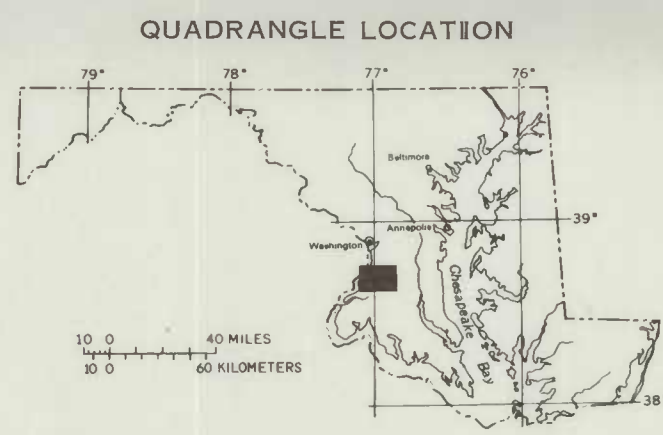


MAP 1: GEOLOGIC MAP OF THE MOUNT VERNON AND PISCATAWAY QUADRANGLES, MARYLAND

By
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STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
MARYLAND GEOLOGICAL SURVEY
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Copies of Map and/or Atlas available from
Maryland Geological Survey
John Hopkins University
Baltimore, Maryland 21218



