

Geologic Map of Prince George's County, Maryland

by John D. Glaser, 2003

And Silt-Loam Soils with Hardpan in Upland Deposits from Hack (1977)

- ALLUVIUM** — Interbedded sand, silt-clay, and subordinate gravel. Light to dark-gray, tan, or brown; weathers pale-gray, yellow, or brown.
- AQUA FORMATION** — Sand, variably glauconitic, and minor calcareous or ferruginous sandstone. Dark greenish gray to medium-gray; weathers "salt and pepper" speckled to rusty brown.
- BRIGHTSEAT-SEVERN FORMATIONS, undivided**
 - BRIGHTSEAT FORMATION** — Sand and silt, clayey in part, variably glauconitic. Dark gray to dark greenish gray; weathers pale-gray to brownish gray.
 - SEVERN FORMATION** — Sand, fine-grained, variably glauconitic. Pale-gray to medium-gray; weathers mottled pale-gray and yellow.
- POTOMAC GROUP (Patuxent, Anundel, Patuxent Formations)**
 - Patuxent Formation** — Sand, silt, and subordinate fine- to medium-grained clayey sand. Red, tan, gray, buff, or mottled; dark-gray, where heavily organic.
 - Anundel Clay** — Clay, silt, and subordinate fine- to medium-grained clayey sand. Red, tan, gray, buff, or mottled; dark-gray, where heavily organic.
 - Patuxent Formation** — Medium- to coarse-grained, moderately to well foliated sedimentary melange consisting of a quartzofeldspathic matrix that contains coarse pebbles and fragments of metamorphic rocks which specifically include fragments of meta-igneous and meta-sedimentary rocks in the mapped area (Fleming et al., 1995). The rock weathers to a porous, spongy brown saprotite and grades upward to a sticky micaceous red and gray clay (Whittington and Froelich, 1974).
- LAUREL FORMATION** (Hopson, 1964; Fleming et al., 1995) — Metasedimentary rock unit, which includes considerable mica gneiss and schist; a metamorphosed sedimentary melange.
- MARLBORO CLAY** — Clay, pale-red to silvery-gray, and minor interbedded silt, yellowish gray to pale-gray.

The Aquia is composed of sand, fine- to medium-grained, poorly sorted to well sorted, containing as much as 40 percent glauconite. Thin layers and concretionary zones of calcareous shelly sandstone are scattered through the unit. Outcrop sections contain "rusty" ferruginous sandstones in places. Bedding is massive for the most part, with burrow mottling common. Molluscan fossils, chiefly large *Turritella* and *Ostrea*, are present in some beds. The Aquia reaches a maximum 150 feet (45.7 m) in thickness in Prince George's County. Aquia sands accumulated on the marginal marine shelf in less than 200 feet (61 m) of water during Late Paleocene time.

The Brightseat consists of mostly fine-grained, poorly sorted sand, with up to 30 percent glauconite, but generally much less. In places, the basal Brightseat contains some medium to coarse sand with quartz grains, small pebbles, phosphatic clasts, and shark teeth. The unit is essentially a fine-grained sequence, with the relatively coarse lower portion grading rapidly upward to fine-grained clayey sand and finally dense clayey micaceous silt. The abundance of mica is characteristic of the upper Brightseat, as is a decided purplish cast in unweathered sediment. The Brightseat is both thin and lithologically similar to the underlying Severn Formation; thus, the two units are mapped together at this scale. It thickens southwestward as the county, reaching a maximum of about 60 feet (18.3 m) south of the District of Columbia. The Brightseat is a marine shelf unit of early Paleocene age.

