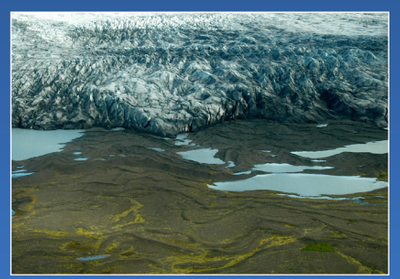
NORTHEAST INDIANA'S GLACIAL LEGACY

Chain O' Lakes State Park in Noble County, Indiana, owes much of its surface form and geologic makeup to the action of glaciers during the most recent Ice Age (the Pleistocene Epoch). Although the Pleistocene began about 2.6 million years ago, the effects of only the most recent major ice advance are evident in Noble County. The steeply rolling hills, bogs, and interconnected lakes bear witness to the massive ice sheets that advanced over and then melted from this part of the Midwest near the end of the Pleistocene, between 19,000 and 16,000 years ago.



Advance and retreat

This modern-day glacier in Iceland gives us a glimpse of what northwestern Indiana looked like at the end of the Pleistocene. The retreating glacier left behind sediments and carved depressions that filled with water from the melting ice.

Glacial meltdown

The beadlike string of lakes formed during the final stages of meltdown of the Erie Lobe. Nine of the park's thirteen lakes are connected by channels carved by water from the melting glacier.

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

INDIANA GEOLOGICAL SURVEY
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Eskers, kettles, and bogs

The Northern Moraine and Lake Region is noted for its beautiful scenery and lakes — a landscape created by glaciers. Big Finster Lake is one of the kettle lakes that formed as the Wisconsin-age glacier retreated. Large blocks of ice broke free from the glacier and were buried under insulating debris. The ice slowly melted, leaving behind steep-sided depressions that filled with water.

THE GEOLOGIC STORY

of Chain O' Lakes State Park

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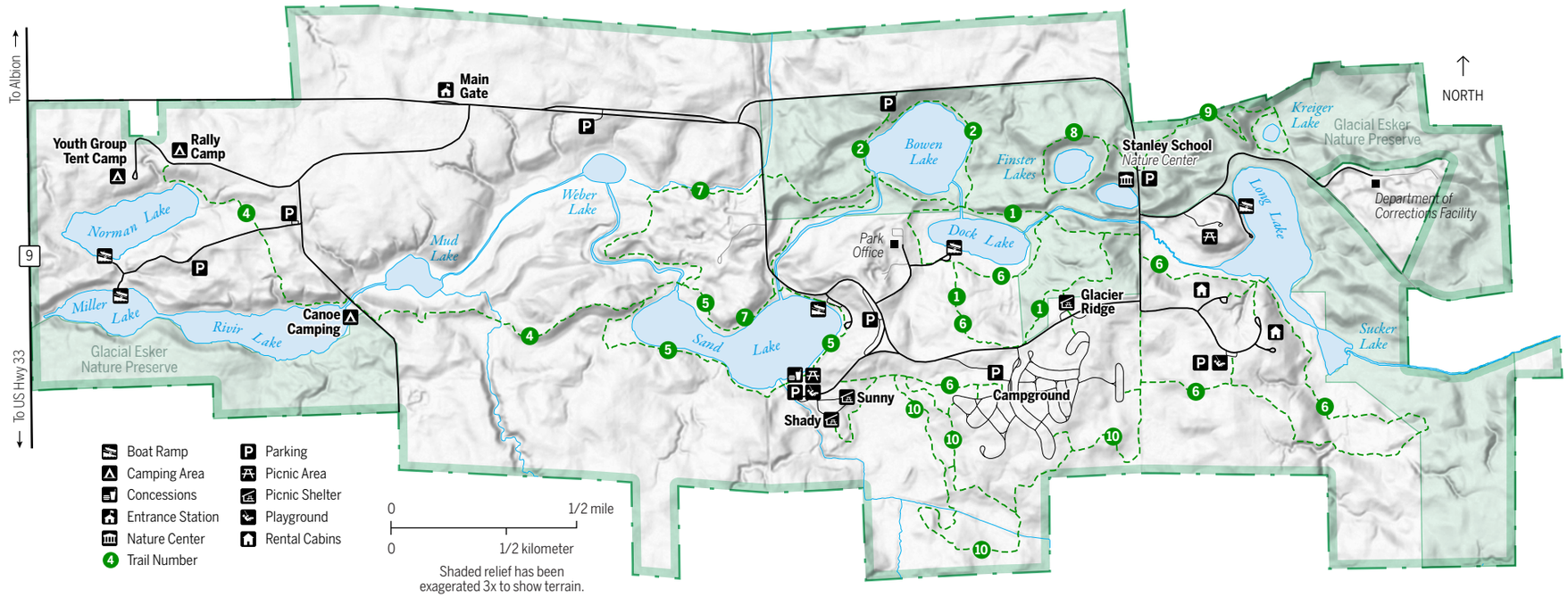
Glacial History

