

MISSOURI'S GEOLOGICAL

by Joe Gillman photographs by Scott Myers



Missouri boasts one of the nation's best and most recognized state park systems. From hiking to camping, many fascinating geologic treasures await visitors. Often, these natural areas are so rare they have been recognized as places that deserve protection and public enjoyment. Thus, they became state parks.

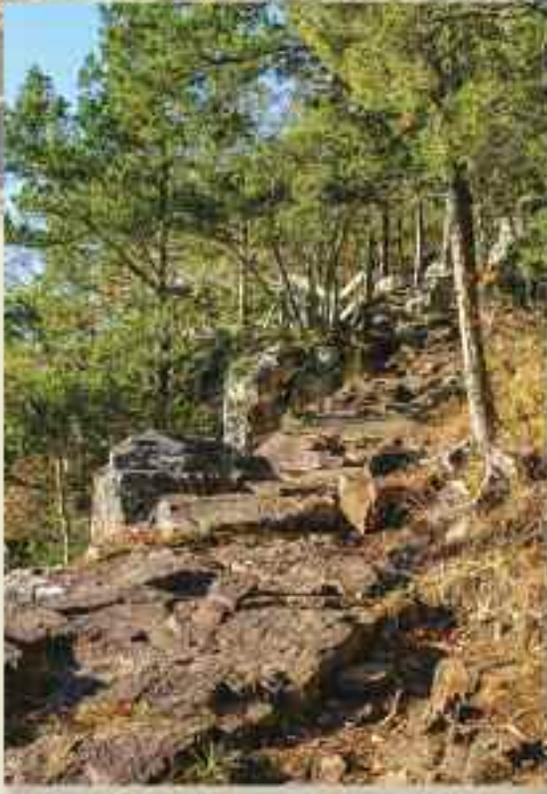
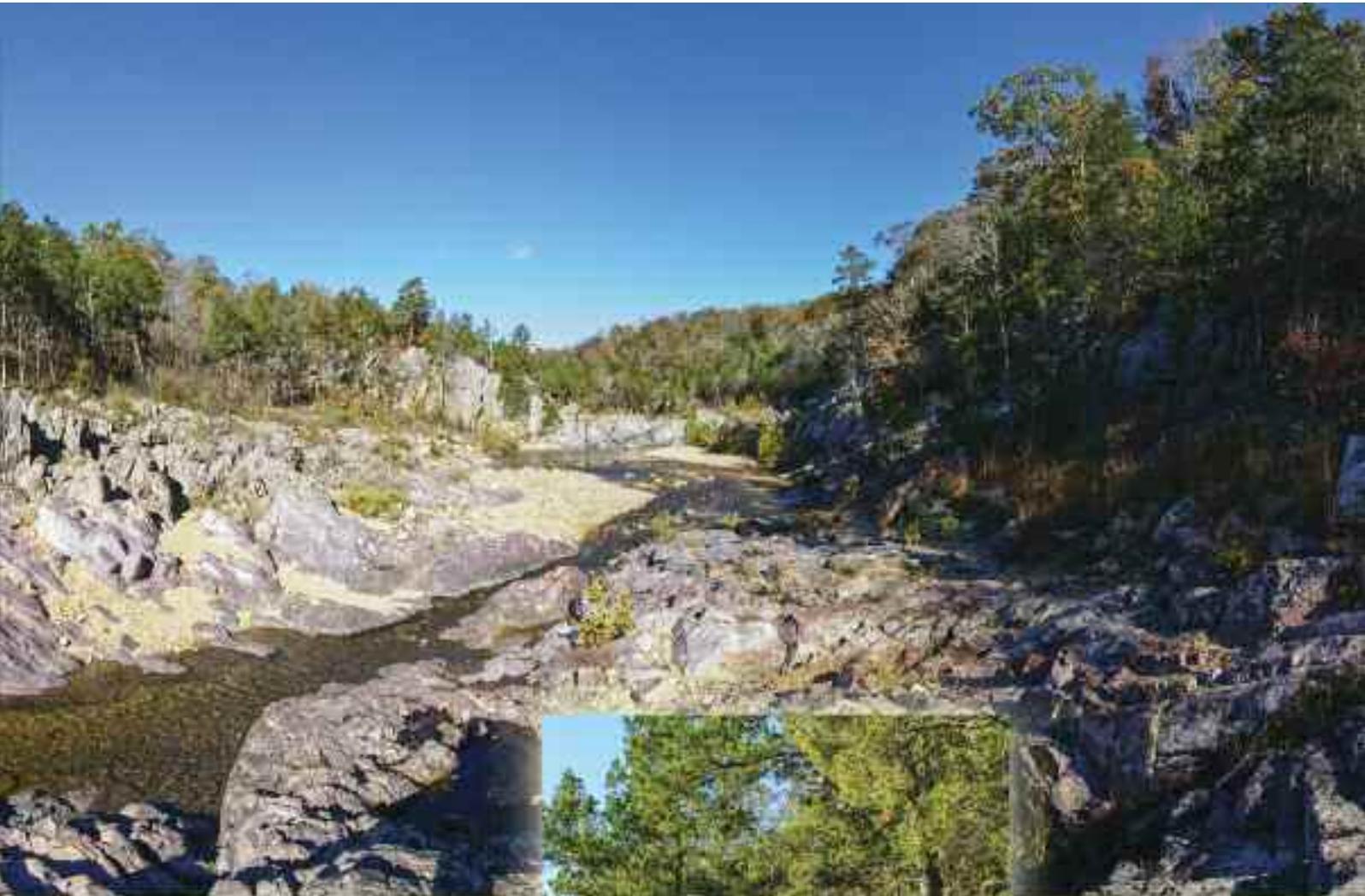
The geology in Missouri state parks is as diverse as many of the activities available to visitors.

