Archaeology in Cave Conservation and Restoration

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Archaeology in cave conservation and restoration shares many of the same problems and analytical procedures found in other chapters of this book. Rock art and historic writing (page 99) are types of archaeological remains. The processes that deposit and alter paleontological remains (page 83) are the same as those affecting archaeological remains. Chapters on those subjects should be considered prerequisite to this chapter, which is limited to comments regarding conservation and restoration as it applies to archaeology, and includes a discussion of the variety of remains found in caves.

When Contemplating a Restoration Project

When considering a conservation project there is no substitute for researching the history of the cave in question before work begins. That history includes official records—deeds, titles, written histories, newspapers, and past research projects—as well as oral accounts of the cave gleaned from landowners, local residents, cavers, and others. Of course, one has to evaluate the merits of both the official and unofficial records of any site, but careful historical research will enhance understanding of what might be found.

Experts should be consulted whenever possible regarding known or expected remains found in a cave. I have experienced a few cave conservation situations where an attitude prevailed that protecting archaeological remains might stand in the way of some “greater” good for the cave. Perhaps this is due to rivalry among disciplines (which in turn is probably due to the competition for limited funding dollars in the sciences) or simple mutual misunderstanding of goals. Involving archaeologists (and all specialists for that matter) early in the planning process can help avoid conflicts among conservators and archaeologists.

All cave conservation and restoration projects should institute a system to inventory and monitor the environmental conditions and the state of archaeological remains in the cave prior to and following any project. One must know the extent of archaeological remains or resources before initiating any action, and then follow up with monitoring of those remains or resources over extended periods. The type of inventory or monitoring, of course, will have to be tailored to the types of remains potentially impacted and the alterations that are planned. (See inventory, page 19; also see photomonitoring, page 207.)

Restoration: An Event in the Archaeological Timeline

Humans are, of course, one of many animals that enter and use caves. Each trip into a cave has an impact, and leaves a record of that trip, no matter how subtle. It is that record that archaeologists study, especially as it recedes further into time. By piecing together the surviving evidence of that
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record, archaeologists construct the history of cave use to understand human fascination with caves, how caves affect human cultures, and how humans affect caves. Restoration, whether for aesthetic or ecological purposes, has an impact on the cave environment.

For an archaeologist, the act of restoration is but one in a long line of human events within a particular cave. Each new act has the potential to alter or obliterate evidence of past activities. Combine human activity with other processes in caves—structural breakdown, water movement, other animal activity, and organic decay—and the archaeological task of constructing a timeline of past events can be daunting.

**Preserve Remains in Context**
Archaeologists’ particular analytical specialty is to study and document the remains or evidence of past human activity in its context. In other words, to the archaeologist, context of a find is as important as the particular artifact. That is why archaeologists go to elaborate lengths to document the context of the artifacts they dig up or collect before that context is destroyed.

By context, archaeologists mean the place where an artifact is found, and what that place tells us about when, where, how, and why an artifact was used. Recording the context of artifacts has many scales. An archaeologist may say that this artifact was found in a cave, or that this artifact was found in a particular cave, or that this artifact was found in this particular cave at this particular spot, or that this artifact was found in this particular cave at this particular spot associated with five other particular artifacts, and so on.

The types of questions asked about archaeological remains determine the level and detail of contextual information that is recorded. In the final product, archaeologists may not use all the data that they collect in their analysis. But once the context is destroyed (that is, the artifact is removed and its matrix destroyed), one cannot go back and collect additional data regarding its context. Hence, archaeologists are taught to err on the side of recording more data rather than less.

The foremost goal of archaeology is to preserve the remains of past human activity in their original context until such time comes that a thorough and rigorous research design can be created that will incorporate the study of those remains into larger research questions. Insofar as possible, archaeological excavation is designed to have minimal impact, and to leave a portion of the site for future study.

However, current human activity continues to degrade previous archaeological evidence while creating new remains that may someday also be the subject of archaeological study. Consequently, archaeologists must continuously make decisions about what is significant to preserve and study. Such decisions apply to remains found aboveground or within caves.

