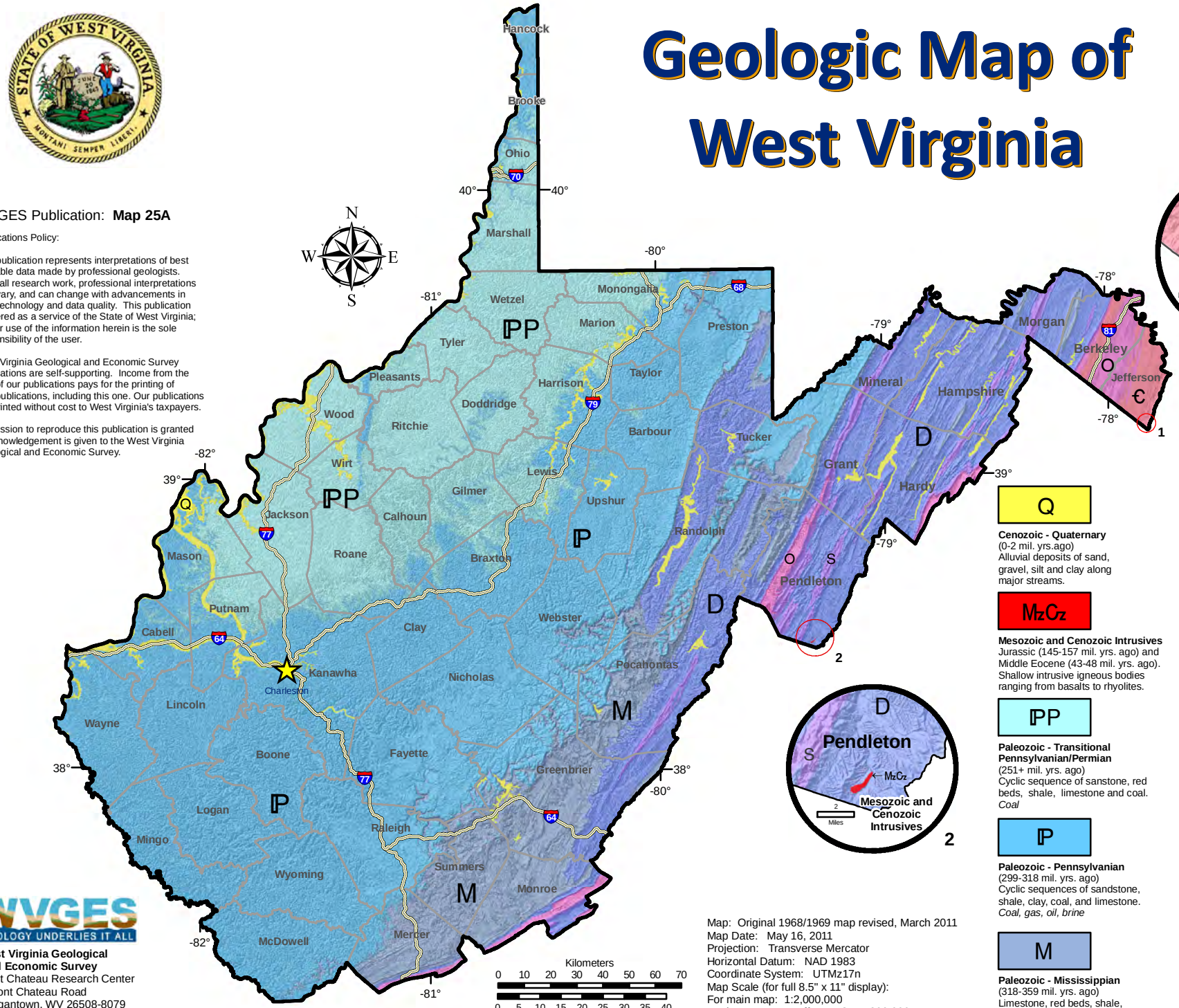
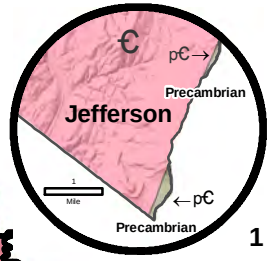
Geologic Map of West Virginia





WVGES Publication: **Map 25A**

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Legend: Era-Period

USGS Geologic Coloring Scheme

Q
Cenozoic - Quaternary
(0-2 mil. yrs.ago)
Alluvial deposits of sand, gravel, silt and clay along major streams.

Mz Cz
Mesozoic and Cenozoic Intrusives
Jurassic (145-157 mil. yrs. ago) and Middle Eocene (43-48 mil. yrs. ago). Shallow intrusive igneous bodies ranging from basalts to rhyolites.

