

EXPLANATION

**ARTIFICIAL FILL**  
Composed of heterogeneous materials such as rock, unconsolidated sediment, clay, silt, and dredge spoil. Only major areas of fill on highly disturbed ground have been mapped, such as filled pits, diked flood plains, and transportation corridors across topographically low areas.

**ALLUVIUM**  
Interbedded gravel, sand, silt, and clay of variable composition and sorting. Typically confined to flood plains of perennial streams, upland gathering areas, and marshes adjacent to estuaries. Sediment size, sorting, and mineralogy are strongly controlled by the source rocks and geomorphic setting. The quartzose sand and polymer gravels are typically well-sorted and loosely compacted; the silts and clays are often water saturated and poorly bedded. Minor amounts of colluvium (unmapped) may intertongue with alluvium at or near the bases of slopes. Thickness 0.5 to 3 meters.

**TALBOT FORMATION**  
Buff to orange, poorly-sorted, poorly bedded quartz silt with kaolinitic, illite, and montmorillonitic clays. Very sparse leaf and twig debris in bedded silts. Thin and very poorly exposed with magnetic clasts chiefly below the 10' contour. Depositional environment: alluvial flood plain or open marsh. Thickness 0.5 to 3 meters.

**UPLAND GRAVEL**  
Orange-brown, poorly-sorted, fine sand to boulders commonly floating in a clay-silt matrix. Periglacial orientation along horizons of abrupt lateral and vertical sediment size changes. Deposits are well-bedded in places, fining upward; sequences 1 to 3 meters are rare. Sparse to abundant gravel and large blocks of fresh to weathered mafic crystalline rock are diagnostic framework components. Thickness 0.5 to 8 meters.

**UNCONFORMITY**

**PATUXENT FORMATION**  
KxS Sand facies. Highly variable, interbedded sand, gravel, silt, and clay containing ferruginous cement. Sand and gravel typically quartzous with a buff, kaolinitic clay-silt matrix. Sediments are organized into fining-upward packages (2 to 3 meters thick) consisting of thin-bedded gravel with clay clasts or cross-bedded sands at the base grading upward to laminated or massive silt/clay at the top. Elsewhere vertical sequences show abrupt sediment size changes and erosive contacts. The heavy mineral suite is characterized by staurolite, zircon, tourmaline, and kyanite. Sparse silified and abundant rounded replacements of both cyclopooids and coniferous wood are present throughout the Formation. These sediments were deposited in a high-gradient braided stream complex. Thickness 0.5 to 30 meters.

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**KxK** Clay facies. Light gray to black or brown clay containing variable amounts of quartz silt and gravel. Most concentrations of lignite, partially purified wood or macerated leaf and cone debris are associated with some siltstone sequences. Thin partings of sand and/or gravelly clay are interbedded with massive clay. These isolated sand/gravelly clay are typically associated with stream channels or abandoned stream channels or pre-Cretaceous topographic lows. Thickness 0.5 to 9 meters.

**UNCONFORMITY**

**DIABASE**  
A single occurrence of rusty-weathering, fine-grained, massive black pyroxene-plagioclase rock as a dike less than 2 meters thick. Located along Gunpowder Falls, 1.000 meters east of Bel Air Road.

**PGMATITE**  
Diabase, mappable bodies of massive, coarse-grained to very coarse-grained, light gray to pinkish rock composed of micro (mostly muscovite), quartz, zircon, and minor garnet and/or biotite. Crystals are commonly 1 to 2 millimeters in diameter. Similar pegmatites in the adjacent Potomac quadrangle yield rubidium-strontium mineral ages of 2.5 million years.

**OVERLAP** Areas in which other rock formations include up to 50% pegmatite, identical to that described above, as concordant masses a few meters thick. Commonly associated with or replaced by a four-faceted gneiss rock of the same mineralogy.

**COLD SPRING GNEISS**  
Fine- to medium-grained, uniform muscovite-biotite-microcline-plagioclase quartz gneiss bearing microcline ovals or subhedral megacrysts up to 5 millimeters in longest dimension. Age unknown.

**GUNPOWDER GNEISS**  
Fine- to medium-grained, very uniform muscovite-biotite-microcline-plagioclase-quartz gneiss, locally bearing small microcline megacrysts, 2 to 4 millimeters in diameter. Concordia plot yields age of 450 million years.

