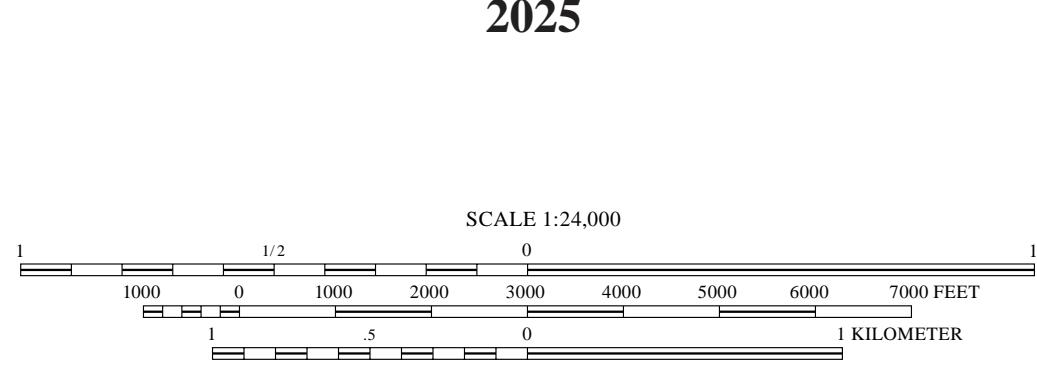


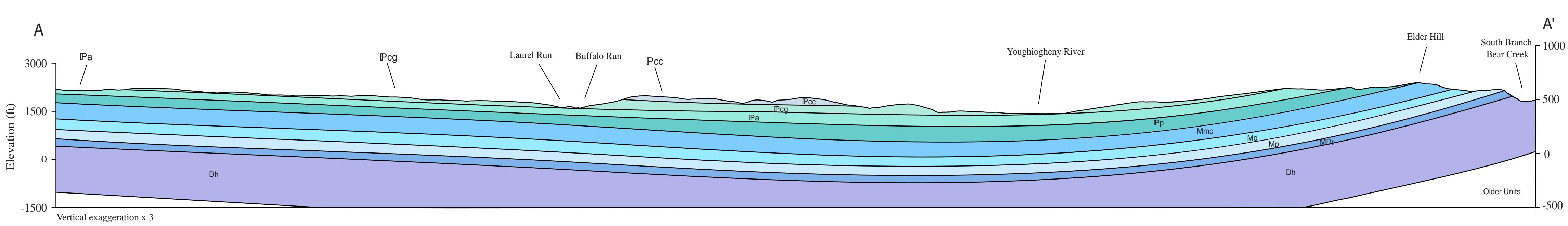
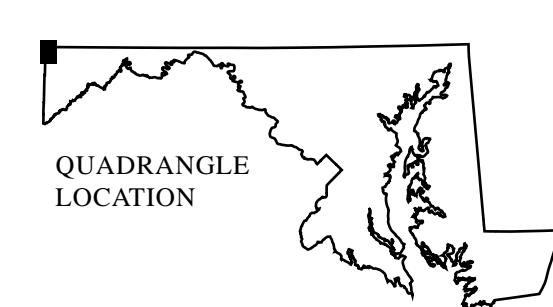
Description of Map Units

