

**Wisconsin Department of Natural Resources  
Decontamination Protocols for Preventing the Spread of  
White-Nose Syndrome in Bats**

Compliance with the Department-approved White-Nose Syndrome (WNS) decontamination protocols<sup>1</sup> described in this document below is required by section NR 40.07 (8) (b) 1., 2. and 3., Wisconsin Administrative Code, as provided by s. NR 40.07 (8) (c), Wis. Adm. Code.

**CAUTION:** Disinfectant efficacy is based on application to hard, nonporous surfaces and the ability to prevent the regrowth of *Geomyces* sp. on artificial culture media. Tests are currently being conducted on porous fiber materials such as ropes and harnesses to determine disinfectant efficacy to kill the fungus on these substrates and their effects on gear integrity. The repeated use of disinfecting agents may compromise the effective use of vertical equipment; therefore, this equipment should be dedicated to one cave or mine, or not used at all.

**Notice:** Do not take gear into a cave or mine if that gear cannot be thoroughly decontaminated or disposed of (i.e., if harnesses, ropes, or webbing cannot be decontaminated, we advise that you not enter caves or parts of caves requiring use of such gear). In addition, non-essential items should be left home as they may contribute to spreading the fungus.

**Clarification regarding diving and cave diving:**

- Diving in lakes, rivers or any other surface water body is exempt from these decontamination protocols.
- Cave diving at sites that are fully inundated with water (no air pockets and no air chambers) is exempt from these decontamination protocols.
- The department is currently working with the diving community to develop decontamination protocols for sump diving. While the protocols are in development, decontamination protocols are not required for sump diving.

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1. Use the following methods to decontamination equipment, gear, clothing and other objects of any kind before placing or bringing them into or near a cave or mine if they have been in or near another cave or mine within the state:

**a. Cave or Mine Tourists**

All persons entering a tourist cave or mine shall comply with the following decision tree for decontamination:

1. Have you been in a cave or mine for any reason, since 2005?

*No:* Proceed to the tour.

*Yes:* Continue to question #2.

2. Are the cave or mines you visited outside Wisconsin?

*No:* Proceed to the tour.

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<sup>1</sup> Adapted from U.S. Fish & Wildlife Service's 6/29/09 Disinfection Protocol

*Yes:* Continue to question #3.

3. Are you wearing or carrying anything that you took into the cave or mine (e.g. clothing, footwear, jewelry, watches, flashlights, cell phones, cameras, etc)?

*No:* Continue on the tour

*Yes:* Please remove and bag those items or return the items to your car. If your footwear has been inside a cave or mine outside Wisconsin, the tour operator will spray your footwear with a disinfectant.

#### **b. Recreational Cavers**

All equipment, gear, clothing and other objects of any kind must be decontaminated immediately upon leaving a cave or mine (see 2.b.) and must already be clean when arriving at a new site.

#### **c. Researchers, Monitoring and Surveillance Personnel**

All equipment, gear, clothing and other objects of any kind must be decontaminated immediately upon leaving a cave or mine (see 2.c.) and must already be clean when arriving at a new site.

2. Use the following methods to decontaminate equipment, gear, clothing and other objects of any kind when exiting with them or removing them from inside or near any cave or mine:

#### **a. Cave or Mine Tourists**

For walking tours, no additional decontamination measures will be required.

#### **b. Recreational Cavers**

Begin decontamination immediately upon exit (prior to getting into vehicle, or if not leaving the site in a vehicle, begin decontamination before leaving the site). Place a tarp on the ground and wrap your outer layer of clothing in the tarp and put the tarp in bucket, or place your outer layer of clothing inside a sealable, covered plastic storage bin. Your inner layer can be left on but should be washed as soon as possible. Transport the bucket or storage bin home. Clean the clothes, tarp and bucket or storage bin following the protocols listed below.

For sites with active recreational digging, dedicated gear must be used for each site and stored at that site.

