. Union Street
Montgomery, Alabama 36130

Arkansas Game and Fish Commission

<http://www.agfc.com/>
2 Natural Resources Drive
Little Rock, AR 72205
800-364-4263 or 501-223-6300

Georgia Department of Natural Resources

<http://www.gadnr.org/>
2 Martin Luther King Jr. Drive, SE Suite 1252
Atlanta, GA 30334

Illinois Department of Natural Resources

<http://dnr.state.il.us/>
One Natural Resources Way
Springfield, IL 62702-1271
dnr.endspec@illinois.gov

Indiana Department of Natural Resources

<http://www.in.gov/dnr/>
402 West Washington Street
Indianapolis, IN 46204
317-232-4200 or 877-463-6367.

Iowa Department of Natural Resources

<http://www.iowadnr.gov/>
502 E. 9th Street
Des Moines, IA 50319-0034
515-281-5918

Kentucky Department of Fish and Wildlife Resources

<http://fw.ky.gov/>
1 Sportsman's Lane
Frankfort, KY 40601
Information Center: 800-858-1549
info.center@ky.gov

Michigan Department of Natural Resources

<http://www.michigan.gov/dnr>
Wildlife: Mason Building, Fourth Floor, P.O. Box 30444
Lansing MI 48909
517-373-1263, fax 517-373-6705

Minnesota Department of Natural Resources

<http://www.dnr.state.mn.us/index.html>
500 Lafayette Road
St. Paul, MN 55155-4040
651-296-6157 or 888-646-6367
info@dnr.state.mn.us

Missouri Department of Conservation

<http://www.mdc.mo.gov/>
2901 W. Truman Blvd.
Jefferson City, MO 65109
P.O. Box 180 (zip 65102)
573-751-4115, fax 573-751-4467

Ohio Department of Natural Resources

<http://www.dnr.state.oh.us/>
Division of Wildlife
2045 Morse Road, Building G
Columbus OH 43229-6693
614-265-6300 or 800-WILDLIFE

Tennessee Wildlife Resources Agency

<http://www.state.tn.us/twra/>
Ellington Agricultural Center
440 Hogan Rd. Nashville, TN 37220
615-781-6500
Ask.TWRA@tn.gov

Wisconsin Department of Natural Resources

<http://www.dnr.state.wi.us/>
101 S. Webster Street
PO Box 7921
Madison, Wisconsin 53707-7921
608-266-2621 or 888-936-7463

U.S. Fish and Wildlife Service

<http://www.fws.gov/>

Midwest Region

<http://www.fws.gov/midwest/>
One Federal Drive
Fort Snelling, MN 55111-4056
612-713-5360
MidwestNews@fws.gov

Southeast Region

<http://www.fws.gov/southeast/>
1875 Century Boulevard
Atlanta, GA 30345
Southeast@fws.gov

**ATTACHMENT 2:
White-Nose Syndrome in bats: Cave Advisory March 26, 2009**

[Accessed from: <http://www.fws.gov/northeast/wnscaveadvisory.html>]

U.S. Fish and Wildlife Service recommends suspending activities in caves to protect bats from white-nose syndrome

Advisory:

White-nose syndrome (WNS) is a malady of unknown origin that has killed hundreds of thousands of bats across the northeast United States during the past three years and continues unchecked. It threatens to spread to the Midwest and Southeast, home to many federally endangered bat species as well as some of the largest bat populations in the country.

The evidence collected to date indicates that human activity in caves and mines may be assisting the spread of WNS. The primary agent of concern is a fungus that is new to science and may possibly be an invasive species. This fungus grows best in the cold and wet conditions common to caves and abandoned mines and likely can be transported inadvertently from site-to-site on boots and gear of cave visitors. Therefore, the U.S. Fish and Wildlife Service is recommending actions to reduce the risks of further spread of WNS. We hope that slowing the spread of WNS will buy time that is critical to confirming the cause and potentially implementing management actions to minimize the impacts to native bat populations.

