

**White-Nose Syndrome Decontamination Protocol**  
**U.S. Fish and Wildlife Service – Version 01.25.2011**

**I. GENERAL INFORMATION:**

The US Fish and Wildlife Service (USFWS) strongly recommends, first and foremost, compliance with all cave<sup>1</sup> closures, advisories, and regulations on all Federal, State, Tribal, and private lands. However, where such closures are not required or recommended, the following protocol outlines the best known procedures to help reduce the transmission of the fungus *Geomyces destructans* (*G.d.*), believed to be the cause of white-nose syndrome (WNS), to important bat habitat and populations. WNS is responsible for significant bat mortality in eastern North America, and threatens bat populations across the continent.

**If not properly trained and/or permitted by the appropriate government agency; then please do not handle bats.** If you observe live or dead bats (multiple individuals in a single location) that may exhibit signs of WNS, contact a wildlife professional in your state wildlife agency (<http://www.fws.gov/offices/statelinks.html>) or contact your nearest USFWS Ecological Services Field Office (<http://www.fws.gov/offices/>). Researchers, contact your state or federal agency for permitting requirements.

**II. RECOMMENDED DECONTAMINATION PRODUCTS:**

All necessary and appropriate precautionary use, storage, and disposal information should be apparent on each of the product labels. It is critical that all researchers and biologists read and follow all label instructions provided on the products mentioned in this protocol. It would be a violation of federal law to use, store, or dispose of a regulated product in any manner not prescribed on the approved label/MSDS.

The following chemical (a minimum of 0.3% quaternary ammonium compound, unless otherwise denoted) and natural products were tested in the laboratory and determined effective for killing the conidia of *Geomyces* spp.:

1. Lysol<sup>®</sup> IC Quaternary Disinfectant Cleaner - (A product effective at 1:128 dilution, or 1 ounce of concentrate per gallon of water.)<sup>2</sup>
2. Professional Lysol<sup>®</sup> Antibacterial All-purpose Cleaner (A product effective at 1:128 dilution, or 1 ounce of concentrate per gallon of water.)<sup>2</sup>
3. Formula 409<sup>®</sup> Antibacterial All-Purpose Cleaner (Off-the-shelf concentrations as specified by label)<sup>2</sup>
4. A 10% solution of household bleach – (A product effective at 1 part bleach to 9 parts water)<sup>2</sup>
5. Lysol<sup>®</sup> Disinfecting Wipes (0.28 % di-methyl benzyl ammonium chloride)<sup>2&3</sup>
6. Boiling in water for 15 minutes<sup>2</sup>

**III. DECONTAMINATION PROCEDURES:**

**BEFORE EACH CAVE VISIT:** In order to effectively reduce the risk for human transfer of *G.d.*, it is imperative that everyone follow these decontamination procedures any time you plan cave visits. **Under no circumstances should clothing, footwear or gear that was used in a WNS-affected state or region be used in a WNS-unaffected state or region.** Clothing or gear that has been or is suspected of being exposed to *G.d.* may be reused in other WNS affected caves; however, the WNS decontamination procedures provided in this document should always be followed for items used in affected caves prior to entering another affected cave or leaving the affected state or region. Used gear that must be transported out of affected states or regions should

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<sup>1</sup> The use of the word “cave” in this document includes natural caves, man-made mines, or any other site that may harbor *G.d.* spores.  
<sup>2</sup> Use of some products which contain quaternary ammonia, isopropanol, and other potentially harmful chemicals or boiling water in confined spaces needs to be approached carefully due to inhalation or contact risks of the product. Since products/procedures may also cause damage to clothing, gear, and sensitive electronic equipment, all users should be aware of these risks prior to entering cave environments. Use of personal protective equipment to reduce contact with the product is strongly encouraged, particularly if extended contact is anticipated or as recommended by the manufacturer. Always read and follow the MSDS information and all safety/use criteria for every product used.  
<sup>3</sup> The active ingredient is considered to be at the effective concentrations known to kill the conidia of *Geomyces* spp.; however, the efficacy of field application remains to be demonstrated. Any equipment decontaminated with this product should be used with extra precaution until laboratory results are finalized.

be decontaminated, contained, and sealed prior to leaving the affected area and should not be stored or transported in close proximity with unexposed equipment. If gear cannot be decontaminated, either for safety reasons or fear that equipment may be damaged, it should not enter subsequent caves but rather be designated for use in that one specific cave. Gear should not be used in multiple caves in the **same day** unless the decontamination procedures below can be performed **between each cave visit or the maximum distance between visited caves is less than 10 miles (see supplements for explanation)**.