**Special Considerations in Caves**

Caves require special considerations from archaeologists due to the subtle and fragile remains that are preserved underground.

Always leave artifacts in place and resist handling them. Do not collect artifacts (unless under the supervision of a permitted archaeologist). Photograph the remains if possible and accurately record their locations. There are exceptions to this rule—for example, if the remains are in imminent threat of being destroyed by natural processes or human activity. If possible, involve an archaeologist in such removal. Where this is not possible, take detailed notes of the location and context. Remove the items to a safe location only if there is imminent threat of destruction.

In many states, the removal of artifacts or paleontological remains from caves is illegal without a permit from the state and permission of the
landowner. Make every effort to treat archaeological remains like all objects in caves—geological or biological—leave them as you find them.

**Implications of Preservation, Conservation, and Restoration**

Studies of the archaeological context of remains depends upon the geological and hydrological context in which those human artifacts and activities were introduced and how that context may have changed or may have been altered over time.

**Preservation**

Preservation implies that the archaeological remains are stable in their current environment—but stability depends on the geological context of the cave. Dry, upper-level passages offer more stability than wet sinks or stream passages. An artifact exposed in the cut bank of a stream passage could be destroyed or moved by the next flood episode.

The talus cone at the bottom of an entrance pit is a dynamic environment in which both archaeological and paleontological remains are often deposited together. Investigating the archaeological context of remains in such an environment incorporates the study of geological as well as archaeological processes.

**Conservation**

Conservation implies that policies should be implemented and procedures followed to minimize future impacts and to protect resources where they are found. This means reducing traffic, restricting access, confining pathways to designated trails, and generally caving softly. It is impossible to eliminate all impacts from human presence in a cave, but by being cognizant of the resources that are potentially present we can significantly reduce damage.

It became necessary, for example, to preserve the famous Paleolithic cave paintings in Lascaux, France, by closing the cave to the public and building a full size replica for tourists. Only a few individuals are granted access to the real Lascaux.

**Restoration**

Restoration implies that something can be returned to a former state. In reality, however, we are creating a new state that, based on our best information, approximates some state in the past. Envisioning that former state is the difficult part. It is also impossible to always anticipate all the consequences of any restoration act. Preserving an archaeological site in a cave and restoring the natural ecological processes to that cave may not always be compatible. The resource manager then must decide which is more important.

For example, reconfiguring the natural entrance to Mammoth Cave, Kentucky, with a bat-and-animal-friendly gate allowed a greater amount of airflow into the historic section of the cave. This changed the condensation zone, altered the amount of water dripping from the ceiling, and accelerated the deterioration of significant 19th century saltpeter remains. In an attempt to restore “natural” ecological conditions, the cave was subject to greater airflow than probably ever existed in the recent geological past. (Placing Plexiglas® over part of the gate to reduce the volume has since reduced airflow.)

Archaeological restoration usually refers to the study of structural remains that are excavated and analyzed in order to construct a replica of a structure. Until fairly recently, archaeological restoration was quite popular.
but it has largely fallen out of favor. It is much more common in public archaeological sites to uncover archaeological remains and interpret them in place, rather than attempt full-scale reconstructions.

**Types of Archaeological Remains Found in Caves**

Where caves are significant features of the landscape, humans were likely to have entered, explored, and exploited them in prehistoric as well as historic times. The types of archaeological remains potentially found in caves varies by region and period of use. Consult specialists for a particular region to obtain the best information for any given cave site (for example, Crothers and Watson 1993).

**Mining Niter Dirt**

In the eastern U.S., one of the most common historic uses of caves was mining of niter dirt (which was converted to potassium nitrate or saltpeter), especially during the Revolutionary War, the War of 1812, and the U.S. Civil War. These remains are quite conspicuous in Mammoth Cave, Kentucky; Big Bone Cave, Tennessee; and Organ Cave, West Virginia.