**OVERLAP** Areas in which the other rock formations include interbedded Gunpowder Gneiss, identical to that described above, as concordant sills and rarely as cross-cutting dikes, as much as ten meters thick. Locally very muscovite rich along Homage Run.

**CONTACT**  
generally approximate or inferred. Distribution and concentration of structural symbols is an approximate measure of the reliability of any contact.

**BOUNDARY BETWEEN MINERAL FACIES OF THE LOCH RAVEN SCHIST.**

**normal fault**  
U - upthrown side  
D - downthrown side

**thrust fault**  
teeth on upper plate

**axial trace of anticline or dome**

**axial trace of overturned syncline**

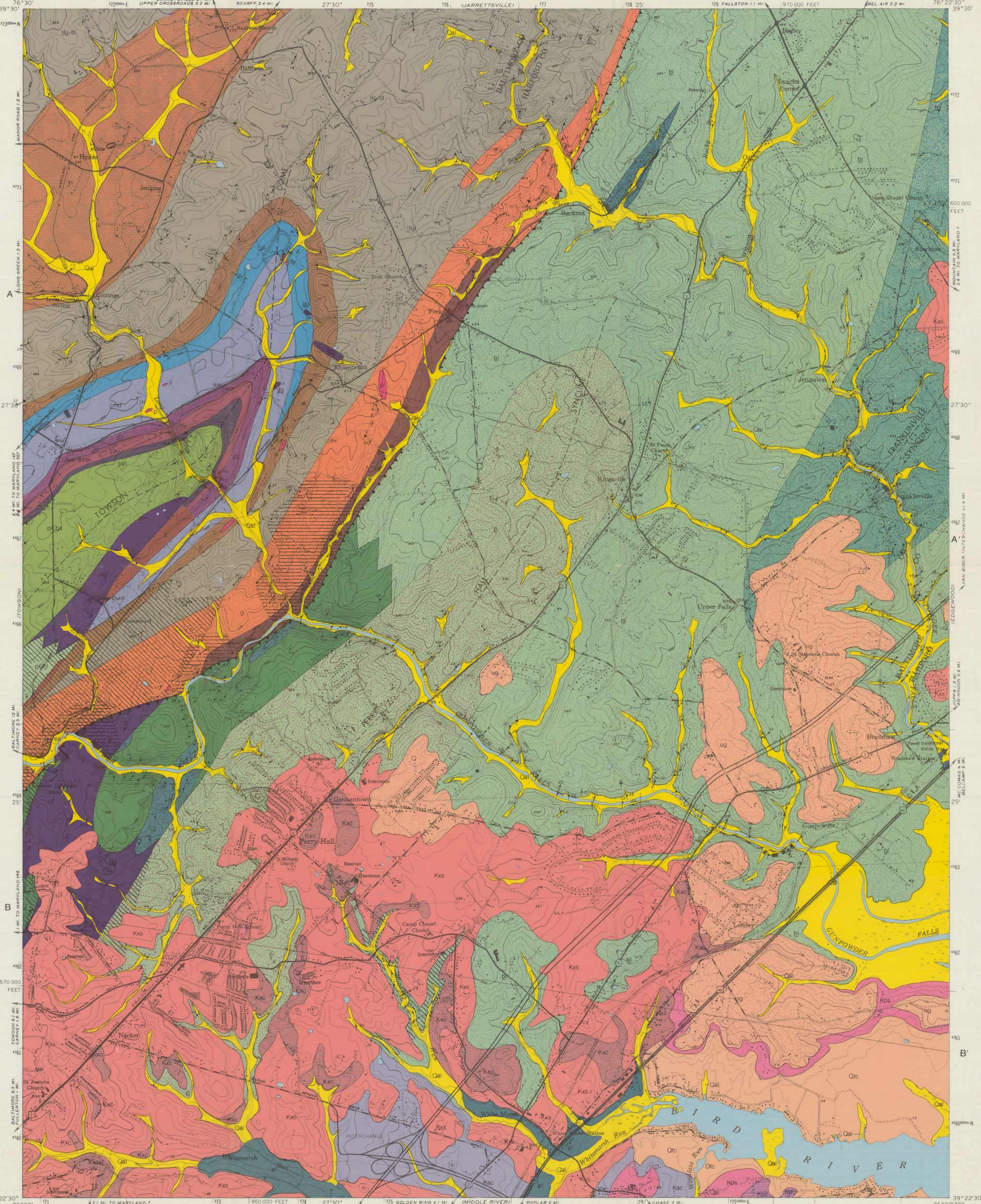
**foliation or schistosity (everywhere virtually parallel to compositional layering)**