"In some ways, geology was the primary force that created many of our state parks today," said Bill Bryan, director of Missouri State Parks, a division of the Missouri Department of Natural Resources. "These

unique geologic features are one of the main reasons more than 18 million people visit our state park system every year."

Evidence of extinct volcanoes, glaciers, cave systems, earthquakes and old mines are just a few of the interesting things to see. Not only are some of North America's oldest rocks exposed in the remnants of ancient volcanoes, relics from the most recent glacial period also exist. These processes leave us with incredible reminders of Missouri's distinctive beauty and geologic history. World-class geologic features can be seen in many state parks, including Bennett Spring, Johnson's Shut-Ins, Onondaga Cave, Grand Gulf and Elephant Rocks.

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Physiographic Regions

Missouri's landscape can be divided into three distinct physiographic, or landform regions: the Central Lowlands, the Ozark Plateau and the Coastal Plain. Each region's geologic makeup and geographic characteristics are unique when considered within regional boundaries. These three regions are often subdivided into more distinctive physiographic areas.

Central Lowlands

Northern and a portion of west-central Missouri are part of the Central Lowlands region, characterized by gently rolling, broad landscapes. Much of this region was

(Top) Johnson's Shut-Ins State Park is a geologic jewel of Missouri. A natural water park, crystal clear water from the East Fork of the Black River cascades over and around igneous rocks that have been worn smooth through time.

(Left) The park boasts a multitude of trails that reveal the geologic history of the region.



(Above) At Finger Lakes State Park, near Columbia, the hilly terrain left behind following coal extraction in the 1900s provides the perfect setting for a challenging mountain bike trail ride. Strip-mine pits also offer recreation opportunities like swimming, canoeing and fishing.

shaped by the advance and retreat of major ice sheets during the ice age. Remnants of these geologic events can be found in the thick glacial material left behind and the occasional boulder transported here from Minnesota or Canada. This region also is home to the gentle topography of the Osage Plains, a non-glaciated great prairie that opens to the west.

During the ice age, fine-grained sediments were deposited along the major river valleys. Many of the particles were later blown into ridges of dune-like hills that rise

above the surrounding landscape. An example is “The Pinnacles” area in Van Meter State Park, where visitors can hike along a geologic feature directly linked to glaciers that once dominated the landscape. Other parks that exhibit remnants of glaciated terrain include Thousand Hills State Park and Crowder State Park.

Geology played a key role in the development of Finger Lakes State Park, located along the southern boundary of the Central Lowlands. In this region, during an ancient geologic time period, plant-rich swamps left behind thick deposits of coal. The coal was later extracted from the ground, leaving many piles of mined earth and water-filled strip pits.

The rugged playground is a popular destination for all-terrain vehicle and mountain bike enthusiasts. Although this landscape is man-made, the careful observer can still see the geologic features and coal outcroppings that led to the creation of this park.

