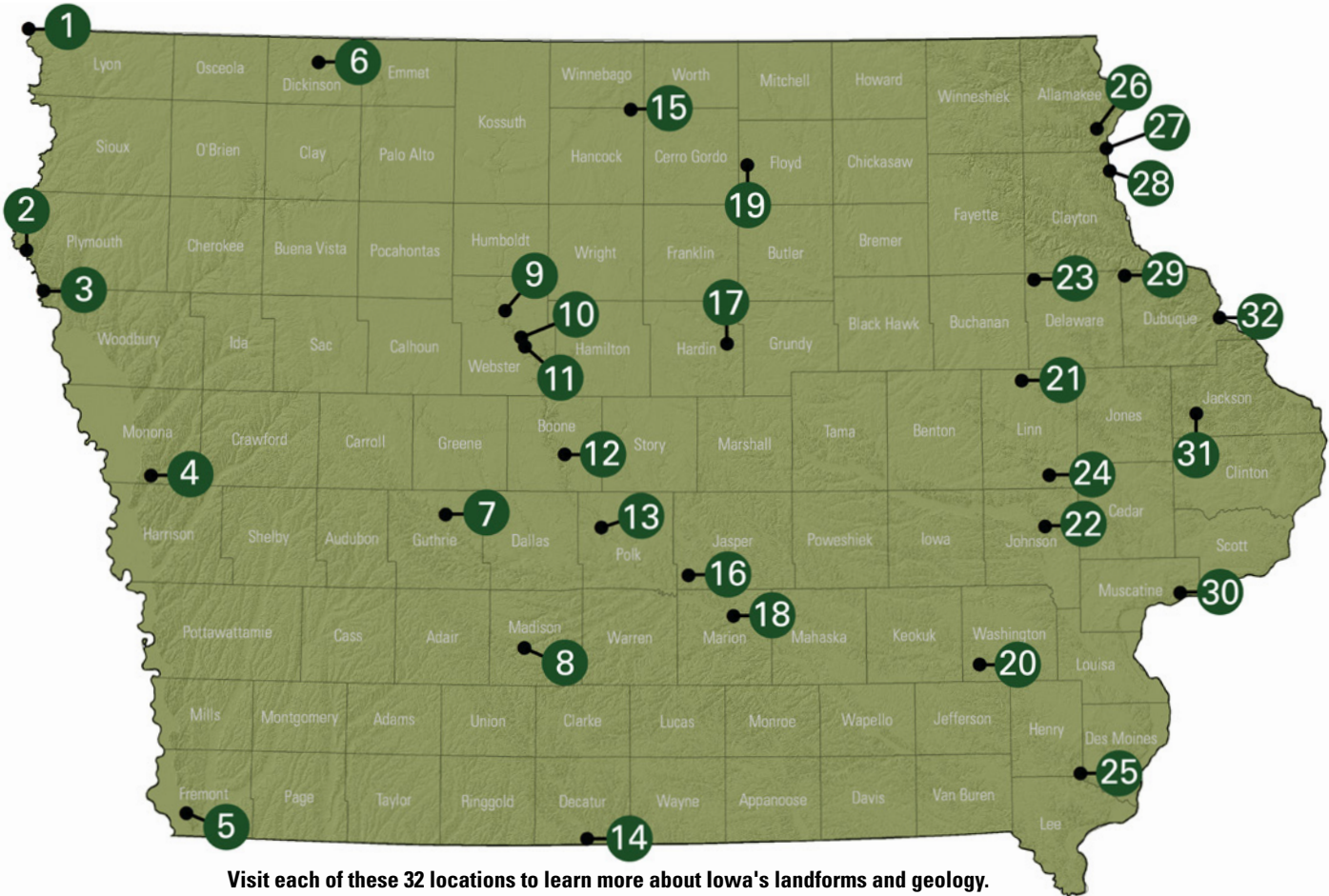


A SUPPLEMENT TO IOWA'S LANDFORMS AND GEOLOGY

One of the best ways to learn about and appreciate the landforms and geology of Iowa is to get outside and visit the rocks, sediments, and landscapes in person. While some of Iowa's most interesting geological features (like the Midcontinent Rift or the Manson Impact Structure) can't be seen at the surface, many interesting features can be explored up close in Iowa's state and county parks, refuges, and recreation areas. This resource is a guide to some of the best sites around the state where visitors can explore more than a billion years of Iowa's geological history as told in rocks and landforms.