#### Submersible Gear (for example, clothing and soft-sided equipment)

- **Clothing:** Wash all clothing and any appropriate equipment in a washing machine using the hottest cycle possible for the material and conventional laundry detergents. Laboratory testing has found Woolite® fabric wash to be the best surfactant for clothing. Rinse thoroughly, and then follow by soaking with sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water in a tub or plastic container. Soak for 10 minutes, then rinse and air dry. If field projects necessitate extended efforts at remote locations, with no travel to new or additional sites, and daily washing or decontamination is not possible, then at the least, wash/decontaminate all clothing and other soft-sided equipment that has had direct contact with bats using the required procedures specified above.
- **Other Submersible Gear (for example, bags, gloves):** Disinfect any equipment that can be submersed in a solution with an appropriate and compatible disinfectant such as sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts

water in a tub or plastic container or \_ 0.3% concentration of quaternary ammonium compounds (for example, Sparquat 256, Lysol® All-purpose Professional Cleaner, or the antibacterial form of Formula 409®). Keep submersed for 10 minutes, then rinse and air dry.

#### Non-submersible Gear

- **Boots:** Boots must be fully scrubbed and rinsed so that all soil and organic material is removed. The entire rubber and leather boots, including soles and leather uppers, can then be disinfected with an appropriate disinfectant such as \_ 0.3% concentration of quaternary ammonium compounds (for example, Sparquat 256, Lysol® Allpurpose Professional Cleaner or the antibacterial form of Formula 409®) or sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.
- **Other Non-submersible:** Disinfect any equipment that cannot be submersed by applying an appropriate and compatible disinfectant to the outside surface by using \_0.3% concentration of quaternary ammonium compounds such as Sparquat 256, Lysol® All-purpose Professional Cleaner or the antibacterial form of Formula 409®, or use sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.

#### Cameras, Computers, and Other Electronic Equipment

- If possible, do not bring electronic equipment to a netting site. If practical, cameras and other similar equipment that must be brought to a site may be wrapped in plastic wrap where only the lens is left unwrapped to allow for photos to be taken. The plastic wrap can then be decontaminated by using Lysol® disinfecting wipes and discarded after use. If using plastic wrap is not practical, alcohol wipes or Lysol® disinfecting wipes can be applied directly on surfaces.

### **c. Researchers, Monitoring and Surveillance Personnel**

Begin decontamination immediately upon exit (prior to getting into vehicle, or if not leaving the site in a vehicle, begin decontamination before leaving the site). Place a tarp on the ground and wrap your outer layer of clothing in the tarp and put the tarp in bucket, or place your outer layer of clothing inside a sealable, covered plastic storage bin. Your inner layer can be left on but should be washed as soon as possible. Transport the bucket or storage bin to a decontamination site. Researches visiting more than one site must have a dedicated decontamination and storage area outside of their dwelling. Clean the clothes, tarp and bucket or storage bin following the protocols listed below.

Researchers, monitoring and surveillance personnel must follow the protocols below for cave/mine work as well as the protocols listed in 3.c. for work with bats.

#### Submersible Gear (for example, clothing and soft-sided equipment)

- **Clothing:** Wash all clothing and any appropriate equipment in a washing machine using the hottest cycle possible for the material and conventional laundry detergents. Laboratory testing has found Woolite® fabric wash to be the best surfactant for clothing. Rinse thoroughly, and then follow by soaking with sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water in a tub or plastic container. Soak for 10 minutes, then rinse and air dry. If field projects necessitate extended efforts at remote locations, with no travel to new or additional sites, and daily washing or decontamination is not possible, then at

the least, wash/decontaminate all clothing and other soft-sided equipment that has had direct contact with bats using the required procedures specified above.

- Other Submersible Gear (for example, bags, gloves): Disinfect any equipment that can be submersed in a solution with an appropriate and compatible disinfectant such as sodium hypochlorite bleach (i.e., household bleach) solution diluted to 1 part bleach to 9 parts water in a tub or plastic container or \_ 0.3% concentration of quaternary ammonium compounds (for example, Sparquat 256, Lysol® All-purpose Professional Cleaner, or the antibacterial form of Formula 409®). Keep submersed for 10 minutes, then rinse and air dry.

#### Non-submersible Gear

- Boots: Boots must be fully scrubbed and rinsed so that all soil and organic material is removed. The entire rubber and leather boots, including soles and leather uppers, can then be disinfected with an appropriate disinfectant such as \_ 0.3% concentration of quaternary ammonium compounds (for example, Sparquat 256, Lysol® Allpurpose Professional Cleaner or the antibacterial form of Formula 409®) or sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.
- Other Non-submersible: Disinfect any equipment that cannot be submersed by applying an appropriate and compatible disinfectant to the outside surface by using \_0.3% concentration of quaternary ammonium compounds such as Sparquat 256, Lysol® All-purpose Professional Cleaner or the antibacterial form of Formula 409®, or use sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.

#### Cameras, Computers, and Other Electronic Equipment

- If possible, do not bring electronic equipment to a netting site. If practical, cameras and other similar equipment that must be brought to a site may be wrapped in plastic wrap where only the lens is left unwrapped to allow for photos to be taken. The plastic wrap can then be decontaminated by using Lysol® disinfecting wipes and discarded after use. If using plastic wrap is not practical, alcohol wipes or Lysol® disinfecting wipes can be applied directly on surfaces.

3. Use the following methods to decontaminate humans and objects of any kind, including but not limited to any net, trap, weighting tube, bat bag, wing punch, ruler, clothing, glove, electronic equipment or exclusion material before and after contact between a bat and a human or a bat and an object:

##### **a. Cave or Mine Tourists**

Does not apply. However, should incidental contact occur follow procedures listed under 3.c., below.

##### **b. Recreational Cavers**

Does not apply. However, should incidental contact occur follow procedures listed under 3.c., below.

##### **c. Researchers, Monitoring and Surveillance Personnel**

Submersible Gear (for example, clothing and soft-sided equipment)

- **Clothing:** Wash all clothing and any appropriate equipment in a washing machine using the hottest cycle possible for the material and conventional laundry detergents. Laboratory testing has found Woolite® fabric wash to be the best surfactant for clothing. Rinse thoroughly, and then follow by soaking with sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water in a tub or plastic container. Soak for 10 minutes, then rinse and air dry. If field projects necessitate extended efforts at remote locations, with no travel to new or additional sites, and daily washing or decontamination is not possible, then at the least, wash/decontaminate all clothing and other soft-sided equipment that has had direct contact with bats using the required procedures specified above.
- **Other Submersible Gear** (for example, bags, gloves, nets, etc.): Disinfect any equipment that can be submersed in a solution with an appropriate and compatible disinfectant such as sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water in a tub or plastic container or \_ 0.3% concentration of quaternary ammonium compounds (for example, Sparquat 256, Lysol® All-purpose Professional Cleaner, or the antibacterial form of Formula 409®). Keep submersed for 10 minutes, then rinse and air dry.

#### Non-submersible Gear (i.e., hard-sided equipment)

- **For Non-submersible Gear** (i.e., bat processing equipment, mist net poles, harp trap frames and legs, folding chairs): Disinfect any equipment that cannot be submersed by applying an appropriate and compatible disinfectant to the outside surface by using \_0.3% concentration of quaternary ammonium compounds such as Sparquat 256, Lysol® All-purpose Professional Cleaner or the antibacterial form of Formula 409®, or use sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.
- **Boots:** Boots must be fully scrubbed and rinsed so that all soil and organic material is removed. The entire rubber and leather boots, including soles and leather uppers, can then be disinfected with an appropriate disinfectant such as \_ 0.3% concentration of quaternary ammonium compounds (for example, Sparquat 256, Lysol® Allpurpose Professional Cleaner or the antibacterial form of Formula 409®) or sodium hypochlorite bleach (that is, household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.
- **Other Equipment:** Use one of the disinfecting agents listed above to sanitize all equipment that comes into contact with a bat's body, including light boxes, banding pliers, rulers, calipers, scale, etc. Any instrument coming into direct contact with bat skin should be rinsed free of chemical disinfectant using clean water or physiologic (0.9%) saline. Clean items after handling each bat. If using containers to weigh bats, separate containers used to weigh tree bats from cave bats, do not place tree bats in the same container previously used for a cave bat. Containers used to weigh bats (film canisters, baggies, cardboard rolls) should be disinfected in between handling each bat. Paper lunch bags can be used for holding and weighing individual bats, and can be immediately discarded after each use. Plastic baggies can also be used to line weighing containers, and bats can even be held in unsealed plastic bags during forearm measurements, reducing contact with wing rulers or calipers. Discard used bags after each bat. Disinfect gloves or discard disposable gloves after handling each bat.

