

DESCRIPTION OF MAP UNITS

- Qal**
Alluvium
Interbedded sand, gravel, and silt-clay.
Sand, very fine to coarse, interbedded with pebbly sand and fine to very coarse gravel. Contains beds and lenses of silt-clay, massive to laminated, in places bearing organic matter such as leaves, twigs, and logs, as well as rare peat beds. Color tan, brown, or shades of gray.
Alluvium embraces typically heterogeneous, generally poorly sorted sediments ranging from well-stratified to massive. Sandy lithologies are predominantly quartzose where derived from upland areas underlain by the Upland deposits (formerly Brandywine Formation) or Calvert Formation.
Alluvium underlies stream channels, floodplains, and adjacent low areas, as well as tracts of tidal marsh flanking the Patuxent River. Major areas of accumulation include Swanson Creek, Indian Creek, and County Line Creek west of the Patuxent River, and the flood plain of Hunting Creek east of the Patuxent River in Calvert County.
This unit is largely the product of channel and overbank deposition within the last 10,000 years. In the Benedict Quadrangle, alluvium is as thick as 20 feet in places.
- Qt**
Terrace deposits (undivided)
Interbedded sand, gravel, and subordinate silt-clay.
Chiefly sand, fine to coarse, grading to pebbly sand, containing beds and lenses of fine to medium quartz gravel, and minor amounts of silt-clay. Color pale-gray, tan, or buff, ranging to brown or reddish-brown in places.
This (informal) grouping includes fluvial terraces flanking all of the major streams and many minor ones in the quadrangle. The terraces lie at elevations ranging from less than 10 feet to just below 100 feet, and record successive episodes of valley cutting alternating with channel deposition. The most important Terrace deposits lie on either side of the Patuxent River valley; these deposits document at least four stages of downcutting. The highest and oldest of the terraces, with a base at 80 to 100 feet, is extensive in the quadrangle. It contains the greatest amounts of gravel and shows the most intense weathering, reflected chiefly in yellow to reddish-brown from oxide staining. In contrast, the youngest terrace deposits, with a base just above flood plain level at about 10 feet, are loosely compacted and show little if any oxidation. This lowest terrace level is widespread in the map area, developed extensively along the Patuxent River and some of its larger tributaries. At intermediate levels are two or more terraces that are not separately mappable, but rather appear to merge imperceptibly. Included as well in the Terrace deposits are small areas of colluvium, also not separately mappable.
Stratification in these sediments ranges from flat to cross-bedded; in places, they appear massive. Exposure is generally poor, but all of the Terrace deposits appear relatively thin, averaging about 10 to 15 feet, and totaling at most 25 feet.
- Tu**
Upland deposits (formerly Brandywine Formation)
Interbedded sand, gravel, and subordinate silt-clay.
Predominantly sand, fine- to coarse-grained, pebbly in places; interbedded with fine to medium gravel and minor amounts of silt-clay. Sand in this unit is orthoquartzitic; the gravel is vein quartz, sandstone, and chert, suggesting a mostly Appalachian source area. Sediment color is largely tan to orange or reddish-brown, although silt-clay beds may be buff, gray, or red in color. Bedding is predominantly lenticular, internally cross-bedded or flat-bedded, or rarely massive. Gravel is concentrated in the lower portion of the unit.
This unit occupies the upland portions of the map area, with a base elevation of approximately 150 feet across the northern part of the quadrangle, declining to nearly 130 feet near the southern boundary. Approaching the Patuxent River, it is apparent that the Upland deposits are a composite unit, in that the base of the unit appears to fall to just above 100 feet. This probably indicates that the unit as mapped includes some younger deposits lying between the Upland deposits and the uppermost Patuxent River terrace included under Qt.
The unit is essentially a thin sheet that is at most 30 to 35 feet thick. The Upland deposits are fluvial sediments, presumably laid down by the ancestral Patuxent River as it swept southward across southern Maryland during the latest Miocene and Pliocene time.
- Tcm**
Chesapeake Group
Choptank and St. Marys Formations (undifferentiated)
Sand, sandy clay, and clay.
Sand, quartzose, fine- to medium-grained, variably clayey, interbedded gradually with sandy clay and clay. Color dark-gray to gray-green where unweathered; pale-gray to yellow or whitish where weathered.
Strata lying above the Calvert Formation, probably belonging to the Choptank and possibly the St. Marys Formations, are provisionally mapped in small areas along the edge of the upland at the eastern border of the quadrangle. The beds are weathered and poorly exposed, and thus uncertainly identified. No more than 50 to 60 feet of sediments belonging to the Choptank-St. Marys part of the section are present here.
The Choptank-St. Marys section is continuously regressive, and records environments from shallow marine shelf grading up to nearshore and marginal marine near the top of the section.
- Tc**
Calvert Formation (undivided in Prince George's and Charles Counties)
Sand, silty sand, and diatomaceous silt.
Both Fairhaven and Plum Point Marls Members of the Calvert Formation are present west of the Patuxent River but were not separately mapped. A greater degree of weathering and limited exposure precluded effective separation.
The lithologic character of each member is essentially as described for Calvert County. Plum Point Marls strata, as documented by the presence of the well-known "bed 10" fossil assemblage, are certainly present in the Calvert section from the vicinity of Swanson Creek south to the southern border of the map area. Elsewhere in the quadrangle, they were not recognized, suggesting that the Fairhaven may comprise nearly all of the Calvert section, particularly over the northwest quadrant of the map area.
- Tzp**
Plum Point Marls (mapped separately in Calvert County only)
Sand and clayey sand.
Sand, very fine to medium-grained, moderately sorted to well sorted. Color olive-gray to pale olive-green where unweathered; pale-gray to buff or tan where weathered. This unit is fossiliferous at several horizons, sparingly so throughout; shell preservation rare, molds and casts common. Bedding massive or burrow-mottled. The base of this member is an unconformity marked over part of the map area by a sharp burrowed contact, and in a few places by a silicified shell bed. The Plum Point Marls is relatively thin in the map area, no more than 25 to 30 feet thick at most.
- Tfd**
Fairhaven Member (mapped separately in Calvert County only)
Sand and diatomaceous silt.
Sand, very fine to fine-grained, clayey in part, grading to silt and diatomaceous silt. Color olive-green to olive-gray where unweathered; pale-gray, tan, or brown in weathered sections. Diatomaceous silt is concentrated in lower portion of the member; upper portion is relatively homogeneous sand and silty sand with pervasive burrow mottling. Fairhaven beds total as much as 80 feet in the quadrangle, but the average thickness is closer to 50 feet.