Visit each of these 32 locations to learn more about Iowa's landforms and geology.

1 GITCHIE MANITOU STATE PRESERVE

The Sioux Quartzite is the oldest bedrock exposed in Iowa, and this state preserve is the only public place to see it. The rocks here are also the only exposed metamorphic rock in Iowa. The sand that forms the Sioux Quartzite was deposited in a braided river system 1.7 billion years ago. Quartzite is formed from sandstone that has been heated enough (by regional metamorphism) to fuse the sand grains together.

2 BROKEN KETTLE GRASSLANDS PRESERVE

Iowa's largest prairie remnant in the northern Loess Hills is an excellent place to see the steep terrain of this geologic feature and landscape type. Note how the biology here is uniquely suited to the rare and extreme landscape.

3 STONE STATE PARK

In the late Cretaceous, Iowa was located on the eastern shore of a shallow sea that stretched from what is now Alaska to the Gulf of Mexico. Stone State Park is the best location to view the sandstone, shale, and limestone that were deposited near the shore. Finds can include fish and shark fossils, large bivalves, and selenite crystals.

4 PREPARATION CANYON STATE PARK

This park has excellent hiking and primitive camping along the ridges of the loess hills. It is just down the street from the Loess Hills State Forest Visitor's Center which features exhibits explaining loess deposition and regional landforms.

5 WAUBONSIE STATE PARK

This park in the southern Loess Hills is a superb place to see the thick loess deposits of western Iowa. These extremely steep hills of windblown material are found almost nowhere else on earth. The windblown loess can reach over 200 feet in thickness.

6 IOWA GREAT LAKES

Glaciers leave behind distinctive landscapes formed as flowing ice sculpts pre-existing land surfaces and deposits rock and sediment upon melting. Iowa's Great Lakes region is an excellent place to see a recently glaciated landscape.

7 SPRINGBROOK STATE PARK

Springbrook State Park sits at the western edge of the Des Moines Lobe formed by the most recent glacial advance. Compare the topography east of the park and west of the park to see the difference several hundred thousand years of erosion can make. Also, see Cretaceous rocks in the park formed on the eastern shore of the Cretaceous-age Western Interior Seaway.

8 PAMMEL STATE PARK

An excellent place to visit Pennsylvanian rocks deposited in a shallow marine environment. Rocks here record a time when Iowa was at much lower latitude and covered by a shallow sea. Many marine fossils can be seen throughout the park, which is located in the Southern Iowa Drift Plain.

9 SNELL-CRAWFORD PARK

The only reliable place to see Jurassic rocks in Iowa. Outcrops along Soldier Creek in Fort Dodge expose both gypsum and bright red mudrocks above it that were deposited in a restricted basin.

10 WOODMAN HOLLOW STATE PRESERVE

Early Pennsylvanian bedrock of the Cherokee Group is well exposed along the Des Moines River at Woodman Hollow. These rocks, mainly sandstone, record a large river delta flowing east to west at the edge of the ocean. Fossils found here include plants, bones, and shark teeth.