We recognize that the steps we are recommending will require sacrifice from the caving community and others, and we regret this inconvenience. However, the observed devastation to bat populations, exceeding 90 percent mortality at many affected sites, and the evidence for human-assisted spread justifies that we exercise an abundance of caution in managing activities that impact caves and bats. These measures will not be a cure for WNS, but they are necessary to help slow the spread of this affliction and to reduce the risks to bat populations in North America. While it is generally recommended that cavers avoid all caves and mines containing hibernating bats (hibernacula), even in states where WNS is not known to occur, we strongly recommend the following steps to further reduce risks of WNS:

A voluntary moratorium, effective immediately, on all caving activity in states known to have hibernacula affected by WNS, and all adjoining states, unless conducted as part of an agency-sanctioned research or monitoring project. Caves infected with the WNS fungus may not show any obvious signs of its presence, and we do not know the actual geographic distribution of all affected sites. Human activity in affected caves may cause fungal spores and particles to become airborne, thereby contaminating exposed materials and allowing for transport. Although we have confidence in the current protocols for decontamination, there is no way to guarantee efficacy for all equipment in all circumstances, and they may not adequately address needs for technical or vertical gear.

Cavers in regions outside the WNS-affected and adjacent states should be using clothing and gear that has never been used in caves or mines in the affected or adjacent states, and should thoroughly clean and contain all clothing and gear upon exiting those locations. Because there is a lag time between the initial point of contact with the causative agent(s) of WNS and the first visible evidence of its presence, we cannot be certain that apparently unaffected sites do not pose a risk for contamination. In order to minimize the risk that WNS could travel across state, regional or national boundaries on clothing and equipment, we are advising that clothing and equipment used outside of the affected region be decontaminated following the protocols available on the Service WNS Web site (see below). This recommendation does not supersede state or local caving orders, and we request that cavers respect and observe all state and local cave closures and advisories.

All scientific activities that involve entry into caves or mines where bats reside should be evaluated to determine if the activity has the potential to facilitate the spread of WNS. Much of the research currently under way in bat hibernacula is related to WNS and/or monitoring, and continued research is essential to advancing our understanding of WNS. All non-WNS related research conducted in caves and mines should be coordinated with federal and state conservation agencies (as per No. 1 above). Potential benefits of research will be weighed against the risk posed to bats. Research or monitoring activities should not be conducted if risks cannot adequately be addressed.

For all scientific activity, no equipment or clothing that has been used in any cave or mine in a WNS-affected or adjacent state should be used in a cave or mine in an unaffected state. Within an affected state, no equipment or clothing that has been used in a WNS-affected county should be used in an unaffected or unknown county. As an added precaution, researchers should decontaminate all clothing and gear, using protocols available from the Service or a local state agency, when exiting any hibernacula.

At the issuance of this advisory, the investigation of key elements of the cause and spread of WNS has been under way for less than one year. Laboratory and field research currently being conducted will require time for analysis and replication. Therefore, these recommendations will remain in effect until the mechanisms behind transmission of WNS are understood, and/or the means to mitigate the risk of human-assisted transport are developed. We will provide quarterly updates on the status and scope of this advisory via the Service WNS Web site (http://www.fws.gov/northeast/white_nose.html).

Background and supporting evidence:

We estimate that more than 400,000 bats have died from WNS, including 25,000 federally endangered Indiana bats, and many more bats are at immediate risk. As of March 18, 2009, at least 60 hibernacula in nine states (Connecticut, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Vermont, Virginia and West Virginia) are known to be affected by WNS.

Current data indicate that a newly identified fungus (*Geomyces* sp.) that thrives in the cold and humid conditions characteristic of the caves and mines used by bats is responsible, at

least in part, for the impacts and mortality associated with WNS (see: Bat White-Nose Syndrome: An Emerging Fungal Pathogen? by Blehert et al. in Science Magazine, vol. 323, 2009, p.229).