Supplemental Information

Use Constraints: These data represent the results of data collection/processing for a specific Department of Natural Resources, Maryland Geological Survey activity and indicate general existing conditions. As such, they are only valid for the intended use, content, time, and accuracy specifications. The user is responsible for the results of any application of the data for other than their intended purpose. Neither the licensor, nor the source of these data make any warranty, expressed or implied, as to the use or appropriateness of the licensed data, and there are no warranties of merchantability or fitness for a particular purpose of use. The Maryland Geological Survey makes no representation to the accuracy or completeness of the data and may not be held liable for human error or defect. Data are only valid at 1:24,000 scale. Data may not be used at a scale greater than that.

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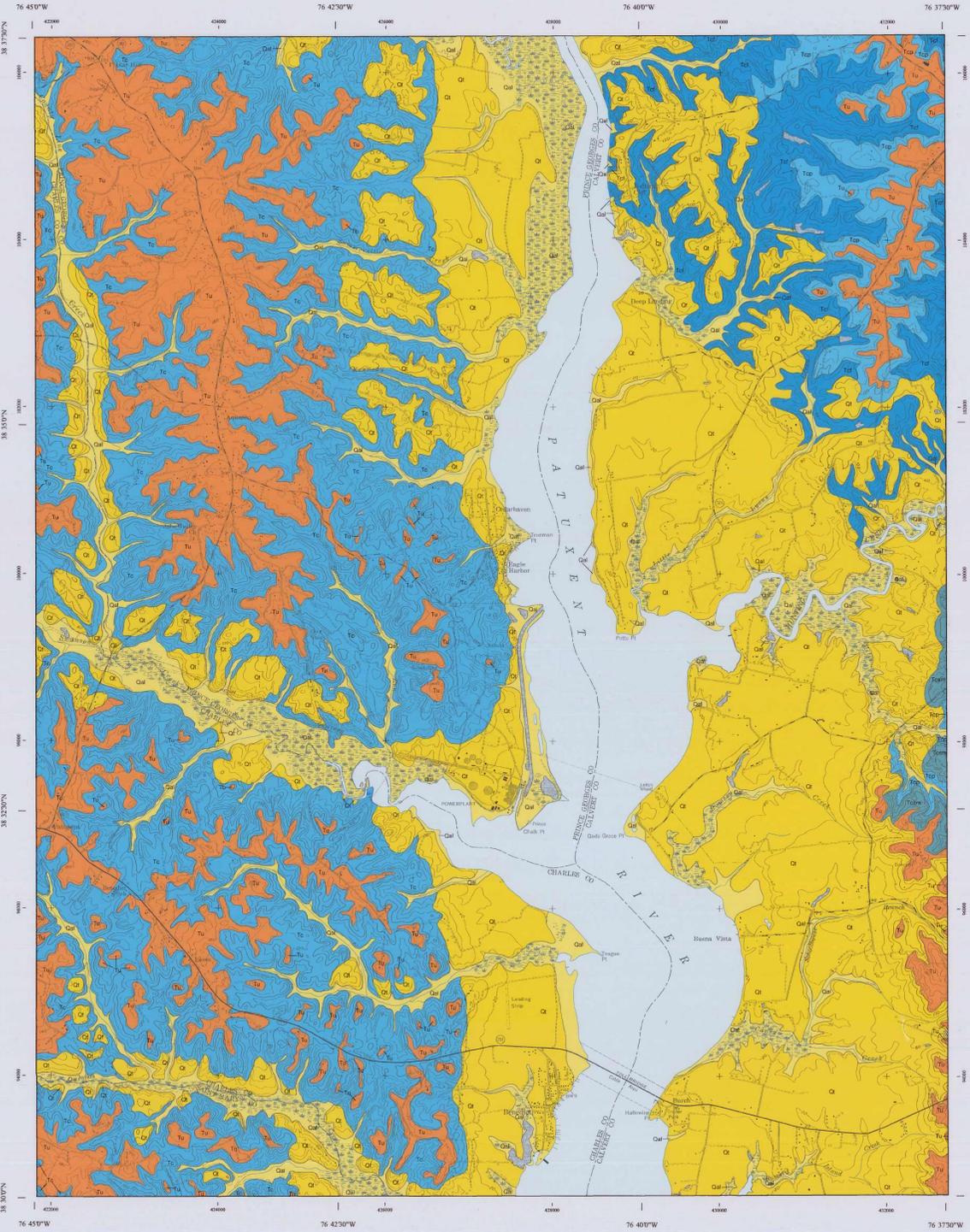
Geologic field mapping was completed in 1999. Geologic map compiled in digital form by Heather Quinn, Maryland Geological Survey. Digital support provided in part by Towson University, Center for Geographic Information Science.

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Explanation of Map Symbols

- Topographic and Hydrologic Symbols**
- Topographic Contour - Index (100-ft interval)
- Topographic Contour - Intermediate (20-ft interval)
- Stream
- Water body (including lakes, ponds, streams)
