

Description of Map Units

Quaternary	Qal Alluvium	Well to poorly sorted, stratified mixtures of unconsolidated clay, silt, sand, gravel, and cobbles; underlies flood plains of nearly all rivers and tributaries. The channel of the tributary is commonly on bedrock with alluvium exposed along the banks. Thickness of alluvium is highly variable as a function of bedrock, topography, and land-use practices. Thickness estimated at as much as 15 feet (4 to 5 m) along the Monocacy River.	Qc Colluvium	Unsorted, light gray to reddish gray, angular boulders to cobbles of quartzite and vein quartz with a silty, clayey reddish matrix. Thickness ranges from a thin veneer to more than 100 feet (30 m).	Qr Weathering residuum	Mixture of moderate reddish brown soil and pebbles to blocks of grayish pink to white angular locally euhedral quartz. Thickness ranges from a thin veneer to 10 feet (3.0 m) thick.	Qd Terrace deposits	Reddish brown to brown, sandy and clayey mixture of rounded pebbles to cobbles of sandstone, vein quartz and quartzite. Present along elevated low relief areas above the Monocacy River. Several separate levels of terrace deposits can be observed, but are not separately mapped here. Thickness ranges from a thin veneer to more than 10 feet (3 m).
Jurassic	Jd Diabase dikes(s)	Medium to dark gray, medium crystalline and equigranular, massive diabase, with characteristic orange-brown weathered surface. Dikes range from a wedge-edge to more than 150 feet (46 m) wide. While displayed as a solid unit on the map, the area mapped as diabase dikes(s) actually represents an interfingering with the surrounding bedrock unit(s).	tg Gettysburg Formation	Reddish brown to reddish gray, locally greenish gray, medium-grained siltstone, variegated claystone and fine-grained sandstone. Sandstones are thin and discontinuous. Siltstone units are root mottled and contain light gray calcite carbonate nodules. The thickness of this member is estimated at 8,000 feet (2,440 m) (Brezinski, 2004).	Tn New Oxford Formation	Interbedded, light reddish gray to reddish brown, root-mottled mudstone, reddish brown sandstone, and reddish siltstone. Most sandstone units are medium to coarse grained, arkosic, have basal lag conglomerates, and fine up-section. A few are relatively laterally continuous and mappable (Tnrc). Mudstone intervals contain pervasive root casts, and local calcite intervals. A brownish red to reddish gray, limestone to quartz-pebble conglomerate (Tnrc), that is 30 to 60 feet (9 to 18 m) thick, marks the base of the formation. The formation may be as thick as 10,000 feet (3,048 m) (Brezinski, 2004).		
Triassic	Gf Grove Formation	Thick bedded to massive, medium to light gray limestone with interbedded tan to medium gray dolomite. Three members are recognized and mapped in the Frederick Valley as identified by Brezinski (2004).	Wm Woodsboro Member	Interbedded, thin-bedded, dark gray, fine-grained limestone, medium bedded, bioturbated, dark gray, fine-grained limestone, and thin wavy bedded limestone with tan, dolomitic partings. Top of Woodsboro Member not exposed because it is covered by the Triassic New Oxford Formation. Thickness is 500 feet (152 m).	Fm Fountain Rock Member	Very thick bedded, medium light gray, locally sandy, with thick intervals of massive, algal thrombolites, and medium bedded, cross-bedded, sandy limestone. Two cross-bedded sandstone units recognized in the middle of the formation (Ogfs) were identified and traced. Thickness is in question, but may be as much as 3,300 feet (1,006 m) along the western flank of the synclinorium in the Woodsboro Quadrangle, and as little as 1,000 feet (305 m) on the eastern flank.		
Ordovician	Cm Cresville Member	Medium light gray to medium gray, thick bedded and cross-bedded, arenaceous limestone and sandy dolomitic limestone with thin interbeds (1 ft or 0.3 m) of medium light gray, sandy, thrombolitic dolomite. Thickness is approximately 150 to 200 feet (46 to 61 m).	Ff Frederick Formation	Very thin to medium bedded limestone, dolomite and thin intervals of shale, sandstone and breccia. Four members are recognized and mapped within the Frederick Formation and were named by Reinhardt (1974) and Brezinski (2004).	Lk Lime Kiln Member	Interbedded, thinly laminated to thinly bedded, dark gray, fine-grained limestone, calcareous shale, and medium bedded, fine-grained limestone near the base, becoming more thickly interbedded toward the top with medium dark gray, fine-grained limestone and wavy bedding and stromatolitic algal beds. Near the top, the member becomes interbedded with cross-bedded, sandy, medium light gray limestone. Thickness is 700 feet (213 m).		
