

**National Park Service
U.S. Department of the Interior**



Natural Resource Program Center

Chesapeake and Ohio Canal National Historic Park

Ancillary Map Information Document

Produced to accompany the Geologic Resources Inventory Digital Geologic Data for Chesapeake and Ohio Canal National Historic Park (CHOH), as well as Antietam National Battlefield (ANTI) and Harpers Ferry National Historical Park (HAFE), and portions of George Washington Memorial Parkway (GWMP).

choh_geology.pdf

Version: 12/16/2009

Geologic Resources Inventory Map Document for Chesapeake and Ohio Canal National Historic Park

Table of Contents

Geologic Resources Inventory Map Document.....	1
About the NPS Geologic Resources Inventory Program.....	3
Map Unit List	5
Map Unit Descriptions.....	8
Qa - Alluvium.....	8
Qc - Colluvium.....	8
QTt - Terraces.....	8
Kps - Potomac Formation.....	8
Jd - Diabase dikes and sills.....	8
TRbl - Balls Bluff Siltstone, Lacustrine Member.....	8
TRbs - Balls Bluff Siltstone, Leesburg Member.....	9
TRmp - Manassas Sandstone Formation, Poolsville Member.....	9
TRmt - Manassas Sandstone Formation, Tuscarora Creek Member.....	9
TRmr - Manassas Sandstone Formation, Reston Member.....	9
MDr - Rockwell Formation.....	9
Mp - Purslane Formation.....	9
DI - Lamprophyre dike.....	9
Dh - Hampshire Formation.....	10
Df - Foreknobs Formation.....	10
Db - Brallier and Scherr Formations.....	10
Dm - Mahantango Formation.....	10
Dmn - Marcellus Shale and Needmore Formations.....	10
Do - Oriskany Formation.....	10
DShk - Helderberg Formation and Keyser Limestone.....	10
Stl - Tonoloway Limestone.....	11
Sw - Wills Creek Formation.....	11
Sb - Bloomsburg Formation.....	11
Sm - McKenzie Formation.....	11
Sk - Keefer Sandstone.....	11
Srk - Rosehill Formation and Keefer Sandstone.....	11
Sr - Rosehill Formation.....	11
St - Tuscarora Quartzite.....	12
Oj - Juniata Formation.....	12
Omu - Martinsburg Formation, Upper Member.....	12
Oms - Martinsburg Formation, Stickley Run Member.....	12
Oc - Chambersburg Limestone.....	12
On - New Market Limestone.....	12
Op - Pinesburg Station Dolomite.....	12
Ok - Kensington Tonalite.....	13
Ogh - Georgetown Intrusive Suite, Biotite-hornblende tonalite.....	13
Ogb - Georgetown Intrusive Suite, Biotite tonalite.....	13
Ogg - Georgetown Intrusive Suite; Quartz gabbro and quartz diorite.....	13
Ogv - Georgetown Intrusive Suite; Serpentine-schist.....	13
Odm - Dalecarlia Intrusive Suite; Biotite monzogranite and granodiorite.....	13

Odt - Dalecarlia Intrusive Suite; Muscovite trondhjemite.....	13
Orr - Rockdale Run Formation.....	14
Ob - Bear Island Granodiorite.....	14
Os - Stonehenge Limestone.....	14
Oss - Stonehenge Limestone, Stoufferstown Member.....	14
Oq - Quartz veins.....	14
OCc - Conococheague Limestone.....	14
Ccb - Conococheague Limestone, Big Spring Station Member.....	14
Cfa - Frederick Formation, Adamstown Member.....	15
Cfr - Frederick Formation; Rocky Springs Station Member.....	15
Ce - Elbrook Limestone.....	15
Car - Araby Formation.....	15
Cwac - Waynesboro Formation, Chewsville Member.....	15
Cwak - Waynesboro Formation, Cavetown Member.....	15
Cwar - Waynesboro Formation, Red Run Member.....	15
Ct - Tomstown Formation.....	16
Ctd - Tomstown Formation, Dargan Member.....	16
Ctb - Tomstown Formation; Bebevola Member.....	16
Ctf - Tomstown Formation; Fort Duncan Member.....	16
Ctbn - Tomstown Formation; Bolivar Heights Member.....	16
Ccp - Carbonaceous phyllite.....	16
Ca - Antietam Formation.....	16
Ch - Harpers Formation.....	17
Chq - Harpers Formation, Quartzite.....	17
Cw - Weverton Formation.....	17
Cs - Sykesville Formation.....	17
Cl - Laurel Formation.....	17
Clc - Loudoun Formation, Conglomerate.....	17
CZlp - Loudoun Formation, phyllite.....	17
CZi - Ijamsville Phyllite.....	18
CZig - Ijamsville Phyllite, greenstone.....	18
CZil - Ijamsville Phyllite, metalimestone.....	18
CZmg - Mather Gorge Formation, Metagraywacke.....	18
CZmm - Mather Gorge Formation, Migmatite.....	18
CZmp - Mather Gorge Formation, Phyllonite.....	18
CZms - Mather Gorge Formation, Schist.....	19
CZu - Ultramafic rock.....	19
CZa - Amphibolite and ultramafic rock.....	19
CZg - Metagabbro and metapyroxenite.....	19
CZt - Tuffaceous schist.....	19
Zc - Catoctin Formation; Greenstone.....	19
Zcs - Catoctin Formation, Phyllite and sandstone.....	19
Zct - Catoctin Formation, Phyllite.....	20
Zcm - Catoctin Formation, Marble.....	20
Zrd - Metarhyolite dike.....	20
Zmd - Metadiabase dike.....	20
Zsm - Swift Run Formation, Marble.....	20
Zsp - Swift Run Formation, Phyllite.....	20
Zsq - Swift Run Formation, Metasandstone.....	20
Ybg - Biotite granite gneiss.....	20
Yg - Leucocratic metagranite.....	21
Ygt - Garnetiferous leucocratic metagranite.....	21
Ygp - Quartz-plagioclase gneiss.....	21
Yhg - Hornblende monzonite gneiss.....	21