11 DOLLIVER STATE PARK

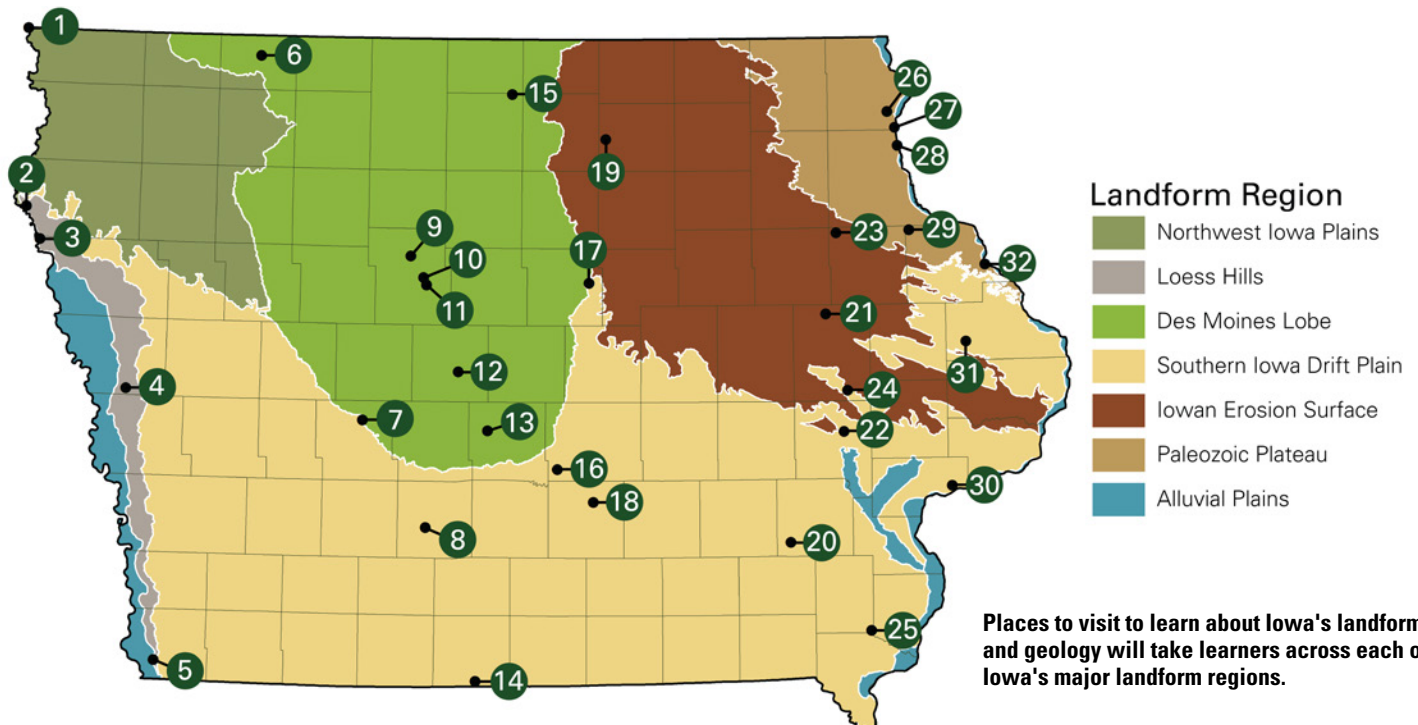
Visitors to this state park near Webster City will see dozens of beautiful outcrops of Pennsylvanian-age rocks. The sandstones, shales, and paleosols exposed by the Des Moines River at Dolliver record a river delta emptying into the sea and preserve many plant and animal fossils.

12 LEDGES STATE PARK

A park made famous by striking Pennsylvanian sandstone cliffs exposed as the Des Moines River and tributaries cut down through the rocks while carrying meltwater from Wisconsin-age glaciers. Notice how some of the sandstone in the park has weathered into unusual spherical or cylindrical formations due to differing hardness of the stone.

13 SAYLORVILLE LAKE

Outcrops along the shore of Saylorville Lake alternate between Pennsylvanian cyclothems (limestone, sandstone, shale, and mudstone) and till deposited during multiple glacial episodes during the Pleistocene.



14 NINE EAGLES STATE PARK
 More forested than Neal Smith National Wildlife Refuge (site 16), this park provides opportunities to explore the dissected landscape and rounded loess-covered hilltops of the Southern Iowa Drift Plain.

15 PILOT KNOB STATE PARK
 An excellent place to view a variety of landscape features left behind during ablation (melting) of the most recent glaciation in Iowa (Des Moines Lobe of Wisconsinan-age) including a large mound of glacial gravel.