Cambrorian	Cz Adamsstown Member	Thinly interbedded, medium dark gray to dark gray, argillaceous, fine-grained limestone and dusky yellow to medium dark gray, silty dolomite. Limestone beds range from 0.1 to 1.5 inches (0.2 to 4.0 cm) in thickness. Several thin (6 to 16 ft, or 2 to 5 m), dark greenish gray to greenish black, light olive brown weathering, silty, calcareous shale intervals are present throughout the member. The top of the member is mapped at the base of the lowest medium to thick bed of sandy or algal limestone. Thickness is approximated at 1000 feet (303 m).	Cs Rocky Springs Station Member	Nodular to lumpy bedded, dark gray, argillaceous, dolomitic limestone at the base with an interval of grayish black, platy shale. Bedding becoming laminated to flaggy upsection. The dark gray limestone with dusky yellow to light olive gray limestone with silty, dolomitic partings and laminations is interbedded with intervals (1 to 33 ft, or 0.3 to 10 m) of thick bedded, medium dark gray, polymictic breccia that grade upsection into planar bedded, arenaceous, medium gray limestone. Clast sizes range from sand size to 1 foot (0.3 m) on the diameter on the western flank of the Frederick Valley synclinorium and diminish to less than 1 to 2 inches (3 to 5 cm) in diameter on the eastern flank. Top of the member is mapped at the top of the stratigraphically highest polymictic breccia or sandstone interval. Thickness is approximated at 1,200 feet (366 m) in the Woodsboro Quadrangle.	Cm Monocacy Member	Black platy shale at the base and top, with polymictic breccia beds and thinly laminated, shaly limestone in the middle. A thick interval of black shale that marks the top of the member (Cm2m) was separately mapped. Thickness is approximately 200 feet (60 m).		
Late Proterozoic? - Cambrian?	Ar Araby Formation	Thickly bedded, greenish black to grayish black, very fine grained to fine grained, barren to silty sandstone, interbedded with medium gray to grayish black, phyllitic shales 3 to 10 feet (1 to 3 m) thick. Top of the formation consists of grayish black, phyllitic shale 50 to 65 feet (15 to 20 m) thick. The Araby Formation is present on the eastern side of the Frederick Valley Synclinorium, and is considered correlative to the Antietam Sandstone on the western side of the synclinorium. Thickness of the Araby Formation is estimated at 600 feet (183 m).	Czsc Sams Creek Formation	Dark greenish gray to medium bluish gray, aphanitic to porphyritic, massive to schistose metabasalt composed of chlorite, epidote, quartz, altered plagioclase, actinolite, hornblende, and albite; igneous texture is locally preserved and pods of epidote are common; includes some metaconglomerate composed of greenstone pebbles and cobbles, and local pillow structures and hyaloclastite.	Czsm Marble	Interbedded, light olive-gray to olive-gray, medium to coarse-grained, medium bedded, locally ferruginous, micaceous, silty sandstone and very fine grained, silty sandstone to sandy siltstone. Thickness is estimated at 500 feet (100 m).		
	Czsp Tuffaceous phyllite	Grayish red-purple and bluish gray, variegated, vesicular phyllite with light gray streaks and blebs of tuffaceous phyllite.	Czqc Quartzite	Light gray to grayish green, medium-grained, thin bedded to massive quartzite and minor calcareous sandstone. Contains detrital plagioclase, orthoclase, and polymictic quartz. Bedding is defined by concentrations of heavy minerals. Light gray, medium- and coarse-grained quartzite, locally calcareous and cross-bedded also present.	Cz Jmansville Phyllite	Dusky blue, grayish blue, very dusky red-purple, greenish gray to pale olive phyllite. Phyllonite contains abundant pods and folded stringers of white vein quartz, and minor slate. Intensely folded and sheared with finely laminated beds seen only in slate. Phyllite consists mostly of muscovite and chlorite, but also contains paragonite and chloritoid. Has a lustrous sheen because of paragonite (determined by x-ray diffraction) and dark color because of abundant hematite dust.		
	Czc Conglomeratic metagraywacke	Light gray and green, medium- to coarse-grained metagraywacke with white quartz pebbles, variegated phyllite, and green chloritic matrix.	Czp Chlorite phyllite	Light olive-gray and greenish gray, chlorite phyllite and metasilstone.				

