

Description of Map Units

- Quaternary**
 - Alluvial Deposits**
Unconsolidated clay, sand, silt, pebbles, cobbles, and boulders. Olive gray to medium dark gray, weathering moderate brown. Finer alluvium such as sand, silt and gravel underlies many of the lower gradient streams, while steeper streams are frequently floored by bedrock or locally derived sandstone cobbles and boulders. Valley floors are narrow in the steep terrain of resistant sandstones (Potsville Formation) and coarse colluvium is transitional with alluvium. Floodplains develop sinusoidally on the less resistant strata of the Allegheny Formation and Conemaugh Group. Total thickness ranges from a thin veneer to 15 feet (5m).
 - Colluvial Deposits**
Unconsolidated cobbles, boulders, and large blocks of sandstone and conglomerate. Light olive gray to yellowish gray. Typically derived from massive Potsville and Allegheny Formation sandstones that were transported by gravity, debris flow, and freeze-thaw processes. Abundant on steeper slopes adjacent to the Youghiogheny River and South Branch Bear Creek. Includes boulder streams and boulder fields. Thickness is estimated at 3 to 15 feet (1-15m).
 - Swamp Deposits**
Peat, lake gyttja, and sandy clay. Beneath peat is gyttja formed from the partial decay of peat and sandy clay ranging in color from light brown to browns with plant debris and wood fragments. Deposits are located west of the Youghiogheny River south of Friendsville. Total thickness estimated at 10 feet (3.5m).
- Pennsylvanian**
 - Conemaugh Group (differentiated)**
 - Casselman Formation**
Shale, sandstone, siltstone, limestone, and coal. Shale is predominantly medium to dark gray and found in association with coal and clay layers. Sandstone is light olive gray and thin- to thick-bedded with occasional cross-bedding. Important coals include: Barton (b) and Wellersburg (w) (Lower Clarysville coal of Jacobsen and Lyons, 1985). Marker sandstone units include: the Gratton above the Ames marine horizon and the Marston coal bed. The base of the formation is mapped at the top of the Ames marine interval. Incomplete thickness in the Friendsville Quadrangle is 100-150 feet (30-45m).
 - Glenshaw Formation**
Shale, sandstone, siltstone, limestone, coal, and redbeds. Shale is medium gray to black, thinly bedded, fissile, typically found in association with coal and clay layers. Coarse-grained olive gray sandstones weather yellowish brown with black and orange-stained, pitted surfaces. Some tabular cross-bedding and massive conglomeratic layers present. Important coals include: Brush Creek (bc), Lower Bakerstown (lb) and Ames (a) (Harlem coal of Jacobsen and Lyons, 1985). Marker sandstone units include: the Mahoning above the Upper Freeport coal bed, the Buffalo above the Brush Creek coal bed, and the Salsburg above the Lower Bakerstown coal bed. Marine horizons are present above the Brush Creek and Ames coal beds and limestone (Myersdale Limestone of Jacobsen and Lyons, 1985) was quarried on the western edge of the Friendsville Quadrangle. The base is placed at the top of the Upper Freeport Coal. Total thickness is 350-425 feet (100-125m).
 - Allegheny Formation**
Sandstone, conglomerate, shale, coal, and underclay. Interbedded sandstone and conglomerate intervals are very light to medium light gray, thick-bedded to massive with white quartz pebbles. Tabular cross-bedding and iron staining are common and iron banding is occasionally present. Erosional channel bases have abundant plant fossils, black to brown iron staining, and stylolites. Shale is medium gray to black, thinly bedded, fissile, typically found in contact with coal and clay layers, and capped by resistant sandstone layers. Two minable coals are mapped (from top): Upper Freeport (uf) and Upper Kittanning (uk). The Upper Freeport is the most persistent and commonly mined coal bed in the Youghiogheny basin. The base is mapped on the top of the Homewood Sandstone. Total thickness is 200-250 feet (60-75m).
 - Potsville Formation**
Sandstone and conglomerate, with minor shale, coal, underclay. Sandstone and conglomerate are light olive gray and thin-bedded to massive. Tabular cross-bedding, erosional bases, and fossil plant fragments are common. The Homewood Sandstone, present at the top of the formation, forms ledges and colluvial slopes in the southern portion of the Friendsville Quadrangle in South Branch Bear Creek and the Youghiogheny River and largely covers underlying lithologies. No minable coals are mapped in the Friendsville Quadrangle. The Potsville Formation rests unconformably on the Mauch Chunk Formation. The base is mapped on the disappearance of olive green sandstone and appearance of red and green shale or soil. Total thickness is 150-200 feet (45-60m).
