

Adapting to Darkness

Many cave creatures living in darkness are eyeless with no coloring pigments. While sightless, most have sensory systems that mentally picture their environments. Shown are the eyeless cave fish (above) and the cave crayfish (right).

PHOTOGRAPHS OF BIODIVERSITY AND CAVE CREATURES BY CHRIS CLARK

Above and Below: One Ecosystem Linked by Water

Beneath the sandstone and shale ridges of Mammoth Cave National Park lies the most extensive cave system on Earth. After 4,000 years of intermittent exploration, the full extent of this water-formed labyrinth remains unknown. With over 365 miles of surveyed passageways, Mammoth Cave is over twice as long as any known cave. How long might it be? Geologists think there could be 600 miles of yet undiscovered passageways.

This vast cave system holds one of the world's most diverse cave ecosystems. About 130 forms of life can be found in Mammoth Cave. Most are quite small. Some use the cave only as a haven, while others are such specialized cave dwellers that they can live nowhere else. All depend on energy from the surface. Life in the cave is not separate from the rest of the park's natural communities. It is an extension of the larger biological whole, whose diversity and abundance are preserved in this place. To tour the cave and not explore the park's surface trails and waterways is to gain but half of the total picture here.

The rugged, forested hill country of Mammoth Cave National Park is sanctuary to an array of wildlife. Deer and wild turkey frequently feed near roadsides, and 60 miles of park hiking trails provide access to the diverse life of the eastern hardwood forest. The Green River further enhances the variety of scenery and habitat. Running 27 miles through the park, the Green River is one of North America's most biologically diverse rivers. This abundance has drawn humans to this region for nearly 10,000 years.

Prehistoric peoples explored 10 or more miles of Mammoth Cave 4,000 years ago. Archeological evidence shows that these early cavemen collected crystals and other salts in the cave. Cave exploration ceased 2,000 years ago, not to resume until the cave was rediscovered in 1798.

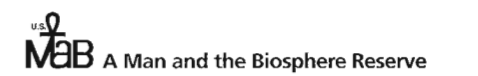
Mammoth Cave played an important role at the very start of American tourism. As an attraction, the cave predates all national parks. Publicized in the War of 1812, the "mammoth" cave of Kentucky became an

attraction by 1816. With the early scenic national parks, Mammoth Cave helped define our national identity in the 1800s, when a young United States sought status among world powers. Despite industrial and military might, we lacked the ancient places and cultural antiquities that Europe offered. Wonders of nature were our great treasures. Big was beautiful: Mammoth Cave, Grand Canyon, and Giant Sequoia. These superlatives still live up to what Ralph Waldo Emerson once called "the brag" about them.

A World Heritage Site and Biosphere Reserve
Mammoth Cave was authorized as a national park in 1926 and fully established in 1941. Only 40 miles of passageway had been mapped then. As surveying techniques improved, great strides were made in describing and understanding the cave system's overwhelming extent. Several park caves were shown to be connected, and we now know the cave system extends well beyond the national park boundary. The park was named a World Heritage Site in 1981 and became the core

area of an International Biosphere Reserve in 1990. With its 53,000 surface acres and underlying cave ecosystem, Mammoth Cave National Park is an international treasure.

But national park status and international recognition do not guarantee the continued protection and integrity of the natural systems of Mammoth Cave National Park. The park is not a self-contained system. Research shows that the cave and resident ecosystems are parts of regional groundwater basins in the much larger Green River basin. Groundwater inputs originate far beyond the park boundary, and under high-water conditions the water quality is seriously degraded. Air quality studies detect ozone at concentrations that can damage vegetation. To preserve these world class cave, forest, and riverine ecosystems for future generations, we must work together to protect the region's air and watersheds.



