Guidelines for Trash and Rubble Cleanup Projects

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Sometimes caves and sinkholes become trash dumps. Large rubble piles from trail building are often left in show caves. Other chapters discuss detailed aspects of removing artificial fill (page 367) and cleaning out sinkholes (page 381). While much of the restoration and rubble removal at these sites is intuitive and obvious, below are some guidelines to minimize surprises and ensure the work goes smoothly.

Trash Pits and Sinkholes
Trash is sometimes dumped in sinkholes or cave entrances. Working inside the cave may not be necessary, so access and removal is relatively simple. Following are some important items to consider for restoration work that involves trash removal.

Gloves and shots. Everyone should wear thick leather gloves and be current on their tetanus shots. While many underplay the threat of tetanus, by the time the symptoms appear it can be fatal. Check with your doctor for other immunizations you should consider.

Recycling. Decide in advance if it is feasible to recycle the glass, aluminum, and other materials removed from the cave or sinkhole. If so, prepare areas and containers for sorting and temporary storage, and be sure to line up a recycling facility that will accept the materials. If possible, sort the recyclables as they are dug out of the pile—otherwise assign enough people to sort them at the top.

Disposal. Arrange in advance how you will dispose of the materials. You may need to take them to a public landfill and pay a small fee. Contact the landfill first. Some only accept certain types of trash and have vehicle or load requirements. See if a public agency can be involved to waive the fee and perhaps provide a dump truck. If the trash volume is small, it could be divided between the cavers and set out with their weekly trash pickup.

Interview the owner. Find out what the owner knows about the age, content, and extent of the trash. It will prove important in planning the restoration project and for the considerations listed below.

How old is it? In many states, human-produced materials more than 50 years old are considered archaeological or historical artifacts (cultural artifacts). Their handling and disposal may be regulated. Contact your State Historical Preservation Office (SHPO) for advice if you suspect a dump could hold historical material. If possible, find an archaeologist to monitor the excavation for rare or unusual items worthy of preservation that most people wouldn't recognize. (See 50-year rule, page 341; also see SHPO page 116 and page 334.)
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Is it toxic? Use common sense. Avoid physical contact with potential hazardous materials and fumes. If you’re not sure, leave it alone, even if you must cancel the restoration project, and call a county or state inspector to assess and remove it. For recent dumps where containers of hazardous materials are more likely to be intact, use additional leak-proof containers for transport. Hazardous materials should not be disposed of with the nonhazardous trash—make disposal arrangements with the appropriate facilities. With most old trash dumps, bottles and cans have long ago leaked their chemicals into the groundwater. However, toxic substances in car batteries and other hazardous materials may still present hazards.

Rubble Piles
Many privately owned show caves are first developed on a shoe-string budget. Unfortunately, as trails are cut, the rubble is dumped in piles or down pits and out-of-the-way passages. Special considerations in rubble removal are covered in the following section. Three primary concerns are essential when removing trail rubble:

- Exercise caution to protect the cave from additional damage.
- Learn from the owner if electrical or other utility lines may be hidden in the rubble.
- Decide with the owner how to sort and what to do with whole or broken speleothems that may be found.

How to Remove Large Volumes of Materials
Regardless of whether it is trash or rubble, following are some guidelines for removing large volumes of materials.

Limit the number of diggers. Cavers love to dig, but this craving must be curbed. In projects where a lot of material needs to be removed, especially if the project is conducted in a cave or down a deep sinkhole or pit, many cavers will be needed to haul away the material produced by only a few diggers.

Buckets. For most projects, hauling debris in 20-liter (5-gallon) plastic buckets is the easiest method for transporting materials. The size of the bucket limits weight to a reasonable amount. Buckets are sturdy, hold large and small items, do not leak, and are convenient to stack, load, and transport. At least 30 buckets are needed for small projects and over 100 may be needed for large projects. At any given time, many of the buckets are in transit in or out of the cave or are waiting to be filled. Of course, plans should be made in advance for removing large or awkward items that will not fit in buckets.

Partly fill the buckets. Depending on the weight of items loaded, it may be important to fill buckets only half-way. Full buckets are often too heavy for most cavers to carry. The half-way fill also works if the material is likely to spill out, or if the weight or contents are more likely to break the buckets.

Don’t repack buckets. Once a bucket is filled, do not empty or repack it until it is ready to be dumped. Repacking results in extra effort, less efficient use of people, spillage throughout the cave, and more cleanup. Wheelbarrows have been used in some projects, but they can create messes in the cave. Also, time is lost loading and unloading wheelbarrows, and they are likely to damage the cave if the passages are narrow.

Pass, do not carry buckets. Carrying buckets is tiring, inefficient, and creates a lot of potential for injury to cavers and caves. The most efficient
way of moving buckets over irregular terrain, like stairways in a show cave or uneven ground in a sinkhole, is to pass them, in assembly-line fashion. Place cavers about 2 to 3 paces apart. This requires a few more people, but is easier on the people and the cave, results in faster removal of the buckets, and produces far less confusion than cavers running all over the place.

**Dollies.** Upright or truck dollies should be used in flat-floored passages. Half-filled buckets can be stacked 3 or 4 high and wheeled quickly out of the cave or to an area where people will pass them onward. If passages are narrow, a prearranged location should be established for the dollies to pass each other.

**Dump trucks.** All removed material should be dumped into a truck and carried off for proper disposal at a landfill. If only rubble and dirt are removed, a flat-bed trailer may suffice to carry the trail rubble to a field where it can be deposited and blended with the landscape.

**Heavy equipment.** Some excavations may be beyond what can be feasibly accomplished by human hands and buckets. Some types of work will require heavy equipment such as backhoes, skid loaders ("bobcats"), and excavators. People with specific skills and training in heavy equipment should operate it. For safety reasons—unless required for other specialized tasks—no one else should be allowed in the excavation area. Slopes (and sometimes even level surfaces) in and near sinkholes may be unstable under the weight of heavy equipment. Extreme caution is necessary. The equipment should not be fueled in the sinkhole unless there is no alternative—always take precautions to prevent spills of fuel, oil, or hydraulic fluid. To prevent damage to the natural sinkhole walls and floor, equipment operators must be careful not to dig too deeply in any single movement. Some fill can be left and later removed more carefully by hand.