 - Mississippian**
 - Mauch Chunk Formation**
Shale, siltstone, sandstone, limestone. Shale is reddish gray, olive green, thin-bedded and fissile with root casts, and weathers easily to reddish gray soil. Siltstone and sandstone are thin- to medium-bedded, light olive gray, argillaceous, micaceous, and frequently cross-bedded in multi-stacked sandstone layers that outcrop as small ridges on hillsides and bedrock steps in streams. Thin fossiliferous shales and limestones of the Reynolds limestone occur near the base of the formation. The base of the formation is mapped in red and green shale above the Wymps Gap Member of the Greenbrier Formation. The only exposure is in the South Branch Bear Creek valley. Total thickness is 450 feet (150m).
 - Greenbrier Formation**
Limestone, shale, siltstone, sandstone. Four members are recognized but not mapped (Brezinski, 1989). The basal member (Loyalhanna) is a reddish gray to light gray, arenaceous limestone with large-scale cross-bedding accentuated by weathering. It is 50 feet (15 m) thick. The overlying Deer Valley Member is a light olive gray, massive, crystalline limestone with white to pink calcite veins and slickensides. It weathers to moderate yellowish brown and thin siltstone beds occur every 4-6 inches (10-15cm). It is 15 feet (5 m) thick. The Savage Dam Member overlies the Deer Valley Member and is mostly reddish gray, grayish green, thin-bedded siltstone and variegated shale with mudcracks and light gray to white fine-grained sandstone. Sandstone layers are pale yellowish brown to yellowish gray, thick to massive, cross-bedded, and calcareous. The member is 75 feet (25m) thick. The uppermost unit of the Greenbrier Formation is the Wymps Gap Member, which is light olive gray to medium dark gray, shaly to argillaceous limestone with abundant brachiopod, bryozoa, and crinoid fossils. Bedding is thin to massive, ripple laminated, and sometimes nodular. A distinct fetid odor emerges upon breakage of some units and white calcite slickensides are present. The Wymps Gap Member is 45 feet (14m) thick. The base of the formation is mapped at the base of the Loyalhanna Member. This unit is found in small historic quarries above South Branch Bear Creek. The Wymps Gap Member was quarried historically for lime on the east side of South Branch Bear Creek. Total thickness is 185 feet (56m).
 - Parslane Formation**
Sandstone and conglomerate. Sandstone is predominant in the upper portion of formation and is light olive gray, thin- to medium-bedded, flaggy, and weathers moderate brown. Some layers are cross-bedded with erosional bases and shale rip-up clasts. The base of the formation is a massive yellowish gray to very pale orange conglomerate with rounded clear to white quartz pebbles ranging from 0.3-2 inches (0.5-5cm). Occasional white, friable beds are present. The base of the formation is mapped below this massive conglomerate, which forms ledges and conglomerate block fields. The Parslane Formation appears in the southeast section of the quadrangle. Total thickness is 250-300 feet (75-90m).
 - Devonian**
 - Rockwell Formation**
Shale, siltstone, and sandstone. Siltstone and sandstone are olive green to yellowish gray, thin- to thick-bedded, cross-bedded and burrowed. Shale is olive gray to black and thin-bedded with brachiopods, indeterminate bivalves and coal plant fragments. The base of the Rockwell Formation is mapped where the tan bioturbated sandstones of the Rockwell Formation become prevalent over red shales of the Hampshire Formation. Total thickness is 150-200 feet (45-65m).
 - Hampshire Formation**
Shale, siltstone, and sandstone. Shale is reddish gray, greenish gray, thin-bedded, and lachly with root casts. Siltstone and sandstone are olive green and reddish gray, cross-bedded, and blocky. Where covered the Hampshire Formation is mapped on the presence of reddish gray soil. The base is not present in the Friendsville Quadrangle. Thickness exposed in the Friendsville Quadrangle is 50-100 feet (15-30m).