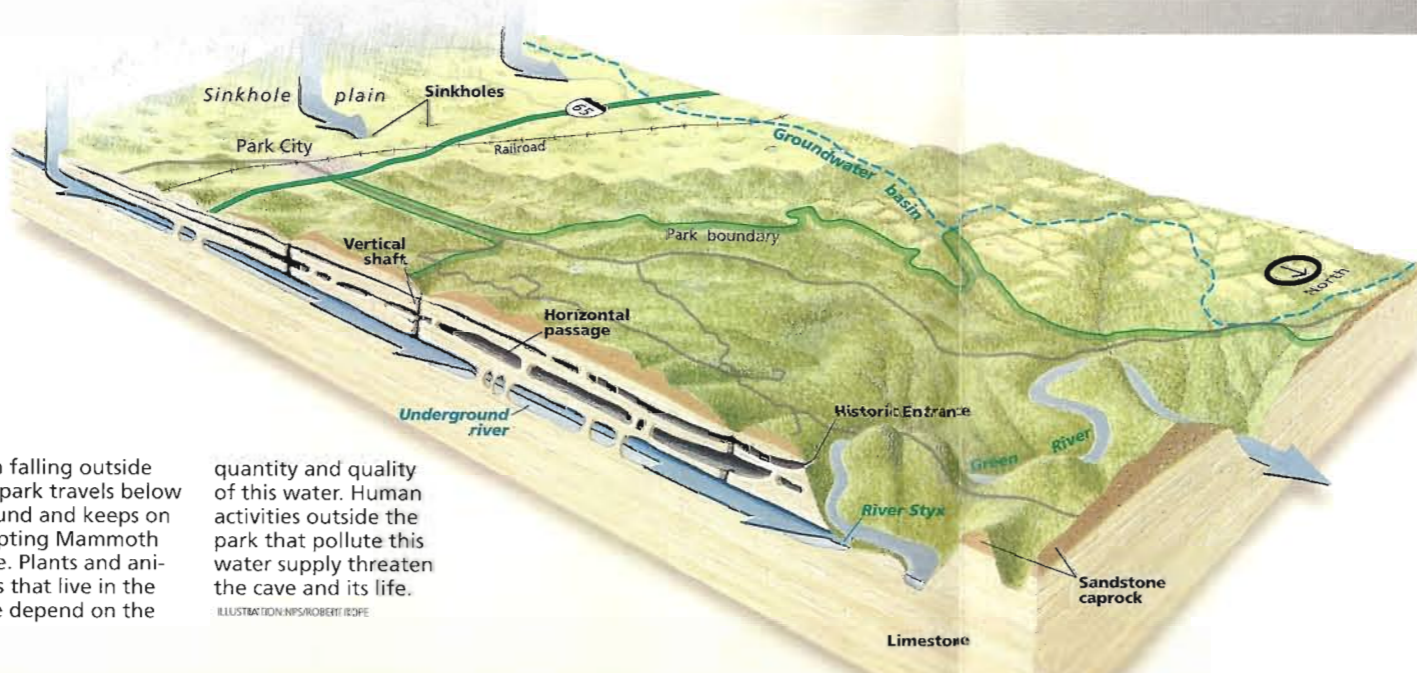
Clean Water Needed

Limestone underlies the Mammoth Cave region. As rainwater infiltrates the soil, it picks up small amounts of carbon dioxide gas. Carbon dioxide reacts with the water to form a weak carbonic acid, making the groundwater mildly acidic. Like most major caves, Mammoth Cave was formed by the slow dissolution of limestone by groundwater. Animals living in the cave depend on the quantity and quality of this water.

Eroded limestone landscapes—called karst topography—are typified by the Mammoth Cave area. Sediments of a shallow sea covering this region 350 million years ago formed the limestone, as highly soluble layers over a 70-million-year period.

Rain falling outside the park travels below ground and keeps on sculpting Mammoth Cave. Plants and animals that live in the cave depend on the

quantity and quality of this water. Human activities outside the park that pollute this water supply threaten the cave and its life.



Caves Still Forming

Over time, as groundwater dissolves the limestone, it forms underground streams. These streams converge, as surface streams do, and create Mammoth Cave's underground rivers. Over Mammoth Cave's geologic history the Green River, the region's master stream, has carved deeply and entrenched itself in its valley. Cave streams responded by creating younger, lower routes and abandoning older and higher channels, creating a network of cave passages. At depths of up to 450 feet below the surface, cave streams are still forming passages today.

As the cave formed, many aquatic species from surface waters slowly adapted to cave habitats. Several evolved as the specialized animals now found in cave streams. These cave biological communities are parts of a nutrient-poor ecosystem that needs excellent water quality to survive.

The geological character that creates Mammoth Cave also threatens the cave's ecology today. Rainwater-turned-groundwater flows readily through the cave's aquatic habitats, but so do pollutants like human waste, agricultural runoff, hazardous spills on roadways, and oil and gas drilling wastes. These are easily washed into cave streams.

Because most of the cave's groundwater originates beyond the park, the Biosphere Reserve boundary encompasses Mammoth Cave's watershed. Today the park and its neighbors work together through the Biosphere Reserve Program to help better protect the cave while promoting environmentally sustainable agricultural, industrial, and business practices outside the park.

Human Use of the Cave and Its Resources



Stephen Bishop was a self-educated enslaved person who became a legendary cave guide and explorer. He began guiding visitors at age 17 in 1838. He was the first person to explore many miles of the vast cave.

