

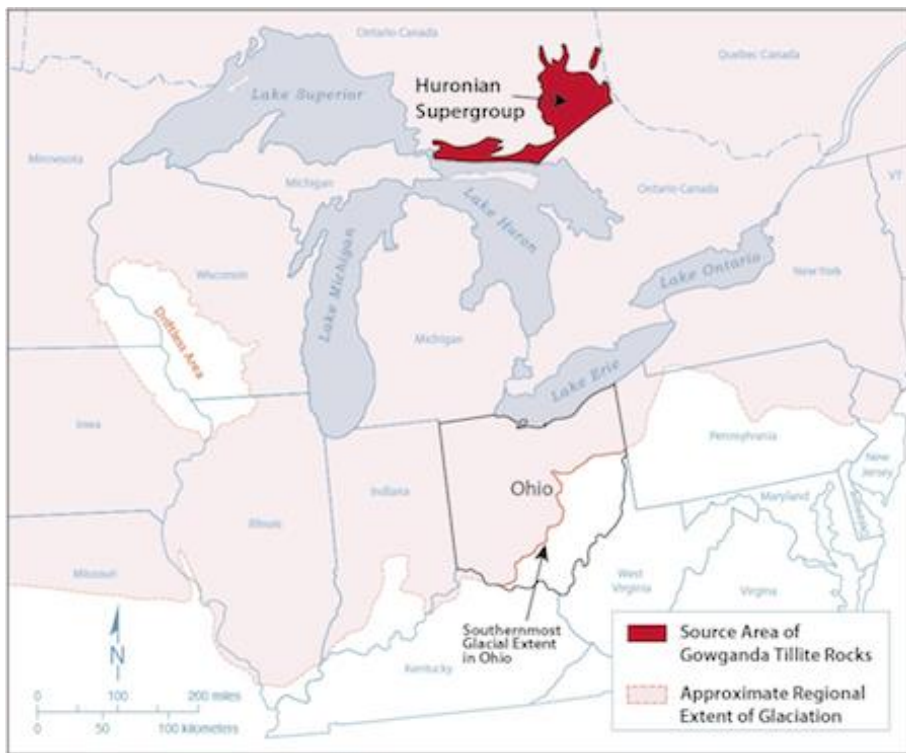
EXTRA: Gowganda Tillites in Ohio

An introduction to some of the oldest rocks in the Buckeye State

by Mike Angle

August 24, 2016—When geologists study Earth, they look for patterns or similarities in different rock types to help them understand the events that formed and shaped them and to draw correlations from modern processes. Rarely can a geologist look at a particular rock and know with great certainty that it has undergone the exact same geologic process at least twice. Even more uncommon is when more than 2 billion years has passed between those two events.

A basic principle of geology is *uniformitarianism* which states that “the present is key to the past.” Uniformitarianism implies that processes ongoing now or in recent geologic times also occurred eons ago. It is not common that a single rock can help substantiate this principle, but ancient rocks known as Gowganda Tillites provide such an example. A *tillite* is a [glacial till](#) that has undergone the lithification process and has become a solid rock. The lithification process occurred because of the high pressures associated with burial and tectonics over the years.



The Gowganda Tillite or Gowganda Formation represents a particular formation exposed in a west-to-east zone between Sault Ste. Marie and Sudbury, Ontario, along the northern shores of Lake Huron. This formation is part of a group of rocks known as the Lower Huronian Supergroup and represents some of the oldest sedimentary rocks found in North America. These units, along with surrounding ancient igneous and metamorphic rocks, helped comprise the crustal rocks that formed the core of Laurentia (also called the [North American craton](#)) and other continents ancestral to North America through the eons. The age of the Gowganda Formation has been dated to range roughly from 2.2 to 2.4 billion years ago (y.a.).

As the Huron shoreline portion of the Upper Great Lakes was glaciated during the Pleistocene Epoch, or most recent Ice Age,

multiple pieces of the Gowganda Formation were eroded and carried along with other [erratic boulders and cobbles](#) into Ohio. Gowganda Tillites are found in both Wisconsinan (14,000–25,000 y.a.) and Illinoian (130,000–300,000 y.a.) glacial deposits in [the glaciated portions of Ohio](#) [pdf]. The tillites may be found embedded within till or other glacial deposits, such as outwash deposited by meltwater streams or kames, which are irregular mounds of sand and gravel left by collapsing, melting ice sheets.

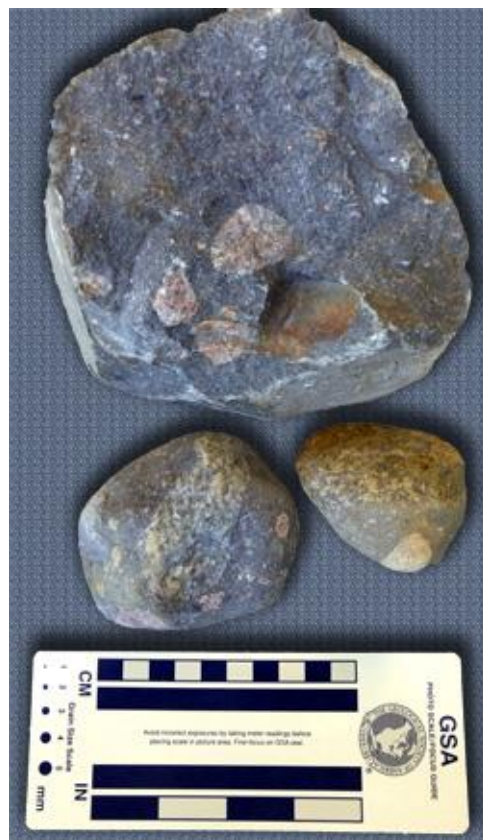
Gowganda Tillites visually and compositionally are quite distinctive from other erratics. The tillites typically are quite smooth to the touch and are typically well rounded unless you find one that has been shattered. Tillites tend to be very dense and heavy for their size. They typically have a dark bluish-green or olive-green tint. The clasts or pebbles are variable in color, but pink, orange, and blackish clasts are common. In rare cases, the tillites might look somewhat laminated or layered. Such examples represent glacial lake or lacustrine deposits that were marginal to the ancient ice sheets. In these lacustrine deposits, the clasts represent dropstones. Dropstones occur when a sheet of ice or iceberg floating in a lake melts, and the heavy pebbles or cobbles sink into the lake bottom sediments.

Practical and industrial uses of tillites are few. However, they make attractive decorative or garden stones, especially the boulder-sized examples.

With a sharp eye, it is possible to spot one of these fine examples of a tillite and to appreciate the fascinating history of a rock that was originally formed by a glacier and since then has been moved hundreds of miles by a succeeding glacier, some 2.2 billion years later. If you think you've found one but need help identifying a tillite, or any other Ohio rock, click here to use [the Rock ID feature on our website](#).

Further Reading

- [Stratigraphy, Sedimentology, and Petrology of the Huronian Supergroup in the Sudbury - Espanola Area, by K. D. Card, D. G. Innes, and R. L. Debicki, 1977](#) [19 MB pdf]
- [The Huronian Supergroup between Sault St. Marie and Elliot Lake, by Gerald Bennett, 2006](#) [1.3 MB pdf]
- [“Glacial Erratics, or ‘What’s the biggest rock in Ohio?’” by Michael Hansen, 1984](#) [pdf]



Gowganda tillites come in a variety of sizes from gravel (0.08–2.5 inches) to boulders (>10 inches) and can be found throughout glaciated Ohio. [Click the image to enlarge.](#)