References Cited:

Baker-Wibberly and Associates, Inc., 1973. Mine abatement measures for the Northern Youghiogheny River Complex, unpublished report to the Maryland Geological Survey, 103 p.

Brezinski, D.K., 1988. Geologic Map of the Avilton and Frostburg Quadrangles, Maryland: Maryland Geological Survey, scale 1:24,000.

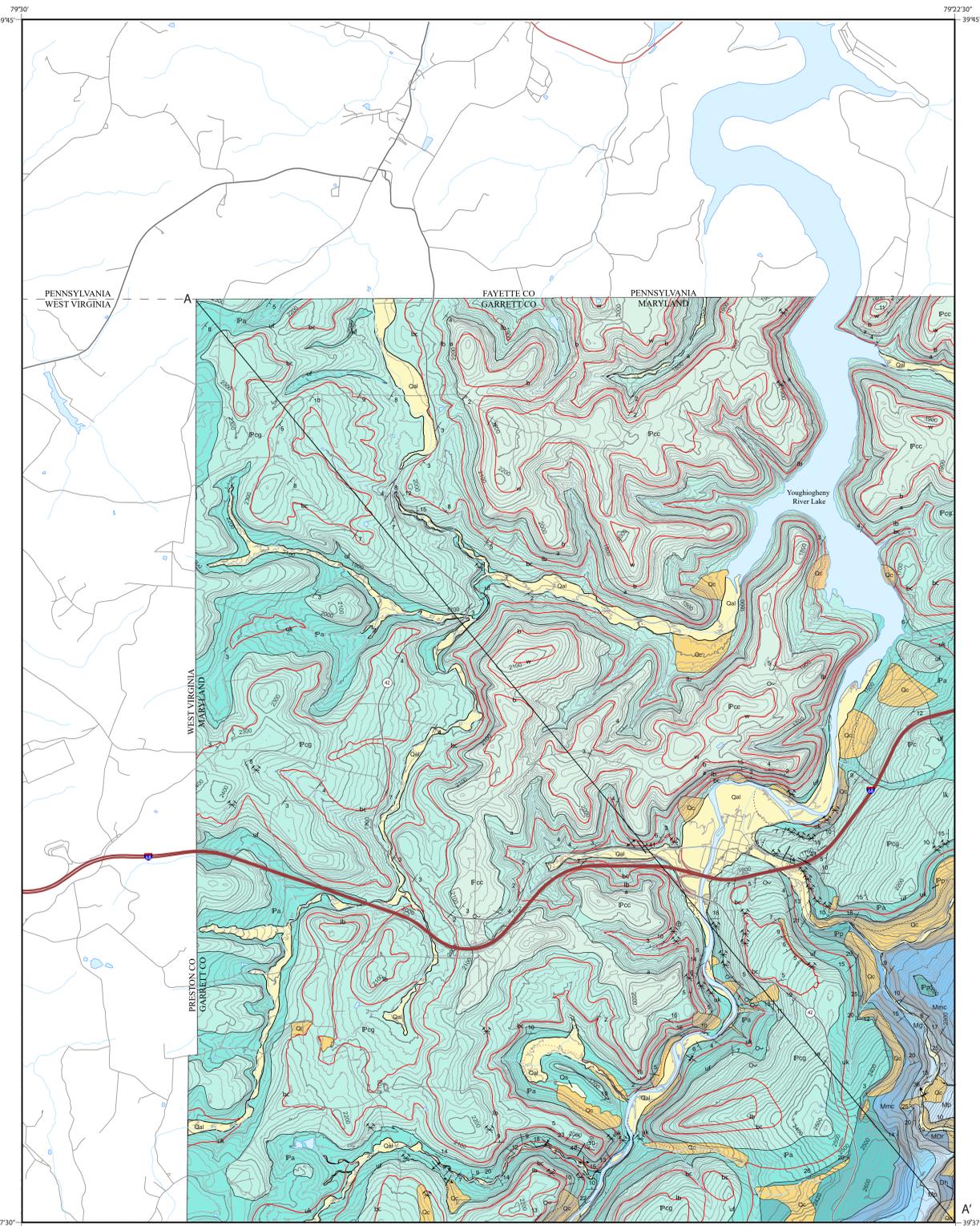
Brezinski, D.K., 1989. The Mississippian System in Maryland: Maryland Geological Survey Report of Investigations No. 52, 75 p.