16 NEAL SMITH NATIONAL WILDLIFE REFUGE
 Gently rolling prairies of Southern Iowa Drift Plain. This landscape is the result of hundreds of thousands of years of erosion as small streams gradually cut into loess and pre-Illinoian glacial material.

17 FALLEN ROCK STATE PRESERVE and STEAMBOAT ROCK AREA
 Here Mississippian dolomite and limestone and Pennsylvanian sandstone create vertical cliff faces. The Iowa River cut these impressive features near the end of the last ice age with vast amounts of meltwater.

18 RED ROCK LAKE and ELK ROCK STATE PARK
 An excellent place to see a variety of Pennsylvanian-age rocks and fossils.

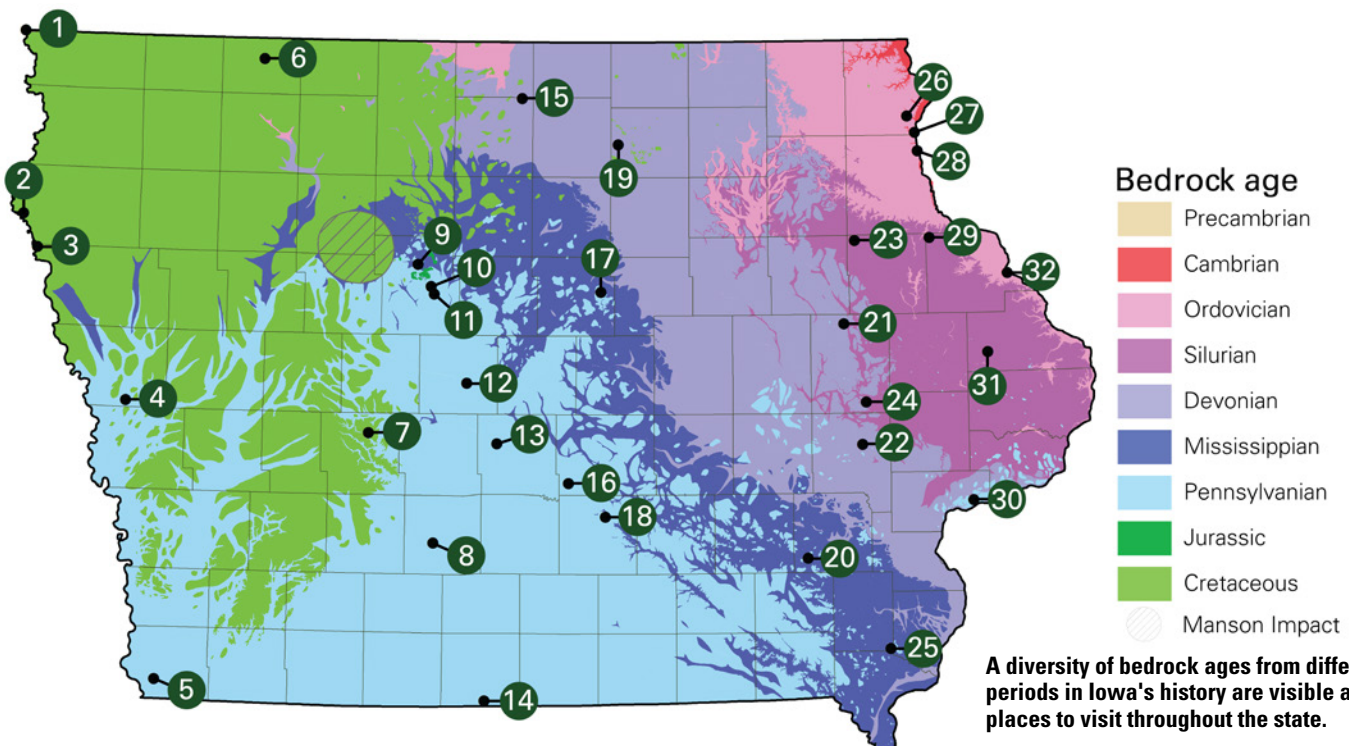
19 ROCKFORD FOSSIL AND PRAIRIE PARK
 The best public fossil collecting site in Iowa; quarry pits of the former Rockford Brick and Tile Company are filled with Devonian fossils in an amazing state of preservation. Find brachiopods, bryozoans, crinoids, and a wide variety of corals. Fossils from this location are internationally known for their intricate details.

