PURPOSE:
The purpose of this SOP is to provide the best available scientific information known to effectively decontaminate clothing, footwear, and equipment that may have been exposed to *Pseudogymnoascus destructans* (*Pd*). Local, state, federal, or other management agencies may have additional requirements or clarifications for equipment used on lands under their jurisdictions or work involving public trust resources. Always follow all state and/or federal permit conditions. Contact the respective agency representatives for supplemental documents or additional information.

The fungus *Pseudogymnoascus destructans* (*Pd*) is the cause of white-nose syndrome (WNS), a disease that has resulted in unprecedented mortality of hibernating bats throughout eastern North America. Since first documented in New York in 2006, WNS continues to threaten hibernating populations of bats across the continent, having spread rapidly through the Northeast, mid-Atlantic, Midwest, and Southeast states, as well as eastern Canada. Because of the devastating effects of WNS in North America, and with the risk of human-assisted transmission, all persons who come into contact with bats, their environments, and/or associated materials for any reason (e.g., research, recreation, etc.) are advised to take precautions to avoid additional, inadvertent transport of *Pd* to uncontaminated bats or habitats.

TRIP PLANNING/ORGANIZATION:
Researchers must consider the order of sites that they visit and what region(s) of the country they will be visiting and the presence of the disease to guard against vectoring the disease to uncontaminated areas.
1.) Identify the appropriate WNS Management Area (Figure 1)

![Figure 1. WNS Management Areas by state.](image)

2.) Once the appropriate Management Areas have been determined, use Figure 2 to determine appropriate uses for A. Subterranean Equipment or B. Terrestrial Equipment.
3.) Choose equipment that can be most effectively decontaminated. Equipment should always be inspected for defects prior to use.

![Figure 2](image_url)

**Figure 2.** Movement recommendations for decontaminated (A) Subterranean and (B) Terrestrial equipment.

4.) Confirmed *Pd* contaminated sites or those with a high index of suspicion for contamination should be visited only after those sites of unknown *Pd*/WNS status have been visited.

**PROCEDURES FOR DECONTAMINATION:**

1.) On site:
   a.) Thoroughly remove sediment/dirt from equipment immediately.
   b.) Contain all exposed and potentially contaminated equipment in sealed bags/containers for treatment away from the location. Decontaminate the outside hard, non-porous surfaces of
containers and bags using one of the treatments indicated in Table 1 prior to moving them to a secondary location (e.g., vehicles, labs, or storage). Store all exposed and decontaminated equipment separately from unexposed equipment.

c.) Clean hands, forearms, and exposed skin using hand/body soaps/shampoos. When feasible, change into clean clothing and footwear prior to entering vehicles.

2.) Off site:
   a.) REMOVE dirt and debris from the outside of vehicles (especially wheels/undercarriage) prior to additional site visits.
   b.) CLEAN submersible and non-submersible equipment according to manufacturer’s specifications. The use of conventional cleansers like Woolite® detergent or Dawn® dish soap aid in the removal of sediments and debris prior to treatment.
   c.) TREAT submersible or non-submersible equipment using the application or product listed in Table 1.
      i. Submersible Equipment (i.e., equipment that can safely withstand submersion in water or other specified product for the recommended amount of time without compromising the integrity of the item):
         The preferred treatment for all submersible equipment is submersion in hot water that maintains a temperature of at least 55°C (131°F) for a minimum of 20 minutes. Ensure that all equipment surfaces remain in direct contact for the duration of the treatment period. The use of applications and products in Table 1 should be done with extreme caution and proper personal protective equipment (PPE) due to the risk of personal injury.
         ii. Non-submersible Equipment (i.e., equipment that may be damaged by liquid submersion):
             Treat all non-submersible equipment using the application or product in Table 1 that complies with the manufacturer’s recommendations.
   d.) RINSE equipment, as appropriate, thoroughly in clean water. Allow all equipment to completely dry prior to the next use.
   e.) DECONTAMINATE the equipment bins, sinks, countertops and other laboratory, office, or home areas with products in Table 1.
Table 1. Applications and products with demonstrated efficacy against Pd^{3,4,5,6,7}. Remember to consult equipment labels, registered product labels, and the appropriate SDS for regulations on safe and acceptable use.

<table>
<thead>
<tr>
<th>Tested Applications &amp; Products</th>
<th>Preferred Applications</th>
<th>Federal Reg No.</th>
<th>Laboratory Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Dedication</td>
<td>N/A</td>
<td>Clean according to manufacturer standards and dedicated to a site</td>
<td></td>
</tr>
<tr>
<td>Submersion in Hot Water^{5,6,7}</td>
<td>N/A</td>
<td>Laboratory effectiveness demonstrated upon submersion in water with sustained temperature ≥ 55°C (131°F) for 20 minutes.</td>
<td></td>
</tr>
<tr>
<td>Ethanol (60% or greater)^{4,6,7}</td>
<td>CAS - 64-17-5</td>
<td>Laboratory effectiveness demonstrated upon exposure in solution for at least 1 minute.</td>
<td></td>
</tr>
<tr>
<td>Isopropanol (60% or greater)^{1,6,7}</td>
<td>CAS - 67-63-0</td>
<td>Laboratory effectiveness demonstrated immediately following contact and associated drying time.</td>
<td></td>
</tr>
<tr>
<td>Isopropyl Alcohol Wipes (70%)^{1,6,7}</td>
<td>CAS - 67-63-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen Peroxide Wipes (3%)^{1,6,7}</td>
<td>CAS - 7722-84-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accel^{5,6,7}</td>
<td>EPA - 74559-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clorox® Bleach^{5,6,7}</td>
<td>EPA - 5813-100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clorox® Wipes^{5,6,7}</td>
<td>EPA - 5813-79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clorox® Clean-Up Cleaner + Bleach^{5,6,7}</td>
<td>EPA - 5813-21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hibiclens^{3,5,6,7}</td>
<td>NDA - 017768</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lysol® IC Quaternary Disinfectant Cleaner^{5,6,7}</td>
<td>EPA - 47371-129</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other effective treatments with similar water based applications or chemical formulas (e.g., a minimum of 0.3% quaternary ammonium compound) may exist but remain untested at this time. Find more information on the EPA or FDA registered product labels by accessing the individual hyperlink or searching EPA or FDA Registration Numbers at: http://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1 or http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm.