Jacobsen, E.F. and Lyons, P.C., 1985. Coal geology of the lower Youghiogheny coal field, Garrett County, Maryland: U.S. Geological Survey Coal Map 101, scale 1:24,000.

Swartz, C.K., and Baker, W.A., 1922. The coal formations and mines of Maryland, in Second Report on the coals of Maryland: Maryland Geological Survey, v. 11, pt. 1, 296 p.

Explanation of Map Symbols

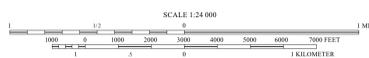
Planar Features	
A—A' Cross section line	⊕ Inclined bedding showing strike and dip
— Contacts	⊕ Horizontal bedding
— Geologic contacts; approximately located, dotted where concealed	⊕ Other Features
— Faults	⊕ Quarry or mine, inactive
— Small, minor inclined fault; showing strike and dip	— Coal Beds
— Folds	— ik Projected outcrop trace of coal bed, dotted where concealed
— Small, horizontal anticline; showing strike	
— Small, horizontal syncline, showing strike	
— Small, plunging syncline, showing strike and plunge	
Base Map Symbols	
— Transportation	— Topography
— Primary route, class 1 (divided, lanes separated)	— Topographic index contour (100- ft interval)
— Primary route, class 1 (undivided)	— Topographic intermediate contour (20- ft interval)
— Secondary route, class 2	— Hydrography
	— Mtd, Ly, Creek, Stream
	— Water body (e.g. lakes, ponds, rivers)



Geologic Map of the Maryland Portion of the Friendsville Quadrangle, Garrett County, Maryland

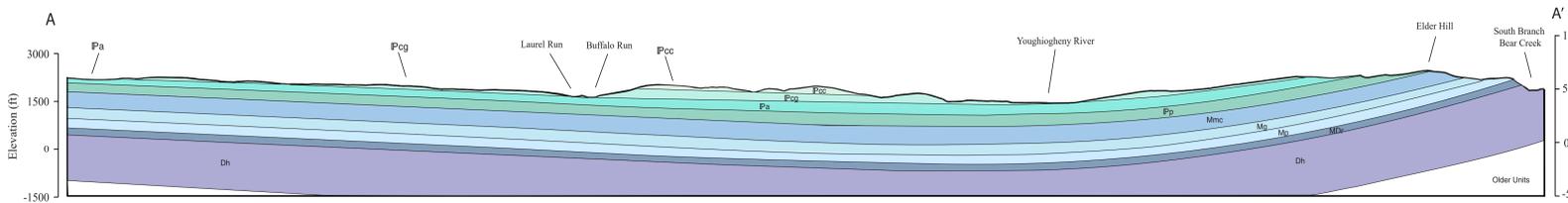
by Rebecca Kavage Adams and David K. Brezinski 2017

Hydrography and transportation U.S. Geological Survey (USGS) US Topo, Friendsville, MD Quadrangle. Topography generated from 1m LIDAR, USGS and Garrett County, 2015. Maryland State Plane Coordinate System FIPS 1900 Projection: Lambert Conformal Conic, 1980 geodetic reference system Horizontal Datum: North American Datum 1983 Geographic coordinates (latitude-longitude) shown near corners



1	2	3
4	5	6
7	8	9

1. Ft. Necessity
2. Ohioville
3. Confluence
4. Brandenville
5. Accident
6. Curzart
7. Sang Run
8. McHenry
Adjoining 7.5' quadrangle names (Friendsville quadrangle shaded)



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Lary Hogan
Governor
Boyd K. Rutherford
Lieutenant Governor



Department of Natural Resources
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Acknowledgements: This map was partially funded by the U.S. Geological Survey; National Cooperative Mapping Program, under USGS award number G16AC00292. The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. Geologic field mapping conducted in 2016-2017.