LIMESTONE CANYON

McCormick's Creek State Park, located in Owen County, tells the geologic story of south-central Indiana's changing landscape. The limestone canyon walls were deposited 359–318 million years ago and covered by Pleistocene age continental ice masses. The ice slowly melted, leaving behind new drainage patterns that still flow today.

State House Quarry

The Old State House Quarry provided stone for the construction of the State Capitol in Indianapolis. Large blocks of Salem Limestone were quarried and transported to the nearby New Albany & Salem Railroad for distribution across the United States.

Mesic Forest

Diverse forest trees, ferns, and native wildflowers line the trails of McCormick's Cove Nature Preserve. This moist hardwood preserve is one of the best mesic forests in the country.

Photos provided by the Ind. Dept. of Natural Resources and the Indiana Geological Survey.

INDIANA GEOLOGICAL SURVEY
INDIANA UNIVERSITY

Indiana's First State Park

McCormick's Creek State Park is within the Mitchell Plateau, a physiographic region of Indiana characterized by gently rolling hills, deeply entrenched valleys, and limestone-solution features such as sinkholes, caves, and other examples of karst development. The limestone bedrock near the surface was easily weathered by stream action from the Pleistocene Ice Age.

THE GEOLOGIC STORY

of McCormick's Creek State Park

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Bedrock of the Canyon Walls

The focal point of McCormick's Creek State Park is the canyon. A mile long and more than 100 feet deep, the limestone outcrops of this steep-walled canyon reveal a long geologic history. From 359 to 318 million years ago, Indiana was covered by a broad, shallow sea teeming with living organisms. Limy mud and sand were deposited layer by layer in clear waters gently agitated by waves and tidal currents. Many of the organisms living in this shallow sea grew protective shells made of calcium carbonate, which remained long after the creatures died. Over long periods of geologic time, these sediments and skeletons accumulated and hardened into the limestone we see in the park today. Geologists have divided these rocks into three formations: the Salem, St. Louis, and Ste. Genevieve Limestones.

The lowest, and therefore oldest, of these formations is the Salem Limestone. The Salem can be seen in the old quarry near the mouth of the canyon and in the lower canyon walls. This limestone is in thick beds, uniformly sandy in texture, and has weathered into huge rounded blocks. Many sand-sized microfossils are present, along with rounded fossil fragments and a few larger fossils. Many of the tiny pinhead-sized shells are the fossil remains of *Endothyra baileyi*, a single-celled animal that lived in abundance in the ancient sea. Because of its uniformity and massive beds, the Salem Limestone is a world-class building stone. Stone used in the construction of the Indiana State Capitol was quarried in the park between 1878–80. The Old State House Quarry can be seen near the juncture of trails 2 and 7, just south of McCormick's Creek.

The next formation upward is the St. Louis Limestone. This formation is about 120 feet thick and makes up most of the canyon walls. It is more fine grained and thin bedded than the Salem, and includes thin layers of shale, dolomite, and occasional chert nodules. Fossils are more abundant and easy to see, especially the twiglike colonial coral *Lithostrotionella*. Dramatic waterfalls can be found cascading over the limestone ledges of the St. Louis.

The upper parts of the canyon walls are made of the third formation, Ste. Genevieve Limestone. Rocks of this formation are more fine grained, smooth textured, and compact than the overlying units. A common fossil in the upper part of this formation is the oval columnal plates of the crinoid *Platycrinus*. The Ste. Genevieve is the youngest bedrock in the park. All three formations are from the Mississippian Period, and together they represent about one million years of geologic history.