EQUIPMENT AND ACTIVITY SPECIFIC RECOMMENDATIONS:

A. Clothing & Footwear:

IMPORTANT: All clothing (i.e., inner and outer layers) and footwear should be decontaminated after every site visit or otherwise cleaned and dedicated for use at individual sites or areas as determined appropriate in Section IV.

Use of a disposable suit (e.g., Tyvek® or ProShields) or site-dedicated, reusable suit (i.e., coveralls) is an appropriate strategy to minimize sediment/soil accumulation on clothing during a cave/mine or bat research activity.
Disposable items, regardless of condition, should not be reused. Contain all used equipment in plastic bags upon final exit from a site, separating disposable materials from reusable equipment. Seal and store plastic bags in plastic containers until trash can be properly discarded, and/or exposed reusable equipment can be properly decontaminated off site.

B. Cave/Mine and other Subterranean Equipment:
Dedicate or decontaminate all cave/mine equipment (e.g., backpacks, helmets, harness, lights, ropes, etc.). Carefully adhere to manufacturer’s care and use to maintain equipment functionality and safety.

C. Scientific Equipment:
All disposable scientific equipment should only be used on one bat, then discarded. Reusable equipment must be decontaminated between individual bats. When allowable, equipment may be autoclaved before reuse.

D. Mist-Nets:
Contamination of trapping equipment is possible year-round. Dedicate or decontaminate all netting equipment. All nets must be decontaminated after each use according to the submersion in hot water application. All nets should be completely dry prior to the next use.

E. Harp Traps:
All trapping equipment that comes in contact with one or more bats OR enters a cave/mine/bat roost must be decontaminated after each use. Explore the use of disposable trap bags or liners to reduce transmission risks. Disposable trap bags should be discarded after individual use.

F. Acoustic Monitor, Camera, and Related Electronic Equipment:
Dedicate or decontaminate all acoustic monitoring, camera, and related electronic equipment. The material composition of this equipment requires careful review and adherence to the manufacturer’s care and use standards to maintain their functionality and protective features. Electronic devices used as terrestrial equipment pose a limited risk of transmission.

Equipment used in a cave/mine/bat roost may be placed in a sealed plastic casing, plastic bag, or plastic wrap to reduce the potential for contact/exposure with contaminated environments. Prior to opening or removing any plastic protective wrap, first clean, then remove, and discard all protective wrap.

REFERENCES:
This work is a modified version of a product of the multi-agency WNS Decontamination Team, a sub-group of the Disease Management Working Group established by the National WNS Plan (A National Plan for Assisting States, Federal Agencies, and Tribes in Managing White-Nose Syndrome in Bats, finalized May 2011). On 15 March 2012 a national decontamination protocol was approved and adopted by the WNS Executive Committee, a body consisting of representatives from Federal, State, and Tribal agencies which oversees the implementation of the National WNS Plan. The protocol will be updated as necessary to include the most current information and guidance available.

1 To find published addenda and/or supplemental information, visit http://www.whitenosesyndrome.org/topics/decontamination.
2 Visit http://www.whitenosesyndrome.org/resources/map for the most updated information on the status of county and state. County and state level determination is made after a laboratory examination and subsequent classification of bats according to the current WNS case definitions. Definitions for the classification can be found at http://www.nwhc.usgs.gov/disease_information/white-nose_syndrome/Case%20Definitions%20for%20WNS.pdf. Contaminated determination includes both confirmed and suspect WNS classifications.

Efficacy of these agents and treatments are subject to ongoing investigation by the Northern Research Station, USDA Forest Service Cooperative Agreement 13-IA-11242310-036 (U.S. National Park Service and U.S. Forest Service) & 16IA11242316017 (U.S. Fish and Wildlife Service and U.S. Forest Service). Information contained in this protocol from work associated with either agreement will continue to be revised, as necessary, pending results of these investigations.

The use of trade, firm, or corporation names in this protocol is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by state and/or federal agencies of any product or service to the exclusion of others identified in the protocol that may also be suitable for the specified use.

Product guidelines should be consulted for compatibility of use with one another before using any decontamination product. Also, detergents and quaternary ammonium compounds (i.e., Lysol® IC Quaternary Disinfectant Cleaner) should not be mixed directly with bleach as this will inactivate the bleach and in some cases produce a toxic chlorine gas. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Final determination of suitability for any decontaminant is the sole responsibility of the user. All users should read and follow all labeled instructions for the products/applications and/or understand associated risks prior to their use. Treatments and the corresponding procedures may cause irreversible harm, injury, or death to humans, bats, equipment or the environment when used improperly. Always use personal protective equipment in well-ventilated spaces to reduce exposure to these products or applications.