- Marsh, wetland, swamp, or bog



This map from U.S. Geological Survey 7.5-minute Series (Topographic) Benedict, 1953 (photorevised 1974) 1974 magnetic north declination (center of sheet): 8.5 degrees west (To determine current magnetic declination see: <http://www.ngdc.noaa.gov/gi-bu/sy/gmap/declm31.pl>)

Note: Hydrography layer shown is from USGS digital line graph (DLG) for this quadrangle. Topography and cultural/transmission layers from USGS stable base separates.

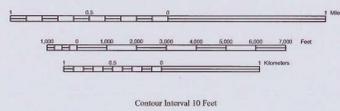
Current map projection: Maryland State Plane Coordinate System 1987 (Projection: Lambert Conformal Conic, 1980 geodetic reference system) (Horizontal Datum: North American Datum 1983)

State Plane (NAD83) 2000 meter grid ticks and coordinates shown in black Geographic coordinates (latitude/longitude) (NAD83) shown at 2.5' intervals in black

Geologic Map of Benedict Quadrangle, Calvert, Prince George's, Charles and St. Mary's Counties, Maryland

By
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2002

Scale 1:24,000



Adjoining 7.5' Quadrangle Names
Benedict Quadrangle, shaded

1	2	3	1. Brandywine
4	5	6	2. Lower Marlboro
7	8	9	3. North Heath
			4. Hagerstown
			5. Prince Frederick
			6. Charlotte Hall
			7. Mechanicsville
			8. Stomox Island



Copies of this map are available in hard copy (paper) and digital form from: MARYLAND GEOLOGICAL SURVEY 2300 Saint Paul Street Baltimore, MD 21218 Ph: 410-554-5500 Fax: 410-554-5502 <http://www.mgs.md.gov/>

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