EXPLANATION

- ALLUVIUM**
Interbedded sand, gravel, and silt-clay.
Fine to very coarse gravel, sandy gravel, and sand, massive to laminated silt-clay, in places with organic matter including leaves, twigs, and logs; mottled silt-clay, and rare peat. Color tan, brown, pale gray to very dark gray. These are heterogeneous, generally very poorly sorted, and commonly showing clear stratification and strongly reflecting the composition of the coarse sediments. The dominant lithology associated with streams draining the Southern Maryland Upland is quartzite gravel and sandy gravel commonly coarse with cobbles and boulders. In contrast, alluvium in the floodplains of streams crossing the Potomac River contains a mixture of silt-clay with considerable fine gravel. Qal also includes a number of small tidal marsh areas underlain by dark organic-rich mud, as well as a few narrow sand beaches bordering the Potomac River.
Qal underlies stream channels, floodplains, and adjacent low areas, and is the record of channel and overbank deposition mostly during the last 10,000 years.
Thickness 2 to 15 feet.
- TERRACE DEPOSITS**
Interbedded sand, clayey sand, and pebbly sand; minor gravel and silt-clay.
Fine to coarse-grained clayey sand, predominantly quartzite but glauconitic in places, and subordinate quartz gravel. Color tan, brown, reddish-brown, or gray. Terrace deposits include mostly heterogeneous materials, poorly sorted, massive to well-stratified, the latter mostly flat-bedded. The greatest concentration of gravel in the terraces flanking Piscataway and Mattawoman Creeks is in contrast, the extensive Qf flats bordering the Potomac River are underlain by mostly sand and clayey sand containing scattered pebbles, cobbles, and boulders.
These sediments are fluvial in origin, the product of Late Pleistocene terrace deposition by the major streams of the area.
Thickness 3 to 25 feet.
- MINOR TERRACE DEPOSITS AND COLLUVIUM**
Interbedded sand, clayey sand, and gravel; massive, poorly-sorted to unsorted clayey sand with pebbles and cobbles.
Sand, fine to coarse-grained, and predominantly quartzite gravel; flat bedded to massive; uppermost portion commonly pebbly loam. Color tan, brown, or gray. Lithologically similar to Qf. This composite unit includes a variety of partially dissected older terraces flanking the major streams of the Potomac River. It is composed of quartzite gravel and silt-clay with considerable fine gravel. In places, the uppermost portion is a thin, yellowish to reddish-brown pebbly loam. These deposits predate the deposition of Qf, and have also the same reddish to grayish coloration, mostly on gentle slopes, which are inseparable from the terrace deposits at this scale.
Thickness 3 to 20 feet.
- BRANDYWINE FORMATION**
Sand, pebbly sand, and gravel; capped by sandy, pebbly loam in places.
Sand, medium to coarse-grained, poorly-sorted; interbedded with pebbly sand and medium to coarse gravel. Sand predominantly quartzite, pebbles are quartzite, sandstone, and chert; portions of deposit closest to Potomac River contain small percentage of crystalline rock clasts including gneiss, phyllite, and schist. Basal beds include sporadically-distributed boulders up to 7 feet in length. Color pale gray to orange-brown. Bedding mostly lenticular, cross-bedded to massive. Where best developed, approximately 10 to as much as 15 feet of yellowish to reddish-brown pebbly loam.
The Brandywine Formation is fluvial in origin, and was presumably deposited by the ancestral Potomac River during the time span between Late Miocene and Early Pliocene.
Thickness 3 to 40 feet.
- CALVERT FORMATION**
Sand, clayey to silty; diatomaceous silt, and minor clay.
Homogeneous sand, very fine to fine-grained, clayey to silty. Color olive-green to olive-gray where unweathered, tan or brown in weathered sections. Includes in basal portion one or more beds, totaling as much as 15 feet, of olive-green diatomaceous quartz silt containing up to 40% diatoms; diatomaceous beds thin to northwest and are absent in the area north of Piscataway Creek and west of Turners Creek. Basal few feet of Calvert Formation contains a pebbly sand and silt with coarse sand, small quartz pebbles, black phosphate clasts, and vertebrate remains including shark teeth. Bedding obscure; most common sedimentary structures are narrow, vertical, and filled with gray to green clay. Fossil mollusks, predominantly Venericardina, are common in layers and thin bands throughout the unit. Individual layers and concretionary bodies are also distributed throughout the unit. Along the western edge of the map area, the Calvert pinches out and is overlapped by the Nanjemoy.
The lower Calvert probably accumulated in a restricted marine basin, whereas the upper portion of the unit records a more-normal middle shelf environment.
Thickness 3 to 70 feet.
- NANJEMOY FORMATION**
Sand, clayey, glauconitic in part, and silt-clay.
The dominant Nanjemoy lithology over much of the map area, especially to the south and east, is fine to medium-grained, very clayey sand, containing variable amounts of glauconitic silt and clay according to 20% of the sand fraction. Dark fine and glauconitic sandstone occurs both sporadically throughout the unit to northwest and is absent in the area north of Piscataway Creek and west of Turners Creek. Basal few feet of Nanjemoy typically show thin to 20 feet of very fine to medium-grained sand and silt with considerable clay matrix. The basal Nanjemoy contact is sharp and well defined. In places, the lower few feet are commonly shaly, resting on and filling narrow to wide, filled with gray to green clay. Fossil mollusks, Venericardina, are common in layers and thin bands throughout the unit. Individual layers and concretionary bodies are also distributed throughout the Nanjemoy. Along the western edge of the map area, the Nanjemoy pinches out and is overlapped by the Calvert.
The Nanjemoy is a product of inner shelf deposition in relatively shallow marine waters; the absence of glauconitic silt in most of the westward exposures attended by increasing amounts of silt, suggests shoaling conditions.
Thickness 3 to 80 feet.
- MARLBORO CLAY**
Clay, dense, and subordinate silt.
Predominantly clay, brittle to slightly plastic, pale-red to silvery-gray, finely laminated to massive, bedding irregularly lenticular to hummocky; interbedded with yellowish gray to reddish micaceous silt and clayey silt in lenses up to 24 inches in thickness, evenly laminated to cross-laminated, lignitic. Typically, the uppermost few inches to a foot of the unit are gray in color, and the remainder red; in places, the lower few feet are also gray. The Marlboro thins northward over the map area and is ultimately overlapped by the Calvert Formation. Exposures along the Potomac Escarpment consist typically of 2 to 10 feet of gray silty clay with numerous silt interbeds and considerable lignitic debris.
The Marlboro Clay probably accumulated in very shallow marine or brackish water, perhaps in part a tidal flat environment.
Thickness 3 to 30 feet.
- AQUIA FORMATION**
Sand, variably glauconitic, and calcareous sandstone.
Sand, very fine to fine-grained, clayey to silty, containing trace amounts to as much as 25% of glauconitic; interbedded with layers and concretionary zones of calcareous sandstone, friable to hard rock, up to 5 feet thick. Color dark greenish-gray to medium gray. Upper contact sharp, burrowed, with thin wavy beds of Marlboro Clay introduced into the upper few inches of Aquia sand. Fossils are abundant in the Aquia within the map area, the fauna is dominated by large Turritella, Ocenebra, and a few other Venericardina.
The Aquia comprises sediments of the shallow marine shelf, probably deposited in less than 200 feet of water.
Thickness 40 to 150 feet.
- MONMOUTH FORMATION**
Sand, clayey to silty; and basal gravel.
Sand, very fine to fine-grained with considerable silt-clay matrix, with basal gravel up to 2 feet in thickness, comprised of soft quartz pebbles up to 2 inches diameter in dark-gray silty clay matrix, partially gypsum-cemented. Color mottled dark-gray to brownish-gray. Exposures of the Monmouth Formation are restricted to the bluff cresting the Potomac River and Piscataway Creek in the vicinity of Fort Washington; here the unit is 15 feet or less in thickness. The Monmouth exists in the subsurface over at least the northern half of the map area where it increases to 50 feet in thickness.
The Monmouth is the oldest marine unit in the section mapped; deposition took place on the inner shelf, but the basal transgressive gravel probably records very shallow water.
Thickness 15 to 50 feet.
- MAGOTHY FORMATION**
Sand, silt-clay, and subordinate pebbly sand.
Sand, fine to medium-grained, well-sorted to muddy, in places lignitic, white to pale-gray in color; interbedded with laminated, dark gray, carbonaceous silt-clay, and some dense chocolate clay. The Magothy also contains minor interbeds of medium to coarse-grained pebbly sand or gravel.
Within the mapped area, the Magothy Formation is confined to the subsurface of the Piscataway Quadrangle.
Thickness 3 to 50 feet.
- PATAFSCO FORMATION**
Clay, silty, and minor sand.
Clay, silty, tough, massive; mottled pale-gray, red, and tan; sporadic thin lenticular beds of tan clayey sand. Like the Monmouth, the Patafasco Formation is exposed only along the Potomac River in the westernmost portion of the map area. In these outcrops, the upper 20 feet or less of the unit can be seen. Upper contact sharp, unconformable.
The Patafasco Formation is the record of alluvial sedimentation on a broad flat coastal plain.
Thickness 400 to 650 feet.