Yp - Garnet-graphite paragneiss.....	21
Geologic Cross Section.....	22
GRI Source Map Citations.....	23
USGS Open File Report 2001-188A.....	24
Map Unit List - USGS Open File Report 2001-188A.....	25
Geologic Provinces - USGS Open File Report 2001-188A.....	26
Index Maps - USGS Open File Report 2001-188A.....	27
Map Legend - USGS Open File Report 2001-188A.....	28
References - USGS Open File Report 2001-188A/B.....	28
USGS Open File Report 2001-188B.....	34
GRI Digital Data Credits.....	36

Geologic Resources Inventory Map Document



Chesapeake and Ohio Canal National Historic Park, District of Columbia, Virginia, Maryland, and West Virginia

Document to Accompany Digital Geologic-GIS Data

[choh_geology.pdf](#)

Version: 12/16/2009

This document has been developed to accompany the digital geologic-GIS data developed by the Geologic Resources Inventory (GRI) program for Chesapeake and Ohio Canal National Historic Park, District of Columbia, Virginia, Maryland, and West Virginia (CHOH). This data is also of covers in extent Antietam National Battlefield (ANTI) and Harpers Ferry National Historical Park (HAFE), as well as a portions of George Washington Memorial Parkway (GWMP).

Attempts have been made to reproduce all aspects of the original source products, including the geologic units and their descriptions, geologic cross sections, the geologic report, references and all other pertinent images and information contained in the original publication.

National Park Service (NPS) Geologic Resources Inventory (GRI) Program staff have assembled the digital geologic-GIS data that accompanies this document.

For information about the status of GRI digital geologic-GIS data for a park contact:

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About the NPS Geologic Resources Inventory Program

Background

Recognizing the interrelationships between the physical (geology, air, and water) and biological (plants and animals) components of the Earth is vital to understanding, managing, and protecting natural resources. The Geologic Resources Inventory (GRI) helps make this connection by providing information on the role of geology and geologic resource management in parks.

Geologic resources for management consideration include both the processes that act upon the Earth and the features formed as a result of these processes. Geologic processes include: erosion and sedimentation; seismic, volcanic, and geothermal activity; glaciation, rockfalls, landslides, and shoreline change. Geologic features include mountains, canyons, natural arches and bridges, minerals, rocks, fossils, cave and karst systems, beaches, dunes, glaciers, volcanoes, and faults.

The Geologic Resources Inventory aims to raise awareness of geology and the role it plays in the environment, and to provide natural resource managers and staff, park planners, interpreters, researchers, and other NPS personnel with information that can help them make informed management decisions.

The GRI team, working closely with the Colorado State University (CSU) Department of Geosciences and a variety of other partners, provides more than 270 parks with a geologic scoping meeting, digital geologic-GIS map data, and a park-specific geologic report.

Products

Scoping Meetings: These park-specific meetings bring together local geologic experts and park staff to inventory and review available geologic data and discuss geologic resource management issues. A summary document is prepared for each meeting that identifies a plan to provide digital map data for the park.

Digital Geologic Maps: Digital geologic maps reproduce all aspects of traditional paper maps, including notes, legend, and cross sections. Bedrock, surficial, and special purpose maps such as coastal or geologic hazard maps may be used by the GRI to create digital Geographic Information Systems (GIS) data and meet park needs. These digital GIS data allow geologic information to be easily viewed and analyzed in conjunction with a wide range of other resource management information data.