The Severn is composed almost entirely of very fine- to fine-grained glauconitic sand, which is moderately to well sorted. The sand grades in places to dense clayey micaceous sand and silt. Glauconite may comprise as much as 40 percent of the sand fraction. The basal few feet of the unit is fine- to medium-grained with scattered granules and pebbles, silty concretions, and shark teeth. Along the Potomac River and its tributaries in the vicinity of Bowie, a zone of large lobate or elliptical ferruginous concretions marks the top of the formation. Moreover, outcrops along the Potomac may contain considerable selenite. Like the Brightseat, the Severn Formation is a thin unit, 40 feet (12.2 m) thick at most along the Patuxent, and reducing to about 13 feet (4.0 m) in outcrop at the Potomac River. It is mapped on the Brightseat as a single map unit. The Severn was deposited on the inner marine shelf in Late Cretaceous time.

The Potomac Group includes the Patuxent, Anundel and Patuxent Formations. In Prince George's County these units have not been mapped separately at the county scale; instead sediments of the Potomac Group have been mapped according to dominant lithology: sand-gravel facies (Kps) or silt-clay facies (Kpc). Potomac Group strata are Early Cretaceous in age, and record floodplain deposition. A maximum thickness of about 1000 feet (about 305 m) is known in the outcrop belt.

Sand-gravel facies: Interbedded quartz sand, pebbly sand, gravel, and subordinate silt-clay. Sands and gravels typically white, buff, yellow to brown; weathered zone commonly limonitic with ironstone pecks and layers. Silt-clay is white, pale gray, or variegated; dark-gray, where highly organic.

