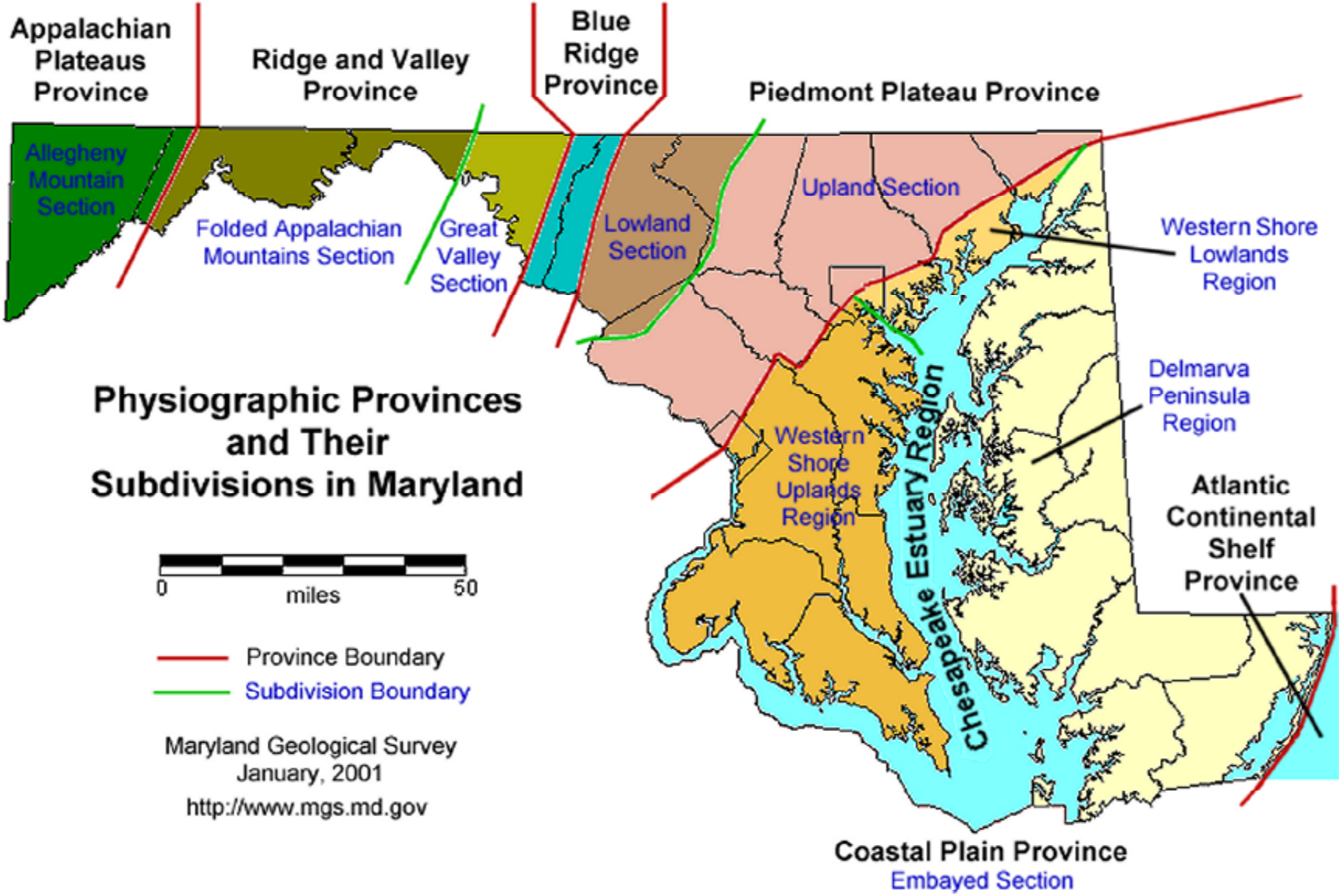
Appalachian Plateaus Province
Ridge and Valley Province
Blue Ridge Province
Piedmont Plateau Province
Allegheny Mountain Section
Folded Appalachian Mountains Section
Great Valley Section
Lowland Section
Upland Section
Western Shore Lowlands Region
Delmarva Peninsula Region
Western Shore Uplands Region
Chesapeake Estuary Region
Atlantic Continental Shelf Province
Coastal Plain Province
Embayed Section
Physiographic Provinces and Their Subdivisions in Maryland
0
miles
50
Province Boundary
Subdivision Boundary
Maryland Geological Survey
January, 2001
http://www.mgs.md.gov

A Brief Description of the Geology of Maryland

Maryland is part of six distinct physiographic provinces: (1) the Atlantic Continental Shelf Province, (2) the Coastal Plain Province, (3) the Piedmont Plateau Province, (4) the Blue Ridge Province, (5) the Ridge and Valley Province, and (6) the Appalachian Plateaus Provinces. These extend in belts of varying width along the eastern edge of the North American continent from Newfoundland to the Gulf of Mexico.