Alluvium	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 flooded by bedrock or locally derived sandstone cobbles and boulders. Valley floors are narrow in the steep terrain of resistant sandstones (Pottsville Formation) and coarse alluvium is transitional with alluvium. Floodplains develop sinuosity on the less resistant strata of the Allegheny Formation and Conemaugh Group. Total thickness ranges from a thin veneer to 15 feet (5 m).
Coluvium	Unconsolidated cobbles, boulders and large blocks of sandstone and conglomerate. Light olive gray to yellowish gray. Typically derived from massive Pottsville 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 50 feet (1-15 m).
Terrace deposits	Peat, clay and sandy clay. Beneath modern peat is clay and sandy clay ranging in color from light brown to brown with plant debris and wood fragments. Deposits are located west of the Youghiogheny River south of the town of Friendsville. Total thickness estimated at 10 feet (3 m).
Conemaugh Group	
Casselman Formation	Shale, sandstone, limestone, ironstone, coal and reefs. Shale is medium gray to black, finely bedded fissile, typically found in coal and clay layers. Sandstone is light olive gray and thin- to thick-bedded with occasional cross bedding. Important coals include: Barton (b) and Wellerings (w) (Lower Claysville coal of Jacobson and Lyons, 1985). Marker sandstone units include: the Grafton Sandstone above the Ames marine horizon and the Morgantown Sandstone above the Barton coal bed. The base of the formation is mapped at the top of the Ames marine interval. The top is not present in the Friendsville Quadrangle; thickness is 100-150 feet (30-45 m).
Glenshaw Formation	Shale, sandstone, limestone, ironstone, coal and reefs. Shale is medium gray to black, finely bedded fissile, typically found in coal and clay layers. Some tabular cross bedding and massive conglomerate layers present. Important coals include: Brush Creek (bc), Lower Bunkerston (lb) and Ames (a) (Harlan coal of Jacobson and Lyons, 1985). Marker sandstone units include: the Upper Mahoning Sandstone above the Upper Freeport coal bed; the Buffalo Sandstone above the Brush Creek coal bed, and the Saltsburg Sandstone above the Lower Bunkerston coal bed. Marine horizons are present above the Brush Creek and Ames coal beds and limestone (Myersdale Limestone of Jacobson and Lyons, 1985) was quarried at the western edge of the Friendsville Quadrangle. The base of the formation is placed at the top of the Upper Freeport Coal. Total thickness is 350-425 feet (100-125 m).
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, thin-bedded fissile, typically found in contact with coal and clay layers, and capped by resistant sandstone layers. Some tabular cross bedding (bottom 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 (60-75 m).
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 colloidal valleys 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 at the disappearance of olive green sandstone and appearance of red and green shale or paleoseal. Total thickness is 150-200 feet (45-60 m).
Mauch Chunk Formation	Shale, siltstone, sandstone and limestone. Shale is reddish gray, olive green, thin-bedded and fissile with root casts, and weathers light to reddish gray. Tabular cross bedding and erosional bases are thin and sandstone beds occur every 4-6 inches (10-15 cm). It is 15 feet (5 m) thick. The Overly 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 (23 m) thick. The uppermost unit of the Greenbrier Formation is the Wymp Gap Member, which is light gray, thin-bedded, and argillaceous limestone with some tabular, thick-bedded, highly fossiliferous sandstone beds. Bedding is thin to massive, well-bedded, and cross-bedded. Tabular A distinct fetid odor emerges upon breakage of some units and white calcite slickensides are present. The Wymp Gap Member is 45 feet (14 m) thick. The base of the formation is mapped at the base of the Loyallama Member. This unit is found in small historic quarries above South Branch Bear Creek. The Wymp Gap Member was quarried historically for lime on the east side of South Branch Bear Creek. Total thickness is 185 feet (56 m).
Greenbrier Formation	Limestone, dolomite, dolostone and sandstone. Four members are recognized but not mapped (Brezinski, 1989). The basal Loyallama Member is a light gray to light gray, annenaceous 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 limestone beds occur every 4-6 inches (10-15 cm). It is 15 feet (5 m) thick. The Overly 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 (23 m) thick. The uppermost unit of the Greenbrier Formation is the Wymp Gap Member, which is light gray, thin-bedded, and argillaceous limestone with some tabular, thick-bedded, highly fossiliferous sandstone beds. Bedding is thin to massive, well-bedded, and cross-bedded. Tabular A distinct fetid odor emerges upon breakage of some units and white calcite slickensides are present. The Wymp Gap Member is 45 feet (14 m) thick. The base of the formation is mapped at the base of the Loyallama Member. This unit is found in small historic quarries above South Branch Bear Creek. The Wymp Gap Member was quarried historically for lime on the east side of South Branch Bear Creek. Total thickness is 185 feet (56 m).
Purslane Formation	Sandstone and conglomerate. Sandstone is predominant in the upper portion of the 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 pale orange conglomerate with rounded clear to white quartz pebbles ranging from 0.3-2 inches (0.5-5.5 cm). 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 Purslane Formation appears in the southeast section of the quadrangle. Total thickness is 250-300 feet (75-90 m).
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 coaly 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. Equivalent to lower portion of the Price Formation in West Virginia. Total thickness is 150-200 feet (45-65 m).
Hampshire Formation	Shale, siltstone and sandstone. Shale is reddish gray, greenish gray, thin-bedded, and hackly 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. Equivalent to the Hampshire Group in West Virginia. Thickness exposed in the Friendsville Quadrangle is 50-100 feet (15-30 m).

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

by
Rebecca Kavage Adams and David K. Brezinski
2025

1	2	3	4	5	6	7	8
Adjoining 7.5' quadrangle names (Friendsville quadrangle shaded)							



References

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

A — A' Cross section line	Planar Features
	Multiple measurements at a single locality
Contacts	
— Geologic contacts; approximately located, dotted where concealed	30° Inclined bedding: showing strike and dip
	20° Inclined bedding
Faults	
— Small, minor inclined fault; showing strike and dip	Horizontal bedding
— Small, minor reverse fault; showing strike and dip	15° Inclined joint
	20° Vertical joint
	15° Vertical joint
Folds	
— Small, horizontal anticline; showing strike	Quarry, inactive
— Small, horizontal syncline; showing strike	x Mine prospect or adit, inactive
— Small, plunging anticline; showing strike and plunge	Coal Beds
— Small, plunging syncline; showing strike and plunge	— uk Projected outcrop trace of coal bed, dotted where concealed
	Other Features
— Small, horizontal anticline; showing strike	— Quarry, inactive
— Small, horizontal syncline; showing strike	x Mine prospect or adit, inactive
— Small, plunging anticline; showing strike and plunge	Coal Beds
— Small, plunging syncline; showing strike and plunge	— uk Projected outcrop trace of coal bed, dotted where concealed
	Base Map Symbols
	Transportation
— 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
	— Stream
	— Muddy Creek
	— Deep Creek
	Water body (e.g. lakes, ponds, rivers)