While the mechanism of transmission is still unknown, the rapid dispersal of WNS from a single New York cave in 2006 to numerous sites in contiguous northeastern states by 2008 suggests that WNS is likely spread through direct bat-to-bat and bat-to-cave contact. Bats are likely the primary vector for WNS based on the rate of spread through 2008 and the behavior of the species affected. There is mounting evidence, however, that human activity may also be responsible for spreading the causative agent(s) of WNS, even during seasons when bats are not occupying caves. The fungus can grow on many different organic materials, and appears to persist in caves and mines year-round. Fungal spores, and/or other microscopic organisms, can easily become attached to skin, hair, clothing and equipment, and it is possible that such elements could remain viable for weeks or months after leaving a subterranean environment. The discontinuous nature of the rapid spread of WNS, especially to the most recently discovered sites in West Virginia and Virginia, suggests that something other than bat-to-bat transmission is contributing to the spread of WNS. The potential for the human-assisted spread of WNS is further supported by the fact that many of the recently affected sites are also popular destinations for recreational cavers, while many bat hibernacula in less-popular or inaccessible caves between the newly affected caves and those affected in 2008 remain unaffected. Records of caver movements also reveal a connection between sites in these affected regions, additionally suggestive of a link to human activity.

Given the current evidence, and the recent advances in knowledge of the fungus associated with WNS, we have developed our recommendations to address the activities that are likely to contribute to the spread of WNS. At this time, the evidence is lacking to recommend the closure of commercial sites that offer cave tours to the general public. Visitors to commercial sites are less likely to visit multiple caves in a short time-period, generally wear plain clothes and shoes that are not repeatedly used for cave-related activities, and are considered to pose a very low risk for the spread of WNS to new caves. Additionally, we will be working with the owners and operators of commercial caves to help them employ methods to minimize the potential for contaminated materials from entering or leaving their sites.

Caves and mines in the newly affected regions of West Virginia and Virginia shelter bat species not previously impacted by WNS. They are also home to some of the largest wintering colonies of hibernating bats in the world, including some of the largest known U.S. populations of the Indiana bat, Virginia big-eared bat and gray bat, all endangered species. Because the Service has responsibility for endangered species, it is imperative that we take the measures necessary to protect these bats. If WNS spreads to these critical hibernacula, or to other significant hibernacula around the world, the impact on bat populations could be devastating.

Moving forward:

Service biologists are working with our federal, state, provincial and private partners to confirm the cause of WNS and to examine the ways in which the affliction spreads. We

encourage those agencies and partners who manage cave resources to strongly consider limiting access to caves and mines to slow the spread of WNS.

As we learn more about the potential role of human transmission of WNS, or when we have the means to greatly reduce such risks, we will make the information available on the Service Web site and will revise these recommendations accordingly. Until then, we appreciate the high level of cooperation from all partners in this ongoing effort, as well as the continued cooperation of the public. We fully support all efforts to exercise caution in caving activities, such as the caving moratorium in Virginia, and we applaud the local and national caving organizations for their dedication to a strong conservation ethic. Furthermore, we encourage our partners with national and local caving organizations to continue their outreach and education efforts to spread the word about WNS and about responsible resource stewardship.

For more information, updates, and a map showing affected counties, see http://www.fws.gov/northeast/white_nose.html.

ATTACHMENT 3:
Concerns Regarding Transmission of WNS During Fall Swarming and Spring Emergence Trapping
September 21, 2009

Use of the word “cave” in this document applies to both caves and mines

The community of scientists investigating white-nose syndrome (WNS) has expressed concern regarding the potential for transmission of WNS during trapping activities at cave entrances during fall swarming and spring emergence. Key aspects of this concern include:

1) Fall swarming is potentially a key period for the transmission of WNS among bats. Bats are highly mobile at this point in the annual cycle – individual bats may visit many caves during fall swarming before ultimately entering hibernation. Bats may be exposed to the fungus associated with WNS (*Geomyces destructans*) at this time. That is, if the fungus is present in a cave where bats are swarming, it may be transmitted to bats. Or, if one or more of the bats at the site are infected with the fungus, it may be transmitted through bat-to-bat contact among the bats swarming at the site. Because bats may visit many sites and large numbers of bats are congregating, the potential for both bat-to-bat transmission and cave-to-bat transmission may be high during fall swarming. We assume that as bats begin the transition to use of cave environments in the fall, that the potential for *G. destructans* to begin actively growing on the bats increases. Not only does the fungus thrive at cave temperatures, but bats also begin using torpor more compared to summer and the use of torpor makes bats more susceptible to active fungal infection. Bats are also highly social during fall swarming, which is when most mating occurs. So a combination of bat behaviors during fall -- congregating for mating and other social behaviors, visiting multiple sites, and moving relatively long distances -- potentially contribute to an increased risk of WNS transmission during this time.