Ozark Plateau

The Ozark Plateau region, likely the most recognizable, is characterized by a broad, uplifted region that occupies much of central and southern Missouri. This area is primarily underlain by thick sequences of limestone and dolomite bedrock that host topography and features that are world famous. These karst geologic conditions created the perfect environment for development of spectacular natural features. The striking geologic characteristics of this region produced monumental springs, extensive networks of caves, steep bluffed valleys and clear, flowing streams.

Quite possibly Missouri’s most impressive karst-related complex consists of a large, collapsed cave system within Grand Gulf State Park. Evidence of these broken, faulted rocks can be seen along the walls of the chasm. Part of the former cave roof is intact, forming a natural bridge. Hiking trails allow visitors to explore these rare geologic features that provide a glimpse into the inner workings of a subterranean world.

These karst features also produced some of the largest springs in the Midwest. Bennett Spring State Park, Roaring River State Park and Montauk State Park are all situated around magnificent springs that are the discharge points for karst systems that issue forth cold, clear groundwater from Missouri’s depths. Wonderful recreational opportunities abound in these parks, such as



fishing, camping, hiking and geologic discovery. Other remarkable geologic features occurring in these parks include Bennett Spring Natural Tunnel and Devil's Kitchen at Roaring River State Park.

"As an avid fly angler, I have had the opportunity to fish for trout throughout the U.S. My favorite waters are still the cold, clear spring-fed creeks of Missouri," said Mark Van Patten, Missourian and nationally known fly fisher, author, and host of the PBS series, *The Tying Bench*. "When the blue ribbon trout streams in many of the mountain states are frozen over, our groundwater springs burst forth at a perfect 54 degrees, allowing for a fantastic fly fishing adventure year round."

If one's preference is caves, Onondaga Cave and Cathedral Cave in Onondaga Cave State Park, Ozark Caverns in Lake of the Ozarks State Park and Fisher Cave in Meramec State Park offer cave enthusiasts a one-of-a-kind geologic environment. For example, in Onondaga Cave, guides lead visitors over electrically lighted, paved walkways, and provide information about geologic wonders of the underworld, such as the King's Canopy, the Twins and other extraordinary speleothems.

This region also is home to the St. Francois Mountains, the eroded remnants of ancient volcanoes, providing a rare glimpse of igneous rocks in the nation's mid-continent. These rocks and the processes that shaped them offer spectacular geologic features at the heart of many popular state parks.

At Johnson's Shut-Ins State Park, visitors are greeted by millions of years of geologic history, and can spend hours splashing among the colorful rocks of one of nature's geologic wonders known as a shut-in. At Elephant Rocks State Park, the rounded, oblong granite boulders are not only beautiful, they are a textbook example of weathering granite. These pink "elephants" rest at the core of the Ozark Mountains and provide a glimpse of Missouri's volcanic past.

Taum Sauk Mountain and Sam A. Baker state parks also offer spectacular geologic features created by these ancient and dynamic volcanic processes.



Coastal Plain

The Coastal Plain region in extreme southeast Missouri is unlike any other in the state. Leveled by erosive floods, it is largely covered by very thick, river-deposited sediments. Contrasting sharply with the surrounding Mississippi River Delta, Crowley's Ridge is the region's most prominent geographic feature – an impressive, narrow series of hills across the flat landscape.

Visitors to Morris State Park can observe the distinctive geologic character of Crowley's Ridge and observe many plant species found no other place in Missouri. This area also is home to one of the most seismically active regions in the mid-continent, known as the New Madrid Seismic Zone.

The earth's natural processes shaped our environment and left remarkable remnants of our varied geologic past that are never repeated and cannot be recreated. With 87 state parks and historic sites spanning more than 145,000 acres, the Department of Natural Resources' state park system has something for everyone. Regardless of which regions you visit, you will find outstanding recreational and educational opportunities. In many of Missouri's state parks, the geologic past can be credited for providing the gems that truly inspired their designation as special places. 🌅

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(Above) This natural bridge is one of several impressive geologic features that can be found in Ha Ha Tonka State Park near Camdenton. (Opposite page) The landscape of Van Meter State Park, near Miami, was formed when melting glaciers sent water rushing into rivers. Winds deposited a fine soil, called loess, on the hills that bordered the river bottoms. Gradual erosion of the loess-covered hills resulted in deep ravines and narrow ridges, known as pinnacles.