The Canyon is Formed

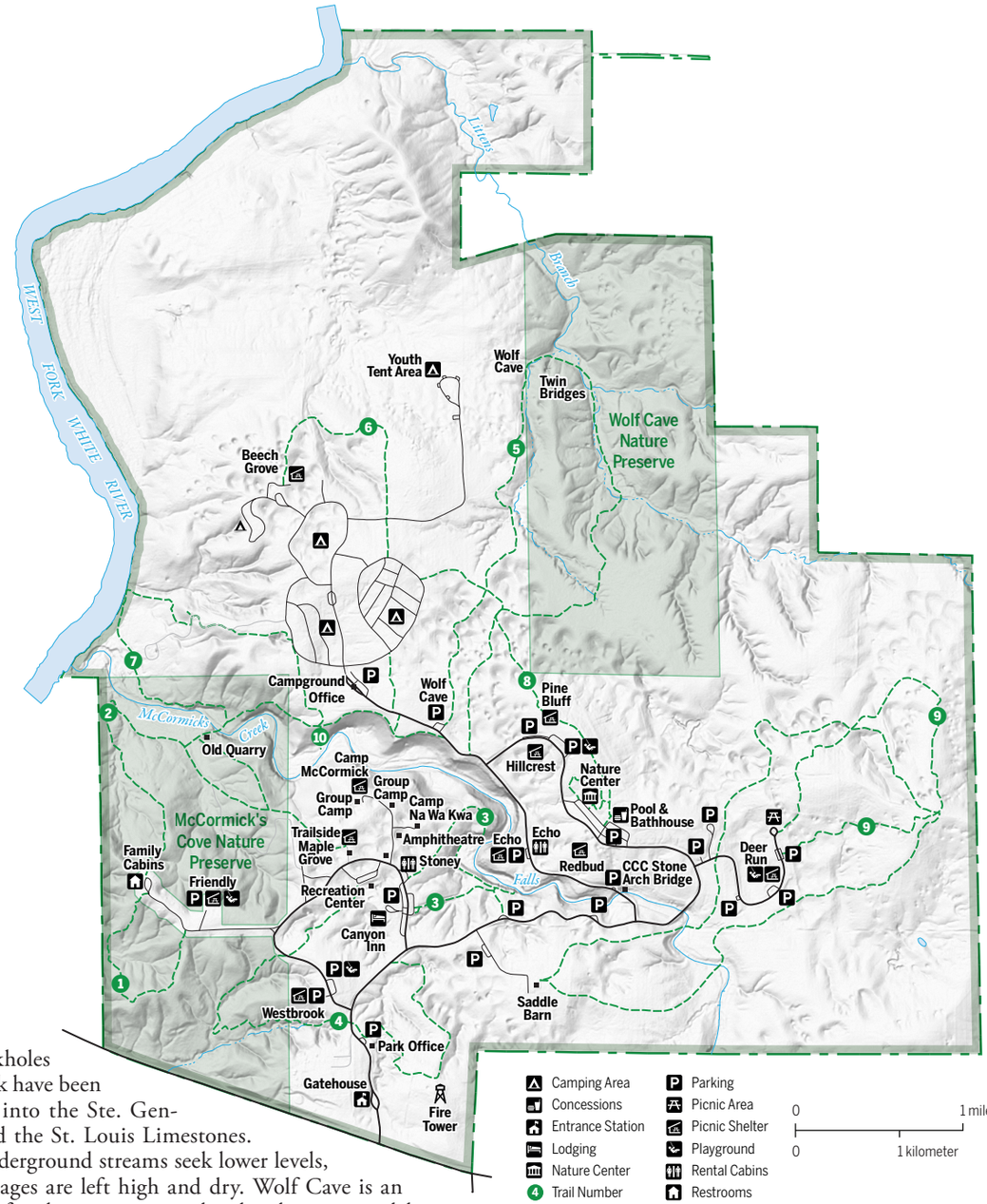
Long after the rocks were formed, the land was uplifted above sea level by Earth's tectonic forces. Streams slowly eroded the rock and formed valleys similar to those that we see today. During the Pleistocene Epoch (2.6 million–12,000 years ago), a series of continental ice sheets advanced from the north and powerfully shaped the topography of Indiana.

The glacier that covered the park area during the Illinoian Stage (300,000–130,000 years ago) left deposits of sand and clay that contain cobbles of granite and other stones from as far north as Ontario. These deposits show that the limit of this glacier's advance was just southeast of the park. The vast mass of ice blocked many of the westward-draining valleys and filled them with sediment. New streams were cut along the margin of the glacier. Meltwater and stream drainage now flowed northwest across what is now the park, and this new pattern of drainage became integrated into modern-day McCormick's Creek.

As the creek eroded downward, the rock-walled canyon was formed. Most of this erosion took place 50,000 years ago, when ice of the Wisconsin glaciation (which did not reach the park area) was advancing from the north. At that time, the climate was wetter and colder, and erosion was more rapid than it is today. The falls, which are evidence of the canyon-forming process, are still eroding their way upstream, but now at slower rate.

Sinkholes, Karst, and Caves

The upland area of the park contains many bowl-like depressions called sinkholes. Some are small, some large, and some are in groups or in rows. A few contain springs and small streams that sink into the ground. All these features are the surface expression of karst topography. Karst features form where carbonate rocks underlie the surface. Freely circulating, slightly acidic rainwater slowly dissolves the limestone to create sinkholes, caves, and subterranean streams. Water then flows directly into these solution features, unfiltered by soil and bedrock.



Most sinkholes in the park have been dissolved into the Ste. Genevieve and the St. Louis Limestones. As the underground streams seek lower levels, some passages are left high and dry. Wolf Cave is an example of a dry passageway that has been opened by erosion. Still further erosion leaves small remnants of the passage as natural bridges, such as the Litten Natural Bridge at Twin Bridges.

Maps: Indiana Geological Survey.