Amateur caver Floyd Collins drew national media attention in 1925, pinned for days by a boulder in Sand Cave. He died before rescuers could free him. The publicity played a role in Mammoth Cave being made a national park in 1926.

Over 10,000 years ago Paleo-Indians hunted animals in the Green River valley near Mammoth Cave. From 4,000 to 2,000 years ago, Late Archaic and Early Woodland Indians explored and mined minerals from Mammoth and other caves. Artifacts these earliest explorers left—including cane reed torches they used to light their way into distant parts of the cave—are well-preserved in drier passageways.

European-American settlers came to the Green River valley in the late 1790s. Like native people before them, the newcomers found uses for Mammoth Cave. The cave served as a mine for saltpeter, key to the manufacture of gunpowder. Before the War of 1812 enslaved persons mined large quantities of this mineral.

By war's end Mammoth Cave's notoriety had grown. Around 1816 people started to visit the cave. In 1838 Stephen Bishop and Mat and Nick Bransford, enslaved persons owned and leased by the cave's owners, became renowned guides.

Bishop discovered many miles of cave. He was first to cross the previously impassable Bottomless Pit and the first to see the cave stream's natural residents, called eyeless cavefish. The Bransfords and their descendants were guides at Mammoth Cave for over 100 years.

Touring the Cave

Plan Ahead Cave tours are given every day except December 25, but tour schedules vary from season to season. Fees are charged. Certain cave tours may require special clothing or equipment. Visitor center hours also vary through the year. Contact the park for cave tour descriptions, schedules, and information on surface activities and special events.

Mammoth Cave National Park
Mammoth Cave, KY 42259-0007
270-758-2180
www.nps.gov/mac

Getting to the Park If you travel south from Louisville, Ky., the most direct route is I-65 south to exit 53 at Cave City. Another 15 minutes of driving takes you to the park visitor center.

If you travel north from Nashville, Tenn., the most direct route is I-65 north to exit 48 at Park City, Ky. Another 10 minutes of driving takes you to the park visitor center.

Time Zones Mammoth Cave National Park and Nashville, Tenn., are in the Central Time Zone, one hour behind Louisville (Eastern Time Zone).



Flowstone

Reserve a Tour Before Your Visit Cave tours can and do sell out. Summer days, holidays, and all weekends are busy. Make advance reservations so you can plan ahead to enjoy the tour of your choice.

For information on making advance reservations, call 270-758-2180 or visit www.nps.gov/mac. You can make reservations in person at the park visitor center, but when you get there the tour you want that day may be full. It is better to make reservations ahead of time.

Children aged 12 or younger are eligible for discounted tickets but must be accompanied by an adult unless noted. Children under six years old may not take part in some cave tours.

Pets Mammoth Cave Hotel has a pet kennel with fees by the hour or day. Only service animals are permitted in the cave. Pets left in parked vehicles may be removed by park personnel because vehicle temperatures may threaten the animals' lives. Pets must be on a leash at all times.

Traveling with Children If your children are very young, consider taking a shorter orientation tour. Children under 16 must be accompanied by an adult. Strollers are not allowed in the cave. Some cave passages are too narrow or low for backpack carriers, and small heads can be injured. Some tours have restroom facilities; others do not. Ask for details.

What Can I Take into the Cave? Photography is permitted, but tripods are not. Flashlights are welcome on all tours except lantern tours but may not be used during tour stops. Respect other people. Don't shine light in their eyes in the dimly lit cave. Also prohibited in the cave are: all weapons (firearms, knives, sharp instruments, pepper spray, mace), backpacks, luggage, purses, strollers, backpack child carriers, and camera bags.

Clothing and Footgear Wear sturdy shoes or hiking boots with good soles. No sandals or bare feet. A light jacket is recommended; cave temper-