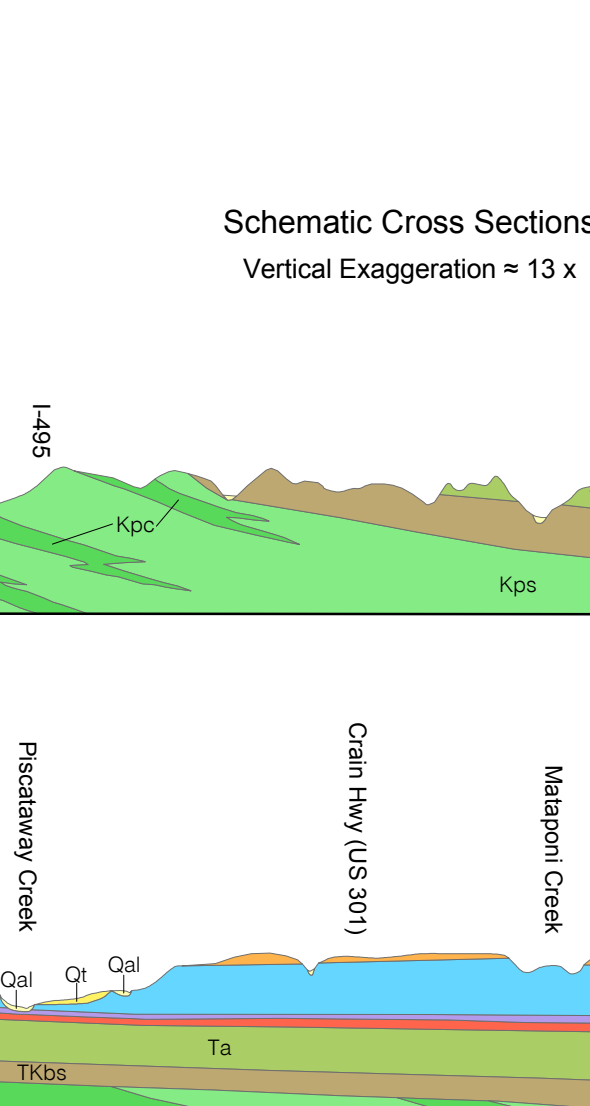
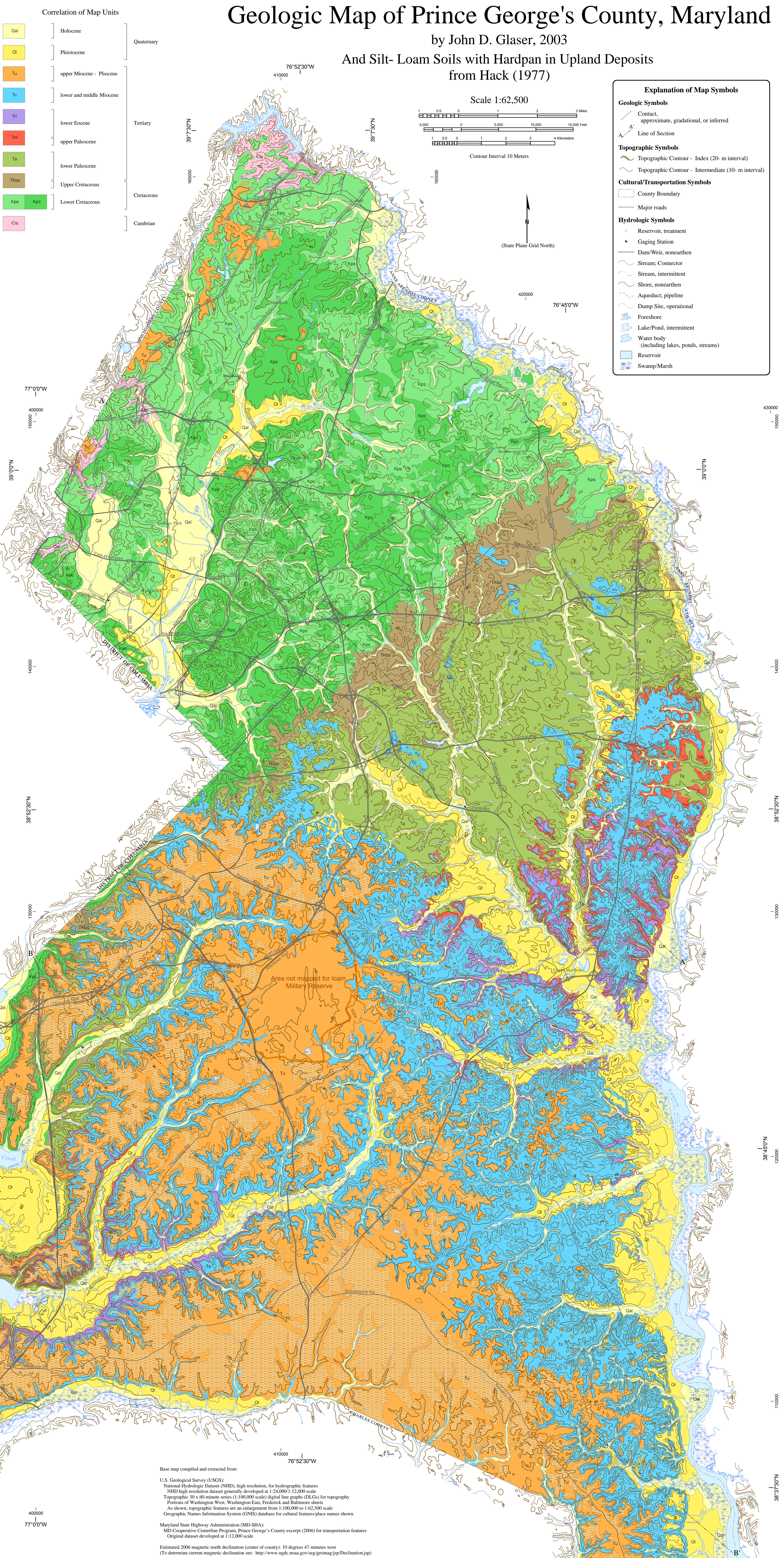
Silt-clay facies: Clay, silt, and subordinate fine- to medium-grained clayey sand. Red, tan, gray, buff, or mottled; dark-gray, where heavily organic.