PP
Paleozoic - Transitional Pennsylvanian/Permian
(251+ mil. yrs. ago)
Cyclic sequence of sanstone, red beds, shale, limestone and coal.
Coal

P
Paleozoic - Pennsylvanian
(299-318 mil. yrs. ago)
Cyclic sequences of sandstone, shale, clay, coal, and limestone.
Coal, gas, oil, brine

M
Paleozoic - Mississippian
(318-359 mil. yrs. ago)
Limestone, red beds, shale, and sandstone.
Limestone, gas, oil, brine

D
Paleozoic - Devonian
(359-416 mil. yrs. ago)
Redbeds, shale, sandstone, limestone, and chert.
Gas, silica sand, limestone

S
Paleozoic - Silurian
(416-444 mil. yrs ago)
Sandstone, shale, limestone, rock salt, and ferruginous beds.
Gas, limestone, artificial brine

O
Paleozoic - Ordovician
(444-488 mil. yrs. ago)
Limestone, dolomite, sandstone. shale, and metabentonite.
Limestone (particularly low silica), building stone, clayshale

€
Paleozoic - Cambrian
(488-542 mil. yrs. ago)
Limestone and dolomite, some sandstone and shale.

p€
Precambrian
(More than 542 mil. yrs. ago)
Greenstone. Present only in extreme eastern Jefferson Co.

Map: Original 1968/1969 map revised, March 2011
Map Date: May 16, 2011
Projection: Transverse Mercator
Horizontal Datum: NAD 1983
Coordinate System: UTMz17n
Map Scale (for full 8.5" x 11" display):
For main map: 1:2,000,000
For inset maps: Jefferson Co. 1:200:000
Pendleton Co. 1:500,000

Kilometers
0 10 20 30 40 50 60 70
0 5 10 15 20 25 30 35 40
Miles

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Bedrock Geology of West Virginia

The majority of bedrock exposed at the surface in West Virginia is sedimentary in origin, deposited during the Paleozoic Era (545 to 230 million years ago); very few igneous or metamorphic rocks are exposed at the surface due to deep burial beneath the thick Paleozoic cover. The geologic history of West Virginia prior to the Paleozoic is poorly understood. The oldest exposed rock in the State, in the tip of the eastern panhandle, is the Precambrian Catoctin Greenstone, a metamorphosed lava which erupted 800 million years ago. During the Cambrian and Ordovician periods, the State was covered by a sea that deposited limestone, shales, siltstones, and minor sandstones. These rocks are now exposed at the surface in the eastern panhandle.

Motion of the earth's tectonic plates reshape and deform preexisting rock units; subsequent erosion and deposition of the sediments produces new rock layers. The first well-known tectonic event to affect the State, the Ordovician Taconic Orogeny, formed a mountain chain to the north and east of West Virginia that became the source of clastic sediment during the latest Ordovician, Silurian, and early Devonian. Marine carbonates were deposited in south and central West Virginia during this time; the north and west were dominated by non-marine clastics and evaporites, especially during the late Silurian.

The next tectonic event, the Devonian Acadian Orogeny, formed a new set of mountains to the northeast. Erosion of these mountains produced sediment deposited across the State from the late Devonian into the Pennsylvanian. Regression of the Devonian sea led to the deposition of continental red beds over much of the State at the end of the Devonian. The sea returned in the Mississippian and thick limestones of the commercially important Greenbrier Group were deposited.

During the Late Mississippian, the sea regressed from West Virginia leaving a low-lying, swampy Pennsylvanian terrain which produced thousands of feet of mainly non-marine sandstone, shale, and coal, the State's economic mainstay.

During the latest Mississippian and into the Permian, the Appalachian Orogeny produced the Appalachian Mountains we know today. Even as these Mountains were being formed from existing rock layers, erosion began to wear them down providing a new source of sediment for streams flowing to the west.

After end of the Appalachian Orogeny in the early Mesozoic, the Atlantic Ocean began opening to the east. Although erosion of the Appalachians produced clastic sediment throughout the Mesozoic and into the present day, no sedimentary rock layers remain from these time periods. However, the extensive deformation of bedrock allowed the intrusion of numerous Mesozoic and Cenozoic igneous rocks in east-central West Virginia, especially Pendleton County.

Glaciers of the Pleistocene Ice Age never reached West Virginia. However, two large, ice-dammed lakes formed in the present Monongahela and Teays valleys, forming lake deposits, changes to the State's drainage, and alluvial deposits in the major river valleys, notably the newly-formed Ohio River. These are the only Cenozoic (younger than 70 million years) sedimentary deposits in the State.

Text credits: Ronald R. McDowell, PhD.; Bascombe M. Blake, Jr., PhD.