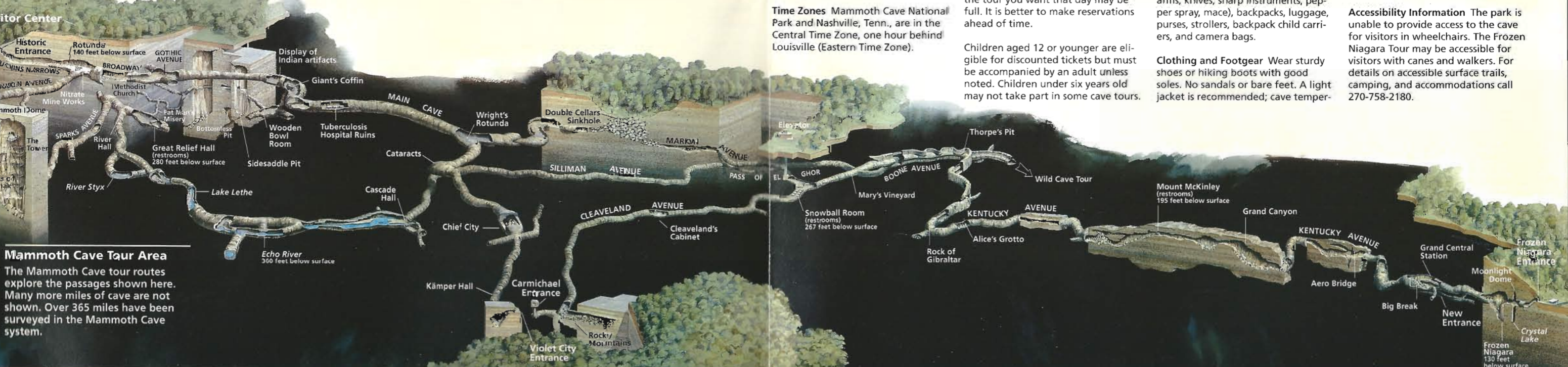


Cavers

atures range from freezing to around 60°F. In winter, dress warmly.

Cave Tour Safety Most cave tours are strenuous and require stooping and walking over uneven trails. All tours require walking up and down steps. You must stay with your tour and on cave trails. Smoking is prohibited in the cave. Children must stay with parents, and everyone must stay on defined tour trails. Do not write on cave walls or collect cave rocks as souvenirs. Use handrails where available. Walk at a comfortable, steady pace. No running, please.

Accessibility Information The park is unable to provide access to the cave for visitors in wheelchairs. The Frozen Niagara Tour may be accessible for visitors with canes and walkers. For details on accessible surface trails, camping, and accommodations call 270-758-2180.



Mammoth Cave Tour Area
The Mammoth Cave tour routes explore the passages shown here. Many more miles of cave are not shown. Over 365 miles have been surveyed in the Mammoth Cave system.

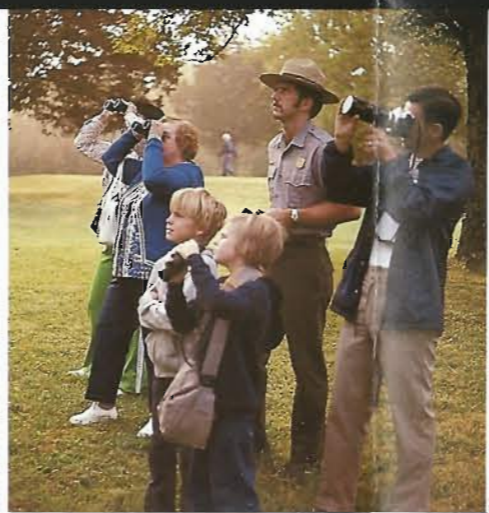
Exploring Mammoth Cave



Sinkhole plain outside the park



Turkey



Birdwalk



Mammoth Cave Baptist Church



Green River

Erosional forces that formed the cave system shaped the entire region's landscape. Rivers, bluffs, sinkholes, cave entrances, and ridge tops all provide varied habitats with many distinct plant and animal communities. Relatively small, specialized habitats, like wetlands and old-growth forest, contribute disproportionately to the park's and Kentucky's biological diversity. Largely wooded, the park features mostly second-growth forest, but small areas of relatively undisturbed old-growth forest—rare in Kentucky—are also found. Beech trees dominate ravine flats, joined by yellow poplar and sugar maple on lower and middle slopes. White and black oaks and three species of hickory define upper slope forests.

Park forests are home to a wide variety of wildlife. Eastern white-tailed deer frequently browse roadsides, and flocks of wild turkey are commonly seen. Walking park trails may be rewarded with sights and sounds familiar to eastern hardwood forests. Squirrels, chipmunks, and raccoons are the most commonly seen mammals.

As the region's base-level stream, the Green River is central to the formation and health of the Mammoth Cave system. One of North America's most biologically diverse rivers, the Green harbors 82 fish species. Gravel bars of the upper Green are critical habitat for freshwater mussels, one of the nation's most endangered animal groups. Over 50 species are found in the park, seven

are listed as endangered. Another four are being considered for listing. The banks of the Green River and its largest park tributary, the Nolin River, abound in wildlife. Deer, wood ducks, turtles, kingfishers, and great blue herons are often seen.

Mammoth Cave National Park has many smaller, more specialized habitats having conditions required for various plant and animal communities. Small ponds and stream banks are wetland refuges for at least one rare sedge, several rushes, bladderwort, arrowroot, and the lance-leaved violet. The sinkholes and cave entrances are moist microclimates for plant species unlike those in drier uplands. Native grassland species, once characterizing

much of western and central Kentucky, grow in isolated patches and along park roadsides now. Sandstone gorges with hemlock, yellow birch, umbrella magnolia, and holly grow in the park's northern part.