The Coastal Plain Province is underlain by a wedge of unconsolidated sediments including gravel, sand, silt, and clay, which overlaps the rocks of the eastern Piedmont along an irregular line of contact known as the Fall Zone. Eastward, this wedge of sediments thickens to more than 8,000 feet at the Atlantic coastline. Beyond this line is the Atlantic Continental Shelf Province, the submerged continuation of the Coastal Plain, which extends eastward for at least another 75 miles where the sediments attain a maximum thickness of about 40,000 feet.

The sediments of the Coastal Plain dip eastward at a low angle, generally less than one degree, and range in age from Triassic to Quaternary. The younger formations crop out successively to the southeast across Southern Maryland and the Eastern Shore. A thin layer of Quaternary gravel and sand covers the older formations throughout much of the area.

Mineral resources of the Coastal Plain are chiefly sand and gravel, and are used as aggregate materials by the construction industry. Clay for brick and other ceramic uses is also important. Small deposits of iron ore are of historical interest. Plentiful supplies of ground water are available from a number of aquifers throughout much of this region. The Atlantic Continental Shelf contains abundant sand deposits, useful for beach restoration.

The Piedmont Plateau Province is composed of hard, crystalline igneous and metamorphic rocks and extends from the inner edge of the Coastal Plain westward to Catoctin Mountain, the eastern boundary of the Blue Ridge Province. Bedrock in the eastern part of the Piedmont consists of schist, gneiss, gabbro, and other highly metamorphosed sedimentary and igneous rocks of probable volcanic origin. In several places these rocks have been intruded by granitic plutons and pegmatites. Deep drilling has revealed that similar metamorphic and igneous rocks underlie the sedimentary rocks of the Coastal Plain. Several domal uplifts of Precambrian gneiss mantled with quartzite, marble, and schist are present in Baltimore County and in parts of adjacent counties. Differential erosion of these contrasting rock types has produced a distinctive topography in this part of the Piedmont.

The rocks of the western part of the Piedmont are diverse and include phyllite, slate, marble, and moderately to slightly metamorphosed volcanic rocks. In central Frederick County the relatively flat Frederick Valley is developed on Cambrian and Ordovician limestone and dolomite. Gently undulating plains underlain by

unmetamorphosed bedrock of Triassic red shale, siltstone, and sandstone occur in three areas in the western Piedmont.

The Piedmont Plateau Province contains a variety of mineral resources. Formerly, building stone, slate, and small deposits of nonmetallic minerals, base-metal sulfides, gold, chromite, and iron ore were mined. Currently, crushed stone is important for aggregate, cement, and lime. Small to moderate supplies of ground water are available throughout the region, but favorable geological conditions locally may provide larger amounts.

Unlike the Coastal Plain and Piedmont Plateau Provinces, the Blue Ridge, Ridge and Valley, and Appalachian Plateaus Provinces are underlain mainly by folded and faulted sedimentary rocks. The rocks of the Blue Ridge Province in western Frederick County are exposed in a large anticlinal fold whose limbs are represented by Catoctin Mountain and South Mountain. These two ridges are formed by Lower Cambrian quartzite, a rock that is very resistant to the attack of weathering and erosion. A broad valley floored by Precambrian gneiss and volcanic rock lies in the core of the anticline between the two ridges.

The Ridge and Valley Province between South Mountain in Washington County and Dans Mountain in western Allegany County contains strongly folded and faulted sedimentary rocks. In the eastern part of the region, a wide, open valley called the Great Valley, or in Maryland, the Hagerstown Valley, is formed on Cambrian and Ordovician limestone and dolomite. West of Powell Mountain, a more rugged terrain has developed upon shale and sandstone bedrock which ranges in age from Silurian to Mississippian. Some of the valleys in this region are underlain by Silurian and Devonian limestones.

For many years the limestone formations have been used as local sources of agricultural lime and building stone. Modern uses include crushed stone for aggregate and cement. A pure, white sandstone in the western region of the province is suitable for glass manufacturing.

The Appalachian Plateaus Province includes that part of Allegany County west of Dans Mountain and all of Garrett County, the westernmost county in Maryland. The bedrock of this region consists principally of gently folded shale, siltstone, and sandstone. Folding has produced elongated arches across the region that expose Devonian rocks at the surface. Most of the natural gas fields in Maryland are associated with these anticlinal folds in the Appalachian Plateau. In the intervening synclinal basins, coal-bearing strata of Pennsylvanian and Permian ages are preserved.

The sedimentary rocks of the Blue Ridge, Ridge and Valley, and Appalachian Plateaus Provinces yield small to moderate supplies of ground water. Under favorable conditions large amounts may occur.

This pamphlet was prepared in 1981 by
Jonathan Edwards, Jr.
Geologist

This PDF version of "Generalized Geology of Maryland" was prepared by Robert D. Conkwright, Division of Coastal and Estuarine Geology, Maryland Geological Survey.

Please send comments on this page to Dale Shelton (dshelton@mgs.md.gov)

Visit MGS Online for information about Maryland Geology

http://www.mgs.md.gov

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
Maryland Geological Survey
2300 St. Paul Street
Baltimore, Maryland 21218
(410)554-5500

updated 1/14/02