During the Pleistocene, in response to global temperatures that averaged about 10° F cooler than present, snowfall in the northern latitudes persisted through the seasons. With time, this perennial snowpack became so thick that it turned first to coarse crystalline ice (*firn*) and then to dense solid ice that eventually began to flow plastically under its own weight and away from the area of greatest snow accumulation. The resultant glacier flowed outward from ice domes centered over present-day Hudson Bay in Canada. Parts of this continental glacier (named the Laurentide Ice Sheet) further subdivided into ice lobes in response to regional topography and the mechanics of ice flow. Geologists recognize evidence in Indiana for several cycles of glaciation that covered the northern half of the state from around 30,000 to 16,000 years ago. Chain O' Lakes State Park was most affected by the Saginaw and Huron-Erie Lobes of the Laurentide Ice Sheet.

Glaciation of the Midwest was not constant during the Pleistocene. Warm periods called *interglacials* punctuated the time between the major ice advances. At the close of each glaciation, regional warming trends resulted in the waning and decay of the vast ice sheets. Left behind was a varied complex of sediments and associated landforms. Some of this material was sorted sand and gravel called *outwash*; and some was mixed sand, silt, clay, and boulders known as *till*. Both kinds of deposits can be seen in the park.

Origin of the Chain O' Lakes

The intriguing beadlike string of lakes that trends east–west across the park property formed during the final stages of meltdown of ice of the Erie Lobe. During its active phase, fracture patterns developed within the glacier as a result of the flow stresses acting within it. As the ice melted, some of these fractures became enlarged by meltwater and served as conduits for sediment-laden streams flowing both within and beneath the decaying ice mass. Sand and gravel was deposited within portions of these meltwater channels, and once the overlying ice melted away, a ridge (sometimes sinuous) of sand and gravel called an *esker* was left behind. Excellent examples of eskers occur between Sand Lake and Weber Lake, and Trail 7 follows the crest of an esker. Detached ice blocks were also covered by sand and gravel carried by the meltwater streams. Eventually the ice melted away, leaving steep-sided depressions that filled with water and became the lakes visitors now see throughout the park. These features are called *kettle lakes*.



Beneath our Feet

An east–west swath that includes about one-third of the park consists of sand and gravel deposits that were laid down by meltwater streams flowing beneath and away from the melting glacier. The sediments are interlayered and, in many places, units of sand alternate with gravel of varying coarseness. Trails 1, 4, 5, 7, and 8 traverse mostly outwash deposits. Till surrounds the outwash deposits on the north and the south. Small areas of till are also exposed at various places within the zones dominated by the sand and gravel. Till is deposited by a variety of mechanisms but, in the region including Chain O' Lakes State Park, most of it is of the variety called *ablation* (or melt-out) till. The ablation till consists of sediments that were frozen into the ice while the Erie Lobe was actively advancing. Some of the rock fragments in the ice were transported from as far away as Canada. These sediments were released as the ice melted, and sometimes moved downslope into depressions on the ice surface or off the edges of he glacier. As the stagnant ice blocks wasted away, the till patches remained. In some places, till thickness exceeds 20 feet. Trails 3 and 6 are on till over much of their path.

Not all the lakes that formed after the ice melted remain today. Some have long since filled in with sediment created by aquatic vegetation. All that remains of these lakes are topographic depressions that contain a fibrous, organic-rich material called *peat*. Trails 2, 6, and 9 will take you to a number of boggy low-lying areas filled with rich muck and peat deposits. Each kind of sediment results in a unique soil type that supports characteristic forms of vegetation. Ask your park naturalist to point them out to you.

Chain O' Lakes State Park is a wonderful place to learn about the Earth's geologic past. As you walk through the park, pay attention to the landscape. The connected lakes, the ridges of sand and gravel, and the steep-sided depressions atttest to the dynamic forces of a once mighty glacier.

Maps: Indiana Geological Survey.