

CAVE RESTORATION CRITERIA

Broken stalagmites and columns can often be glued into their original position, assuming that all pieces of the formation are present. Currently, two-part epoxies hold the longest. However, adhesives will not hold over the long term (years) and if a formation is inactive and not growing it will eventually separate again. It is hoped, that active formations will permanently repair themselves, through the deposition of new calcite.

On inactive formations, mud, soil and body oils may be removed using water and soft-bristle brushes. When such cleaning is done, it is important to start at the top of an affected area, and work down removing the sediment as the work proceeds. With the volume of water used, it is often important to trap and soak up the water and dirt to insure that it does not contaminate other unsoiled areas of the cave.

On active formations mud may be trapped by the deposition of calcite. To remove this dirt, acid must be used to dissolve the deposited calcite. In previous restoration efforts, 5% muriatic (hydrochloric) acid was used with success. In areas important to wildlife as habitat, less toxic sulfuric acid may be used. The use of acids in Park caves will be limited to areas where other cleaning methods have proven to be ineffective.

Graffiti exists in three forms in Park caves. Carbide lamp soot may be removed using a wet brush with fine bristles. Scratches can be covered using small amounts of moist soil rubbed across the surface of the rock, wall or floor. Sediment used for this will be collected as close to the site of the graffiti as possible. Paint, which is rare in Park caves, is difficult to remove. Efforts, by cave restorers across the country, have usually involved wire brushes, vinegar, and patience.

Crystal Sequoia Cave is the only commercialized cave in the Park, and as such is the only cave with blast rubble and debris present in the cave's passages. The total weight of this debris may exceed 100 tons. Removal of this material is a long-term project. In a few areas, delicate formations are present near the rubble and must be protected, but more significantly is the safety of those moving the material. Individual rocks may weigh several hundred pounds, and loads to be moved out of the cave often weigh more than 50 pounds. Such weight can crush small bones and strain muscles and connective tissues. Plans and project statements involving this restoration work will address this safety issue.

The removal of litter and trash from cave environments is often tedious work involving the collection of spent carbide, small pieces of trash and wire, and other items. Much of this work can be accomplished gradually by cavers as they visit caves with this problem.

Microclimate changes may be the most significant alteration that can be made to a cave environment. Such changes are also the least understood and most often overlooked of the problems caused by human interaction with caves. Tom Aley, of the Ozark Underground Laboratory, has developed a set of ideas for the prevention or restoration of natural cave microclimates. a) Natural airflow patterns in caves must be maintained. At dug or enlarged entrances or passages airflow constriction doors must be put in place. New, artificially-created or enlarged entrances should be avoided. b) Visitors to a cave should be clean. Lint, hair, dust, and mud will significantly degrade caves. Cavers should not wear sweatshirts, flannel shirt, sweaters or pile jackets as outer-wear in caves. In commercial caves, or heavily used wild caves a routine cleaning is often needed to remove lint and similar contaminants. c) Any permanent trails constructed in caves should be made of concrete.