20 BRINTON TIMBERS PARK
 Situated on a bluff overlooking the Skunk River, Brinton Timbers has several miles of hiking and horseback trails through a part of the Southern Iowa Drift Plain where loess is thin and little tributary creeks cascade over Mississippian Limestone and occasional boulders from pre-Illinoian till.

21 HITAGA SAND RIDGE PRESERVE
 An excellent place to see a paha ridge created by extreme winds near glacial ice, as well as large boulders left by older glaciers (erratics).

22 CORALVILLE LAKE and DEVONIAN FOSSIL GORGE
 These Devonian outcrops were exposed during recent flood events and have been preserved as a park where visitors can see large corals, brachiopods, trilobites, cephalopods, and other fossils.

23 BACKBONE STATE PARK
 This state park is an excellent place to see both fossiliferous dolomite of Silurian (late Paleozoic) age, as well as cold-water springs related to the unique karst geology of northeast Iowa.



24 **PALISADES KEPLER STATE PARK**

This state park is an excellent location to explore Silurian age outcrops and fossils such as corals and large brachiopods.

25 **GEODE STATE PARK**

Geodes are Iowa's state rock, and are hardened inclusions in limestone, often found in Mississippian-age rocks in southeastern Iowa. Geode State Park displays some remarkable specimens collected from the surrounding area. Beware, however, that it is illegal to remove geodes from State Parks in Iowa.

26 **YELLOW RIVER STATE FOREST**

An excellent place to experience the unique karst landscape of the Driftless (Paleozoic Plateau). The rocks exposed here are Ordovician age and the park contains many cold-water spring features as well as spring-fed streams.

27 **EFFIGY MOUNDS NATIONAL MONUMENT**

This is an excellent location to view not only unique and spectacular Native American mounds, but also the geomorphology of the upper Mississippi River Valley and outcrops of Cambrian and Ordovician bedrock.

28 **PIKE'S PEAK STATE PARK**

This state park on the Mississippi River is probably the best place in Iowa to see and examine early Paleozoic rocks. Nearly the entire sequence of Cambrian and Ordovician rocks are exposed in the park. The park also offers panoramic views of the incised Upper Mississippi Valley that was cut by meltwater during deglaciation.

29 **WHITE PINE HOLLOW**

A spectacular place to see the karst landscape of the Paleozoic Plateau, as well as some of the rare and fragile biology supported by it. See algific slopes and cold-water springs.

30 **WILDCAT DEN STATE PARK**

The easternmost Pennsylvanian rocks in Iowa. Visitors can see how alternating sand, shale, and other rock types form a cyclothem as sea level rises and falls. Many of the sandstone outcrops are banded with beautiful iron staining.

31 **MAQUOKETA CAVES STATE PARK**

Karst is important to both landscape formation, and groundwater in eastern Iowa. Maquoketa Caves State Park gives a sense of how karst can develop and erode bedrock to form caves and subterranean rivers.

32 **MINES OF SPAIN STATE RECREATION AREA**

Spectacular outcrops of Ordovician-age dolomite near the Mississippi River show how groundwater can dissolve channels underground in carbonate rocks and create karst. This is also where Julien Dubuque first mined lead ore in Iowa.

ACKNOWLEDGEMENTS

This article was produced through a collaborative project led by members of the Iowa Association of Naturalists (IAN) and Iowa State University Extension and Outreach. Funding for the project was provided by a Resource Enhancement and Protection (REAP) Conservation Education Program grant.

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This article and others in the Iowa's Nature series were reviewed and approved by the Iowa's Nature Editorial Board: Heidi Anderson, Polk County Conservation; Rebekah Beall and Elizabeth Waage, Story County Conservation; Lilly Jensen, Winneshiek County Conservation; Stephanie Shepherd, Iowa Department of Natural Resources; and Adam Janke and Julia Baker, Iowa State University.

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WL17k June 2021

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