Don't think of Mammoth Cave National Park in two parts: the cave system's below-ground world, and the above-ground realm of forest and light. These are two parts of a greater whole, unified by forces of nature that continue to form the cave, shape the landscape, and nurture their biological communities.

General Information

Mammoth Cave is about 85 miles from both Louisville, Ky., and Nashville, Tenn. From I-65, take exit 48 at Park City or exit 53 at Cave City. The park is in the Central Time Zone; traveling from the north, you gain an hour. Airports and car rentals are in Nashville, Louisville, and Bowling Green.

No park entrance fee is charged, but tour fees are charged for persons six years and older. Fees are charged for camping. Consult the free park publications for lists of visitor center hours and ranger-led and evening programs, a map of trails, and the facilities and activities accessible for persons with disabilities.

Camping
Three park campgrounds are available, with a 14-day camping limit. All the campgrounds have toilets, grills, tables, and water but no hook ups. Houchins Ferry Campground is first-come, first-served. Reservations are recommended for Mammoth Cave Campground and are required for Maple Springs Group Campground, which accommodates large, organized groups and campers with horses. Call 270-758-2180 for information on making advance reservations, or



Early Spiderwort

visit www.nps.gov/macac. Backcountry camping is allowed at 13 designated sites, on riverbanks, and on islands by permit only. Free permits must be obtained at the visitor center.

Scenic Drives
Flint Ridge, Green River Ferry, Joppa Ridge, Houchins Ferry, and Ugly Creek roads let you tour part of the park by private motor vehicle. The latter two roads are not passable by trailers or motor homes. Ask for more information at the visitor center.

Ranger-led Programs
Rangers give orientation talks in the visitor center. Above-ground activities, offered in season, start from specified locations. At Mammoth Cave Campground amphitheater rangers give evening programs in season. There is parking nearby for non-campers.

Junior Ranger Program
Children ages six to 13 can become Junior Rangers by completing projects and taking part in ranger-led programs. Get your Junior Ranger booklet at the visitor center. School groups may qualify for the park's environmental education program. Call the program coordinator at 270-758-2354.

Trails
The park has three wheelchair-accessible trails: Heritage and Sand Cave trails and Sloans Crossing Pond Walk. North of Green River lie 55 miles of trails. There are 23 miles of trails south of the river. Note: Dogs must be leashed at all times.

Bicycling
A nine-mile gravel bicycle trail leads from Mammoth Cave Hotel to the park boundary near Park City, Ky. Bicycles are prohibited around the visitor center and on hiking trails south of the Green River. Mountain biking is allowed on some trails north of the Green River. Ask at the visitor center for park maps and mountain biking information.

Boating and Canoeing
Nearly 30 miles of the Green and Nolin rivers offer canoeing and boating in the park past dramatic

bluffs. You can rent canoes from commercial outfitters outside the park.

Fishing
Muskie, bass, white perch, and catfish await anglers in the Green and Nolin rivers. No license is required in the park, but all other Kentucky fishing regulations apply. Ask for a list of regulations at the visitor center.

Horse Use
Most trails north of the Green River are open for horseback riding. You can rent horses from a concessioner outside the park. For information on horse use call 270-758-2180.

For a Safe Visit
Check park publications for park regulations, restrictions, and cave safety precautions. • Pets are restricted; a kennel is available at Mammoth Cave Hotel. • Be alert for ticks and chiggers and avoid the park's two poisonous snakes, the timber rattlesnake and northern copperhead. • All animals and plants in the park are protected by federal law. Do not disturb or kill them. Do not feed wildlife. If you have questions about any activity, check at the visitor center or ask a ranger.

Lodging and Services
Mammoth Cave Hotel offers hotel rooms, a restaurant, and gas station open all year. Rustic cottages, a camp store, hot showers, and a coin laundry are available spring to fall. For information or reservations contact ForeverNPC Resorts, LLC, Mammoth Cave, KY 42259-0007; 270-758-2225.

Public restrooms, showers, and a coin laundry are near the gas station, store, and post office. (Service Center on map at right.)

For information about privately owned caves, accommodations, and services outside the park call the Cave City Convention Center, 1-800-346-8908.

Mammoth Cave is one of over 390 parks in the National Park System. To learn more about national parks and National Park Service programs in America's communities, please visit www.nps.gov.

More Information
Mammoth Cave National Park
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Mammoth Cave, KY 42259-0007
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