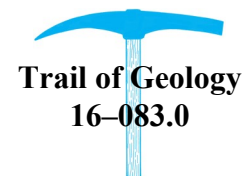


OUTSTANDING GEOLOGIC FEATURE OF PENNSYLVANIA

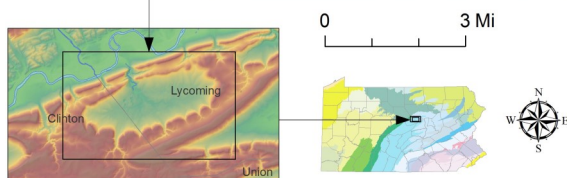
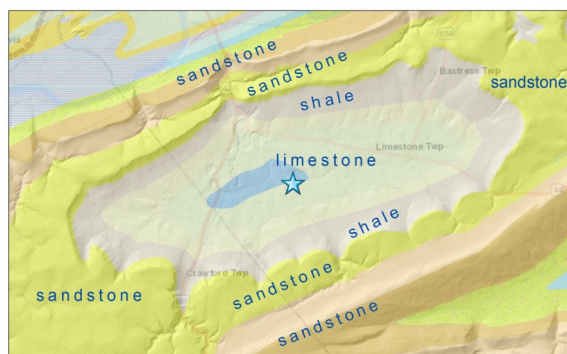
NIPPENOSE VALLEY, CLINTON AND LYCOMING COUNTIES



Stuart O. Reese, 2016

Location

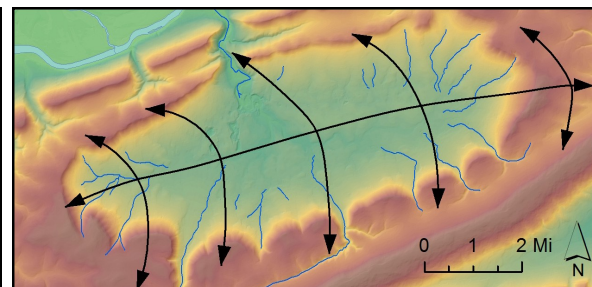
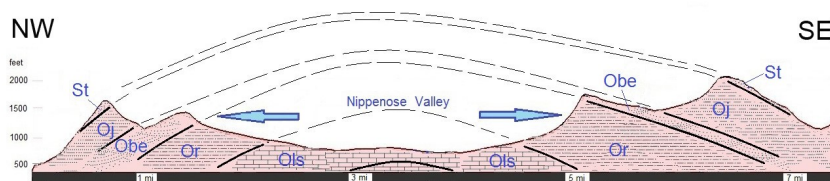
Clinton and Lycoming Counties, lat: 41.1488, lon: -77.1518
(Intersection Pa. Routes 44 and 654); Linden 7.5-minute quadrangle



The geology of the valley also controls the groundwater flow. Streams flow down the rim and disappear into sinkholes at the perimeter of the valley. In the subsurface, water flows through connected fractures and larger voids in the limestone before emerging as springs. This includes Nippono Spring, one of Pennsylvania's largest. The discharge of the springs forms the headwaters of Antes Creek, which exits through the water gap on the northern side of the valley.

Geology

The Nippenose Valley is a unique setting in Pennsylvania: an enclosed karst valley. Karst is a term for a limestone terrain that has undergone a long period of chemical weathering, resulting in closed depressions, sinkholes, and caves. Most karst valleys in Pennsylvania are open-ended or situated between gently rolling hills. Here, the bowl-shaped valley is the result of two major geologic processes. First, during the formation of the Appalachian Mountains, the valley rock layers were folded into an anticline (arch or upfold) with a bit of a twist, tilting down at the southwest and northeast ends. This made what geologists call a doubly plunging anticline. Next came a long period of weathering and erosion that left much harder sandstones as a stepped, double rim around the valley (see cross section). Below the inner rim, the rocks grade into finer grained, softer siltstone and shale, then into the soft limestone of the valley floor. Thousands of feet of rock that once existed above the valley floor were removed over millions of years. Now the sandstones stand about 700 to 1,300 feet higher than the valley—a clear demonstration of preferential erosion of the shale and limestone once the sandstone cap had been breached. Weakly acidic water that infiltrates into the valley reacts more readily with the limestone, creating the landscape we see today.



Top right: Cross section looking northeast through the breached anticline of the Nippenose Valley. Rock units include the Tuscarora (St), Juniata (Oj), Bald Eagle (Obe), and Reedsville (Or) Formations, and Ordovician limestones (Ols). Above left: Looking southwest across the valley floor. Above right: Doubly plunging anticline; note stream drainage. Antes Creek flows north to the West Branch Susquehanna River.