**AFTER EACH CAVE VISIT:** Thoroughly scrape or brush off any dirt and mud from clothing, boots, and gear. Then place all in a sealed plastic bag or plastic container (with lid) to be cleaned and disinfected off-site. At a minimum, outer clothing should be removed prior to entering a vehicle after/between a cave visit. A clean change of clothing is recommended. **Care should be exercised at all times to prevent contamination of clean clothing, equipment, and/or vehicles.** To decontaminate clothing, footwear and gear, please follow all relevant procedures listed below.

**A. Submersible Gear** (i.e. clothing and equipment that can be submerged without damage):

Wash all clothing and any appropriate equipment in washing machine or by hand using conventional detergents in cold, warm, or hot water. Woolite<sup>®</sup> fabric wash has been found to be highly effective for this procedure. Rinse thoroughly, and then follow by soaking for a minimum of 10 minutes in one of the decontaminating products in Section II, then rinse and air dry. Please notice when boiling water is selected as the decontamination method, all gear must be submersed for 15 minutes, then followed by air drying.

*1. Footwear:*

When safety permits, rubber (wellington-type) caving boots (which withstand harsh decontaminating products and are easily cleaned) are recommended. Boots need to be fully scrubbed and rinsed to remove all soil and organic material. Decontaminate rubber and leather boots, (including soles and leather uppers) with a product listed in Section II for a minimum of 10 minutes, then rinse and air dry.

*2. Ropes and Harnesses:*

To date, only Sterling rope and webbing have proved to sustain no damage when using the following procedure. Wash rope/webbing in a front loading washing machine on the gentle cycle using Woolite<sup>®</sup> Extra Delicates detergent. Immerse in a dilution of Lysol IC Quaternary Disinfectant Cleaner for 15 minutes. Rinse twice in clean water and air dry. Brands of rope/webbing other than Sterling have not yet been tested for integrity after decontamination. Brands not tested should be dedicated to a single cave or not used at all.

**B. Non-submersible Gear** (i.e. equipment that will be damaged by submersion):

Clean thoroughly with soap (i.e. Dawn<sup>®</sup> antibacterial dish soap) and water, where appropriate, and then decontaminate all equipment by applying one of the recommended chemical products (understanding certain products are tougher on surfaces than others) in Section II to the outside surface for a minimum of 10 minutes, then rinse and air dry.

*1. Cameras and Electronic Equipment:*

If possible, do not bring electronic equipment into a cave. If practical, cameras and other similar equipment that must be used in a cave may be placed in plastic casing (i.e. underwater camera housing) or wrapped in plastic wrap where only the lens is left unwrapped to allow for photos to be taken. The plastic casing should be decontaminated using one of the appropriate products in Section II. The plastic wrap should be discarded after use and followed up by decontaminating the camera surface with Lysol<sup>®</sup> Disinfecting Wipes, realizing this could damage the body of the camera.

*2. Vehicles:*

In addition to gear, vehicles used to transport equipment can also harbor spores. Keep vehicles as clean as possible by taking extra precautions (e.g. storing gear in clean containers, bringing a change of clothes, conducting all work outside of the vehicle once in the cave) and decontaminating storage containers along with all other clothing, gear, and misc. equipment using the appropriate decontamination products in Section II.

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**Note:** Protocol updated as of 01.25.2011. Please visit <http://www.fws.gov/WhiteNoseSyndrome/> for updated materials and for supplemental documents that detail decontamination procedures for 1. cavers, and 2. researchers.