2) Trapping bats, either in harp traps or mist nets, during this time may exacerbate this risk, by increasing contact among bats. During harp trapping bats make contact both with the wires/lines of the harp trap and the collecting bag attached to the trap; either of these could become contaminated with fungal spores and allow for transmission to another bat captured in the trap. Further, bats may come into direct contact with each other in the collecting bag. Similarly, mist nets can become contaminated with fungal spores. Decontamination procedures have been developed to minimize transmission risk during bat trapping and handling, and have been incorporated into all Region 3 Federal research permits; see protocols at <http://www.fws.gov/midwest/Endangered/mammals/BatDisinfectionProtocol.html>. While we believe that these protocols do help to minimize the risk of WNS transmission, fall swarming represents a heightened risk and a particular challenge for decontamination. Many experts are concerned that it is not possible to develop protocols to sufficiently address the risk of transmission during this time. The potential for transmission in the collecting bag of a harp trap is of particular concern.

3) Increased contact among different species of bats is also a critical consideration. During swarming, more individuals may use a site than will be present during hibernation, and there may be more species present than will ultimately hibernate at the site. Of particular concern is that some species of tree bats, including red bats, may swarm at cave sites along with cave bats. To date, only species of bats that hibernate in caves (at least in part) are known to be affected by WNS. However, red bats use deep torpor for long periods during winter, and may be susceptible

to infection by *G. destructans*. The concern is that tree bats, which are normally associated neither with caves (other than during swarming) nor with cave bats, could be exposed to the fungus during swarming, and being caught in a trap -- especially in a harp trap collection bag with other species of bats -- would exacerbate this risk. Thus, entire species of bats which would likely not otherwise be exposed to WNS could be exposed.

4) Trapping during spring emergence may pose similar risks to those described above for fall swarming. Generally, the congregation of bats and movements of bats among sites are less during spring emergence than during fall swarming. Nonetheless, there can be concentrations of bats at cave entrances during emergence, and if the *G. destructans* fungus is present at a site, bats emerging from that site have likely been exposed. Because the bats are just emerging from hibernation, it is likely that the fungus will still be viable.

There was a discussion of the potential risk of trapping bats during fall swarming and spring emergence at the White-nose Syndrome Symposium in Pittsburgh, Pennsylvania, held August 11-13, 2009. There was general agreement at the Pittsburgh meeting that trapping at cave entrances during swarming and emergence should be discouraged in light of the associated risks. Harp trapping during fall swarming is of particular concern. It was agreed that fall harp trapping should not be used for WNS surveillance. The biologist that led the discussion at the Pittsburgh meeting made the summary statement that “we should do everything we can to eliminate harp trapping for all but the most important and focused WNS research projects.”

Researchers are encouraged to seek alternative techniques in lieu of harp trapping whenever possible. Depending on research objectives, emergence counts and acoustic surveys may provide suitable alternatives with no associated risks (because bats are not trapped or handled). When harp trapping is considered essential for research, the bag should be removed and careful disinfection of the lines/wires should occur after every night of trapping, and even within nights to the extent feasible. Trapping sessions should be as short as possible, catching only the number of bats needed to meet research objectives. Mist netting may lower the risk of WNS transmission compared to using a harp trap with a collecting bag, however because multiple bats will contact the net there remains a risk of transmission. Further, mist netting at cave entrances is generally not advisable because of the potential to catch too many bats too quickly – bats can become entangled and difficult to remove. Not only does this stress bats, but following WNS decontamination protocols under these circumstances may not be possible (e.g., changing latex gloves between handling each bat). Therefore, mist netting cave entrances is not recommended unless there are no alternatives and (as noted by Kunz 1988: Ecological and Behavioral Methods for the Study of Bats) mist nets should only be used near cave openings when populations are small, and must be tended constantly to avoid capture of too many bats.

This document will be reviewed and revised as new information becomes available.