OUTSTANDING GEOLOGIC FEATURE OF PENNSYLVANIA

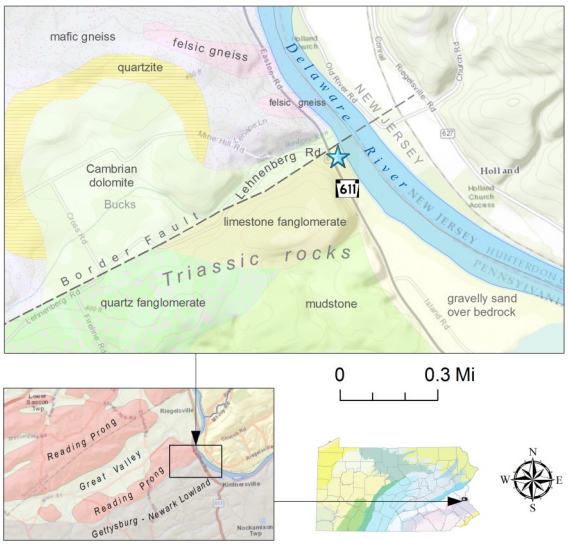
# MONROE BORDER FAULT, BUCKS COUNTY

Stuart O. Reese, 2016

Trail of Geology
16–079.0

## Location

Pa. Route 611 and Lehnenberg Rd., Bucks Co., Durham Twp., lat: 40.5723, lon: -75.1925, Riegelsville 7.5-minute quadrangle

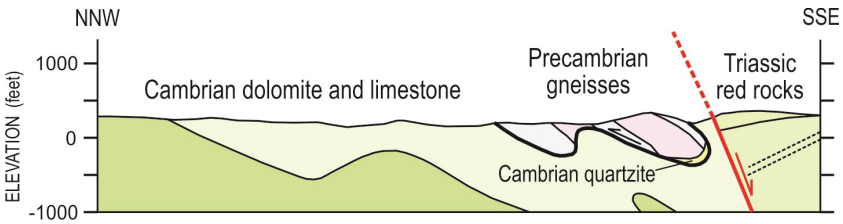



South of the border fault, Triassic rocks dip to the northwest. A plaque below the branch, designates the Monroe Border Fault as a National Natural Landmark.

## Geology

The Monroe Border Fault and adjacent rocks together provide a textbook example of Pennsylvania's long geologic history. The area has undergone multiple episodes of deposition, mountain building, and erosion. Immediately north of the border fault are tightly folded and faulted rocks, which are from a series of complexly folded thrust sheets that were pushed sideways about 440 to 500 million years ago during the Taconic orogeny. This is the Reading Prong section of the New England physiographic province. It is composed of Cambrian quartzite that is over 500 million years old and folded-in Precambrian gneisses that are some of the oldest rocks in the state at over a billion years old. Each unit had its own geologic history before being pushed over Cambrian dolomite and limestone.

Another mountain-building event (the Alleghanian orogeny) followed about 300 million years ago. Then, as Africa began its separation from North America about 250 million years ago, a basin formed in the fairly high terrain. Sediment poured in during the Triassic Period as the basin deepened into what is now the Gettysburg-Newark Lowland section of the Piedmont province. Coarse-grained sediments accumulated along the basin edges. Rivers laden with sediment built alluvial fans. The climate was generally warm but variable; dinosaurs passed through the region while lakes came and went. About 200 million years ago, diabase sills and dikes intruded the basin. Normal faulting and some folding then developed as the basin tilted to the northwest. The border fault is the boundary between the basin and older rocks in this area—millions of years of erosion has unearthed this deep geologic history.




Geologic cross section across the border fault (shown as red line). Modified from Drake and others (1967).

## Recommended Reading

Drake, A. A., McLaughlin, D. B., and Davis, R. E., 1967, Geologic map of the Riegelsville quadrangle, Pennsylvania-New Jersey: U.S. Geological Survey Geologic Quadrangle Map GQ–593, scale 1:24,000.

Monroe Border Fault web page of National Park Service.

Published by the Pennsylvania Geological Survey.

pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES