

## Appendix II. Fieldwork preparations

NO GEAR used in caves within a WNS confirmed or suspected area (i.e., state) may be used for subterranean research in those states where the disease has not been confirmed or suspected (USFWS 2016).

### 1. Packing decontamination supplies to and from study sites

*Options for portaging decontamination supplies:* There are two general approaches that may be undertaken for mobilizing decontamination equipment at a study site. (1) For study sites within 1 mile of vehicles/camp, workers may choose to portage multiple containers and required equipment itemized in Appendix I directly to the study site. Decontamination equipment and disinfectant containers used during decontamination procedures must be cleaned with isopropyl alcohol (70%) wipes (USFWS 2016) before these materials are integrated with other equipment and packed out. (2) Regarding single study sites requiring a many-mile hike to access a particular backcountry site, it may be easier for each person on the backcountry team to have a personal decontamination kit with all of the necessary items to follow the WNS Decontamination Protocol (USFWS 2016) in the field; they will also be responsible for packing their own personal supplies into and out of the remote study site. Personal decontamination kits should contain the following: 16 isopropyl alcohol (70%) wipes, eight all natural/biodegradable wipes, personal hand sanitizer, two pairs of nitrile gloves, two garbage bags, and two zip ties. Supplies must be multiplied appropriately if more than one site is to be visited in a given day. Two pairs of trauma shears are adequate for a six-person team and may be carried to and from the site by a designated person.

### 2. Personal equipment

Personal equipment should be assembled as follows: (1) One pair of disposable or ballistic nylon coveralls per person per day. For visiting multiple study sites in a given day, the number of coveralls will increase accordingly. (2) Cache of personal duct tape per person to be used to tape down wrist cuffs, secure boots/gaiters to coveralls, and repair disposable coveralls as necessary. (3) Various-sized disposable ziplock freezer bags (e.g., sandwich, quart, and gallon sizes). The number of bags per size depends upon the equipment required for a specific research task and the needs of each team member. We recommend double bagging all equipment.

### 3. Establishing staging areas at the study site

Three staging areas near the study site entrance should be established and designated as “clean,” “decontamination,” and “intermediate” zones. All zones should be at least 20 m (66 ft) apart, and clean and intermediate zones must be located upwind from the decontamination zone. (1) The **clean zone** is used to stage non-cave-related gear (e.g., backpacks, extra water bottles, satellite phone, and other equipment), and to change into clean coveralls, boots, and other equipment. (2) The **decontamination zone** is where chemical disinfectants, isopropyl alcohol and all-natural/biodegradable wipes, hand sanitizer, trauma

shears, garbage bags, zip ties, and related supplies are staged. It is also the location for disinfecting equipment, cleaning exposed parts of the body, stripping off and isolating coveralls, and changing into clean clothing. If logistics permit, a hand and body washing station may be established where personnel may clean themselves prior to returning to the clean zone. (3) The **intermediate zone** must be established in an area that team members do not have to walk through to reach the clean zone. This area is used to stage clean boots and a clean change of clothes (isolated in a ziplock bag for the hike back to vehicles/camp). This zone is also used for staging recently cleaned gear to be moved into the clean zone once decontamination procedures are completed. Refer to the following protocols for clarification on zones and their functions.

### 4. Establishing an area for full decontamination/ disinfecting of equipment prior to changing study sites

Designate a decontamination area at least 20 m (66 ft) downwind from vehicles and camp. All decontamination and containment supplies, and personal isolation bags (i.e., gear to be disinfected) should be placed within this area. Full decontamination of equipment (e.g., caving bags, PVC or hiking boots and gaiters, knee/elbow pads, gloves, and any other gear that requires submersion in a chemical mixture) between individual study sites should be determined at the discretion of the jurisdictional regulatory or resource management agency.

### 5. General recommendations and notes

- Proper disposal of camp refuse: Clearly label and segregate garbage bags designated for “contaminated” items from daily camp/project garbage.
- Proper storage of duct tape: Do not place inexpensive duct tape in direct sunlight during warm spring and summer months or store in hot areas (e.g., enclosed vehicles). Depending on the type of duct tape used, the glue adhesive may melt. Gorilla® duct tape works well when exposed to direct sunlight and heat.
- After exiting a study site, decontaminate equipment (helmets, water bottles, urine bottles, metal clipboards, cave survey equipment, and the exterior ziplock and dry bags containing gear) using a three-step procedure. (1) Physically remove dirt and mud from boots, coveralls, and caving and other equipment using nylon brushes. (2) Carefully clean surfaces with isopropyl alcohol (70%) wipes. (3) Remove chemical residue by wiping down all surfaces with all-natural/biodegradable wipes or a clean, damp bandana. This should be done prior to removing gloves.

- Team members should work together and watch each other to ensure appropriate decontamination protocols are applied between study sites. We recommend using the “buddy system” when possible. With team members watching one another, this will reduce the likelihood of overlooking gear, equipment, and clothing that require disinfecting. When working in caves characterized by narrow passages or sections requiring belly crawls, “buddies” are responsible for periodically inspecting each other’s coveralls for breaches and work together during decontamination to make sure all steps are being followed and decontamination proceeds correctly.
- If personnel are portaging equipment into and out of a remote area, quart- and gallon-sized ziplock bags may be used to store used coveralls, nitrile gloves, disinfecting wipes, and other gear. Garbage bags are required to store PVC backpacks and boots. These items should then be placed within a larger backpack for hiking to and from remote study sites. However, compartmentalizing smaller items and equipment in smaller resealable ziplock bags may make packing equipment into a backpack much easier.
- For large multiperson projects, individuals should label their personal isolation bag containing their cave bag, boots, and other equipment by writing their name on a strip of tape adhered to their bag.
- When personnel spend multiple days at the same study site, it may be easier to stage most of the personal and WNS disinfection equipment in the appropriate zones—provided that the site is secure and the risk of theft is low.
- When staging caving equipment at a study site overnight, properly secure all equipment to prevent entry of insects and rodents. Be certain to remove any food items from gear that will be left overnight.
- Staff with regulatory or resource management agencies may require cave/mine personnel to bathe upon completion of operations at each study site prior to returning to their vehicles/camp (e.g., P. Ormsbee, 2011, personal communication).
- Print all field forms on weather-/waterproof paper for easier decontamination upon return to the office.