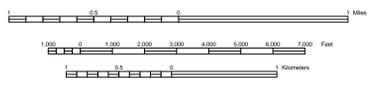
Base layers derived from U.S. Geological Survey (USGS) 7.5-minute Series (Topographic) Woodsboro Quadrangle 1951 (Photorevised 1986) Hydrology layers shown are from USGS digital line graphs (DLG) for this quadrangle Topography and cultural/transportation layers from USGS stable-base film separates (Topography by photogrammetric methods from aerial photographs taken 1943. Culture revised by USGS, 1951. Map edited in 1986 by USGS based on aerial photographs taken 1982 and other sources; this information not field checked and may not meet USGS content standards.) 1986 magnetic north declination (center of quadrangle): 9.5 degrees west (To determine current magnetic declination see: <http://www.ngs.noaa.gov/cgi-bin/seg/grup/ldhmt1.pl>)

Current map projection: Maryland State Plane Coordinate System 1987 (Projection: Lambert Conformal Conic, 1980 geodetic reference system) (Horizontal Datum: North American Datum 1983) MD State Plane 2000-meter grid ticks and coordinates shown in black. Geographic coordinates (latitude-longitude) shown near corners and 2.5° intervals (in black).

Karst Features of the Woodsboro Quadrangle, Frederick and Carroll Counties, Maryland

By David K. Brezinski 2004

Scale 1:24,000



Contour Interval 20 Feet National Geodetic Vertical Datum of 1929 (To convert elevations to the North American Vertical Datum of 1988, subtract 1 foot) (To convert from feet to meters, multiply by 0.3048)



Adjoining 7.5' Quadrangle Names

1	2	3	1 Blue Ridge Summit
2	3	4	2 Emmitsburg
3	4	5	3 Taneytown
4	5	6	4 Carroll Furnace
5	6	7	5 Union Bridge
6	7	8	6 Frederick
7	8		7 Walkersville
8			8 Libertytown

Explanation of Map Symbols

Geologic Symbols

Contacts

- Geologic contact; approximately located
- dotted where concealed

Karst Features

- Active Sinkhole
- Depression
- Spring

Base 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)

Faults

- U Uphrown side
- D Downthrown side
- Thrust fault
- sawtooth on upthrown block
- Overturned Thrust Fault
- base of sawtooth on upper plane; sawtooth in direction of dip
- Fault; concealed
- Fault; inferred

For additional information on USGS cultural/transportation symbolization see <http://pubs.usgs.gov/of/1999/009-43/>

References

Brezinski, D.K., 2004. Stratigraphy of Frederick Valley and its relationship to karst development. Maryland Geological Survey, Report of Investigations 75, 101 p.

Brezinski, D. K. and Edwards, J., Jr., 2004. Geologic map of the Woodsboro Quadrangle, Frederick and Carroll Counties, Maryland. Maryland Geological Survey, Quadrangle Geologic Map, scale 1:24,000 (Version WOODSGEO2004.1).

Reinhardt, J., 1974. Stratigraphy, Sedimentology and Cambro-Ordovician Paleogeography of the Frederick Valley, Maryland. Maryland Geological Survey, Report of Investigations 23, 73 p.

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 with any data, 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. The Maryland Geological Survey makes no warranty, expressed or implied, as to the use or appropriateness of the data, and there are no warranties of merchantability or fitness for a particular purpose of use. The Maryland Geological Survey makes no representation on 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 should not be used at a scale greater than that.

Acknowledgements: This map was funded in part by the Maryland State Highway Administration.

Field mapping of karst features was conducted by David Brezinski in 2002-2004. Field mapping of the geology was completed in 2003-2004. This karst map was compiled in digital form by Heather Quinn of the Maryland Geological Survey and from Anderson and Catherine Lockback of Towson University, Center for Geographic Information Sciences.

The facilities and services of the Maryland Department of Natural Resources are available to all without regard to race, color, religion, sex, sexual orientation, age, national origin or physical or mental disability.

Version: WOODSGEO2004.1
Released June 2004



STATE OF MARYLAND
Robert L. Ehrlich, Jr.
Governor
Michael S. Steele
Lieutenant Governor

DEPARTMENT OF NATURAL RESOURCES
C. Ronald Franks
Secretary
W. P. Jensen
Deputy Secretary
MARYLAND GEOLOGICAL SURVEY
Emery T. Cleaves
Director

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/>