**axis and symmetry of minor fold**

**mineral lineation**

**meters**  
100  
200  
300  
400  
500  
600  
700  
800

**QUADRANGLE LOCATION**

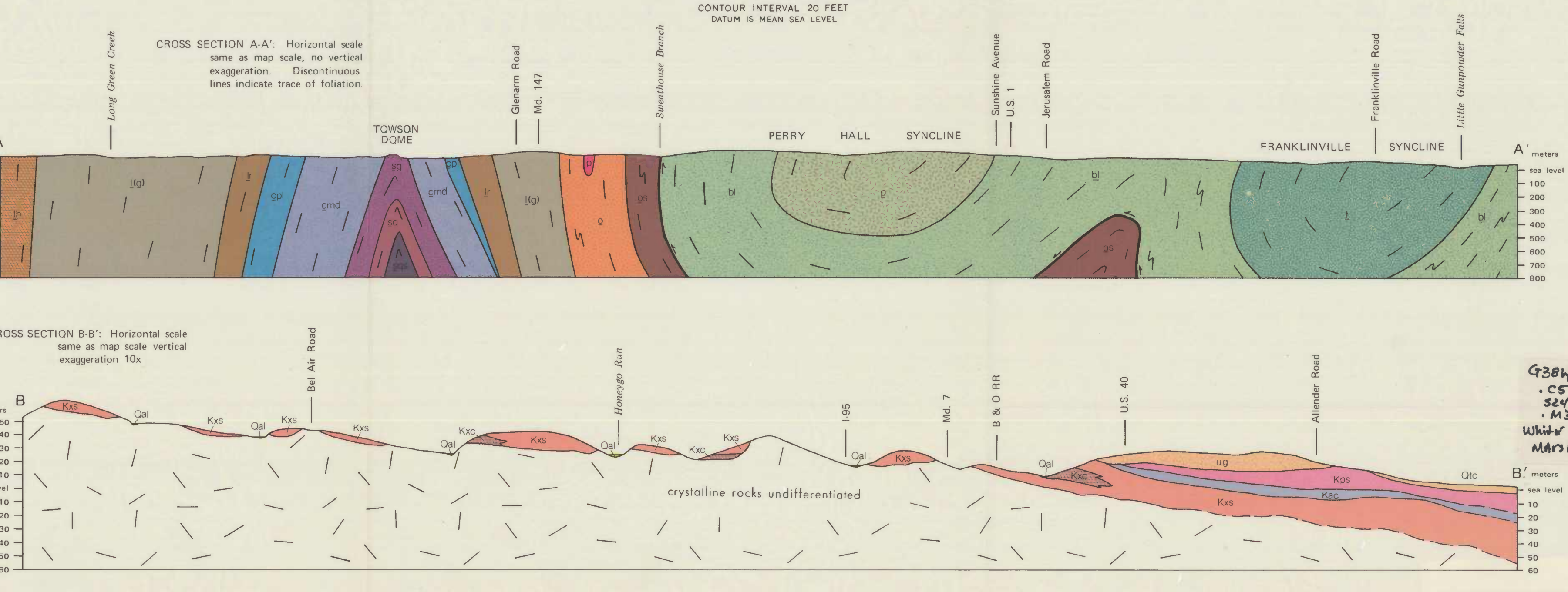


WHITE MARSH QUADRANGLE: GEOLOGY, HYDROLOGY AND MINERAL RESOURCES  
**MAP 1. GEOLOGIC MAP OF THE WHITE MARSH QUADRANGLE, MARYLAND**

BY  
 William P. Crowley, Juergen Reinhardt and Emery T. Cleaves  
 1976

SCALE 1:24,000  
 1000 2000 3000 4000 5000 6000 7000 FEET  
 0 1 2 3 4 5 6 7 8 9 10 KILOMETER

CONTOUR INTERVAL 20 FEET  
 DATUM IS MEAN SEA LEVEL



STATE OF MARYLAND  
 DEPARTMENT OF NATURAL RESOURCES  
 MARYLAND GEOLOGICAL SURVEY  
 Kenneth N. Weaver, Director

Copies of Atlas available from  
 Maryland Geological Survey  
 Johns Hopkins University  
 Baltimore, Maryland 21218

G3841  
 .C5  
 324  
 .M3  
 White  
 Marsh