#### Cameras, Computers, and Other Electronic Equipment

- If possible, do not bring electronic equipment to a netting site. If practical, cameras and other similar equipment that must be brought to a site may be wrapped in plastic wrap where only the lens is left unwrapped to allow for photos to be taken. The plastic wrap can then be

decontaminated by using Lysol® disinfecting wipes and discarded after use. If using plastic wrap is not practical, alcohol wipes or Lysol® disinfecting wipes can be applied directly on surfaces.

### Nets

- Use separate sets between states known to be affected by WNS and states currently unaffected. Realizing that some WNS affected states contain both affected and unaffected sites, under no circumstances should nets that have been used in an affected site be used in an unaffected site. Contact your state wildlife agency for updated information regarding WNS affected sites by visiting the following webpage: <http://www.fws.gov/offices/statelinks.html>
- Bats should be kept in breathable holding bags rather than holding cages. To avoid cross-contamination of samples, it is imperative to keep bats separated using holding bags that are kept as clean as possible. Non-disposable holding bags should be used only once per night of field work and should be washed and decontaminated (following procedures above) and dried between nights of use. Disposable paper bags are also a convenient option for holding bats temporarily. Only one bat should be in a given bag, and that bag should not be reused for a new bat. Disposable exam gloves should be worn over handling gloves and changed in between handling each bat. Disposable gloves should be one size larger than the handling gloves. Smooth leather gloves may be wiped down with a disinfectant (for example, Purell®, Lysol® disinfecting wipes or alcohol wipes) in between handling bats. If only using leather gloves, each handler should have several sets of gloves to interchange in between handling bats. This allows time to effectively kill the fungus and for the disinfectant to completely dry. After each night of netting, remove heavy soil deposits from surface of bags and gloves, soak in an appropriate disinfectant, then dry completely. For situations when gloves may hinder field work (for example, transmitter attachment) and bats come in contact with bare hands, apply hand sanitizer with alcohol (for example, Purell®) after handling each bat. Make sure it dries completely before handling the next bat.

### Harp Traps

- Use separate traps between states known to be affected by WNS and states currently unaffected. Realizing that some WNS affected states contain both affected and unaffected sites, under no circumstances should traps that have been used in an affected site be used in an unaffected site. Contact your state wildlife agency for updated information regarding WNS affected sites by visiting the following webpage: <http://www.fws.gov/offices/statelinks.html>
- In both affected and unaffected states, we require that traps be cleaned nightly after use to remove any dirt/debris from wires/lines and bags. Following cleaning, all surfaces should be sprayed with one of the disinfecting agents listed above. Swab the bag with disinfectant and allow to dry completely (preferably in the sun) prior to the next use. Do not use equipment in an unaffected site following use in an affected site.
- We recognize that when working at a maternity colony using harp traps where regular bat to bat contact occurs, that some of the required decontamination procedures may not be practical. Therefore, we require checking the catch bag more frequently in order to reduce the amount of time that bats are in contact with each other and the bag. To reduce cross-contamination, the catch bag may be lined with a sheet of plastic and replaced with new plastic periodically or wiped down with one of the disinfecting agents above. Disposable gloves should be worn over handling gloves and swapped out regularly throughout the night, or frequently disinfected using Lysol® disinfecting wipes or alcohol wipes.

### Wing Biopsies

- If collecting wing biopsies for any approved research studies on Federally threatened or endangered bats, use a new (unused) sterile punch for each bat. For other bats, punches may be reused, but only if they are still sharp enough to make clean punches. If there is evidence of fungal infection on any individual, use new punches. Be sure to completely sterilize recycled punches between bats by dipping the cutting end in alcohol. Pass the cutting end through a flame 3-4 times, and then allow the flaming punch to naturally extinguish, and cool completely. The cutting board must also be disinfected between processing individual bats using one of the agents detailed above. Disposable, stiff cardboard squares (1 per individual) can be used as an alternate support for biopsy.

### Vehicles

- Do not work on live bats in vehicles. Vehicles used to transport equipment may harbor spores. Do all processing on vehicle hood or on a table away from the vehicle. The tailgate is not preferred since it is likely near netting equipment. A drawstring garbage bag should be placed at each site outside the field vehicle each night so all contaminated bags, gloves, wipes, etc., are contained. Dead bats should be placed in a sealed plastic container and placed inside a second bag or container handled only with clean gloves. This outer packaging layer is considered clean and uncontaminated and safe to transport inside the vehicle (preferably contained within a clean cooler).