The silt-clay facies of the Potomac Group, comprised of the Anundel Clay and much of the lower Patuxent Formation, lies mostly east of Indian Creek. The lithology is predominantly compact red and dark gray clay containing large and small lenses and pecks of sand and minor gravel. Some of the clay is strikingly variegated in color. Dark gray lignitic clay is most characteristic of the Anundel but occurs at other stratigraphic levels as well. Much of the clay is internally massive and weathers blockily. Silt-clay lenses in the uppermost portion of the unit tend to be whitish or pale-gray, and thinner. Rare dinosaur bones and teeth have been found in Potomac silt-clay, as have plant fossils.

Originally thought to be a metamorphosed igneous rock (e.g., gneissic granite, migmatite), the unit is now interpreted as a metamorphosed sedimentary unit that originated as a "chaotic mixture of fragmental rocks and pebbles in an unsorted matrix of sand, silt, and mud" resulting from submarine debris slide and was subsequently metamorphosed (Hopson, 1964).

Some previous workers have considered the Laurel Formation to be the same unit as the Sykesville Formation and mapped the Laurel and Sykesville Formations either as part of the Boulder Group facies of the Wiswashington Formation (Southwick and Fisher, 1967; Cleaves et al., 1968) or simply as the Sykesville Formation (e.g., Muller et al., 1989). A preliminary geologic map of the Beltsville area (Whittington and Froelich, 1974) showed areas that are identified on the current map as Laurel Formation mainly as two facies (diamictic gneiss and pelitic schist) of the Wiswashington Formation. The Laurel Formation nomenclature shown on the current map follows the most recent mapping of the unit by Fleming et al. (1995).

The Laurel Formation is considered Early Cambrian in age by Fleming et al. (1995). However, the precise age of the unit and the timing of deposition of metamorphism (and tectonics) in the region have been debated for decades (e.g., Hopson, 1964; Muller et al., 1989; Drake et al., 1989).



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Supplemental Information

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Geologic field mapping for the original county geologic map was completed by J.D. Glaser in 1966. The geologic map was compiled in digital form and edited by Heather Glaser, Maryland Geological Survey. Additional digital support provided by Catherine Lachkar, Towson University, Center for Geographic Information Sciences.

Revisions, corrections and updates to the original geologic map will be completed periodically as needed and as additional data becomes available. The July 2006 edition includes updated county boundaries, updated hydrographic features and corresponding changes and corrections to the map layout. The geologic layer has been updated to reflect these changes in the base layers and, as a result, the geologic data in the geologic map has been modified to reflect the digital geologic data available for the Benedict quadrangle (imposed at a more detailed, larger, 1:24,000 scale) (Glaser, 2002). Corrections to cross-sections have also been made.

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Original digital release April 2003
Version: PGGE0203.2, release July 2006

Base map compiled and extracted from:
U.S. Geological Survey (USGS)
National Hydrologic Dataset (NHD), high resolution, for hydrographic features
NHD high resolution dataset generally developed at 1:24,000 (1:12,000 scale)
Topographic 30 m digital data (1:100,000 scale) digital line graphs (DLG) for topography
Portions of Washington West, Washington East, Frederick and Baltimore sheets
In these sheets, topographic features are an enlargement from 1:100,000 to 1:62,500 scale
Geographic Names Information System (GNIS) database for cultural feature/place names shown

Maryland State Highway Administration (MDSHA)
MD Cooperative Corridor Program, Prince George's County except (2006) for transportation features
Original dataset developed at 1:12,000 scale

Estimated 2006 magnetic north declination (center of county): 10 degrees 47 minutes west
(To determine current magnetic declination see: <http://www.ngd.msa.gov/geomap/gmp/Declination.jsp>)

Current map projection:
Maryland State Plane Coordinate System 1987
(Projection: Lambert Conformal Conic, 1980 geodetic reference system)
(Horizontal Datum: North American Datum 1983)

State Plane 2000 meter grid lines and coordinates shown in black
Geographic coordinates (latitude/longitude) shown near covers and 2.5' intervals also shown in black with larger font

Copies of this map are available in hard copy (paper) and digital form from:
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