Thousands of smaller caves, however, were mined for nitrates, and evidence may be limited to mounds of niter dirt where the remains of wooden equipment have rotted away and a few names may be scratched on the cave walls.

**Prehistoric Uses of Caves**

Evidence for prehistoric use of caves is generally much more subtle than evidence for historical use. For example, the earliest known record of cave exploration in eastern North America is a remote passage in a Tennessee cave with 274 complete foot impressions in the soft mud floor (Willey and others 2004). Associated with these footprints is a sparse scatter of torch charcoal that has been radiocarbon dated to between 5,600 and 4,870 BP (before present, calibrated to calendar years).

These footprints are still preserved only because the cavers who first entered this passage were keenly observant and steps were taken to limit caving activity in the passage. Even with these precautions, a few of the prints were obliterated by later cavers who ignored the warning signs and flagging tape, and blundered through the footprint passage.

Torch charcoal and charcoal marks from striking or stoking a burning bundle of torch material against the walls and ceilings of a cave (dry river cane, weed stalks, and small wooden sticks were common torch fuels) are telltale signs of prehistoric exploration or activity. These remains are not always obvious to the untrained eye, and are easily obliterated by modern traffic, graffiti, or attempts to remove overlying graffiti.

**Clay and Stone Mining**

A common prehistoric use of caves was mining clay and stone for tool making. For example, chert (sometimes referred to as flint) is commonly found in caves and was a highly desirable tool stone. A number of caves with evidence of chert mining have been found, but one of the more spectacular is in Tennessee (Franklin 1999).

Wyandotte Cave, Indiana, contains well-documented evidence for the mining of aragonite from a large column, which was made into a number of fancy artifact types (Munson and Munson 1990; Tankersley and others 1990).

Gypsum, mirabilite, and probably epsomite were all mined from Mammoth and Salts Caves, Kentucky (Watson 1969, 1997), and gypsum was mined from Big Bone Cave, Tennessee (Crothers 1987). Evidence for
mineral mining and stone quarrying—dug sediment and broken, scraped, or crushed mineral faces found on the walls and ceilings—may not be obvious to the untrained eye.

Prehistoric pictographs, petroglyphs, and "mud" glyphs have also been documented in a number of caves. (See rock art and historic writing for descriptions of these remains, page 100.) Rock art may be found in association with other activities (for example, chert and mineral mining), but it also appears to have been the primary activity in some caves. Mud Glyph Cave, Tennessee, is one of the more celebrated caves in the eastern U.S. where drawing was the primary prehistoric activity (Faulkner 1986).

Burial Caves
Another prehistoric use of caves was inhumation of the dead. Apparently, this practice was widespread in North America, but has been studied only in a few locations (Crothers and others 2002). Talus cones at the bottom of vertical shafts with openings to the surface have been documented as human burial repositories. In these cases, human and nonhuman bone may be commingled in the deposits, because pit caves often trap animals as well. (See paleontology, pages 83 and 86.)

All states have laws concerning the discovery of human remains that usually prohibit the removal of the remains until they are assessed by local law enforcement officers and the coroner’s office. Burials may not be removed without proper permits in most states. The laws and procedures vary by state.

Summary
Archaeological remains are irreplaceable resources that inform us on the historic and prehistoric uses of caves. The remains are often subtle and not obvious to many cavers. If a cave is known to have a rich history or prehistory of use, then an archaeologist (preferably one with cave experience) should be consulted very early in any project to evaluate potential impacts and suggest ways to minimize those impacts.

Even if a cave is not known to have archaeological remains, but is suspected of having cultural value, it is advisable to have an archaeologist look for possible evidence in conjunction with restoration efforts. Once archaeological remains are identified and deemed significant (that is, worthy of preserving in their context), a plan to monitor long-term effects to those remains is advisable.

Rarely can we anticipate all the consequences of an action even under the best of intentions. Caves can be one of the most amazing receptacles for preserving archaeological remains, but they are also one of the most susceptible environments to unintended impacts.

Cited References
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