For detailed information regarding GIS parameters such as data attribute field definitions, attribute field codes, value definitions, and rules that govern relationships found in the data, refer to the NPS Geology-GIS Data Model document available at:

<http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm>

Geologic Reports: Park-specific geologic reports identify geologic resource management issues as well as features and processes that are important to park ecosystems. In addition, these reports present a brief geologic history of the park and address specific properties of geologic units present in the park.

For a complete listing of Geologic Resource Inventory products and direct links to the download site visit the GRI publications webpage http://www.nature.nps.gov/geology/inventory/gre_publications.cfm

GRI geologic-GIS data is also available online at the NPS Data Store site <http://science.nature.nps.gov/nrdata/>. To find GRI data select "geology" as a Category, and use "GRI" as a Word Search term.

For more information about the Geologic Resources Inventory Program visit the GRI webpage: <http://www.nature.nps.gov/geology/inventory>, or contact:

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The Geologic Resources Inventory (GRI) program is funded by the National Park Service (NPS) Inventory and Monitoring (I&M) program. For more information on the Inventory and Monitoring (I&M) program visit: <http://science.nature.nps.gov/im/index.cfm>

For more information on this and other Inventory and Monitoring (I&M) Natural Resource inventories visit: <http://science.nature.nps.gov/im/inventory/index.cfm>

Map Unit List

The geologic units present on digital geologic-GIS data produced for Chesapeake and Ohio Canal National Historic Park, District of Columbia, Virginia, Maryland, and West Virginia (CHOH) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., Qa - Alluvium). Units are listed from youngest to oldest. No description for water is provided. Information about each geologic unit is also presented in the Geologic Unit Information (UNIT) table included with the GRI geology-GIS data.

Geologic Map Units

Geologic Period

CENOZOIC ERA

Quaternary Period

[Qa](#) - Alluvium

[Qc](#) - Colluvium

[QTt](#) - Terraces

MESOZOIC ERA

Cretaceous Period

[Kps](#) - Potomac Formation

Jurassic Period

[Jd](#) - Diabase dikes and sills

Triassic Period

[TRbl](#) - Balls Bluff Siltstone, Lacustrine Member

[TRbs](#) - Balls Bluff Siltstone, Leesburg Member

[TRmp](#) - Manassas Sandstone, Poolsville Member

[TRmt](#) - Manassas Sandstone, Tuscarora Creek Member

[TRmr](#) - Manassas Sandstone, Reston Member

PALEOZOIC ERA

Mississippian Period

[Mp](#) - Purslane Formation

[MDr](#) - Rockwell Formation

Devonian Period

[DI](#) - Lamprophyre dike

[Dh](#) - Hampshire Formation

[Df](#) - Foreknobs Formation

[Db](#) - Brallier Formation

[Dm](#) - Mahantango Formation

[Dmn](#) - Marcellus Shale and Needmore Formations

[Do](#) - Oriskany Formation

[DShk](#) - Helderberg Formation and Keyser Limestone

[Stl](#) - Tonoloway Limestone

[Sw](#) - Willis Creek Formation

[Sb](#) - Bloomsburg Formation

[Sm](#) - Mckenzie Formation
[Sk](#) - Keefer Sandstone
[Srk](#) - Rosehill Formation and Keefer Sandstone
[Sr](#) - Rosehill Formation
[St](#) - Tuscarora Quartzite

Ordovician Period

[Oj](#) - Juniata Formation
[Omu](#) - Martinsburg Formation, Upper Member
[Oms](#) - Martinsburg Formation, Stickley Run Member
[Oc](#) - Chambersburg Limestone
[On](#) - New Market Limestone
[Op](#) - Pinesburg Station Dolomite
[Ok](#) - Kensington Tonalite
[Ogh](#) - Georgetown Intrusive Suite, Biotite-hornblende
[Ogb](#) - Georgetown Intrusive Suite, Biotite tonalite
[Ogg](#) - Georgetown Intrusive Suite, Quartz gabbro and quartz diorite
[Ogv](#) - Georgetown Intrusive Suite, Serpentine, soapstone, and talc schist
[Odm](#) - Dalecarlia Intrusive Suite, Biotite monzogranite and granodiorite
[Odt](#) - Dalecarlia Intrusive Suite, Muscovite trondhjemite
[Orr](#) - Rockdale Run Formation
[Ob](#) - Bear Island Granodiorite
[Os](#) - Stonehenge Limestone
[Oss](#) - Stoufferstown Member of Stonehenge Limestone
[Oq](#) - Quartz veins

Ordovician and Cambrian Periods

[OCc](#) - Conococheague Limestone

Cambrian Period

[Ccb](#) - Conococheague Limestone, Big Spring Member
[Cfa](#) - Frederick Formation, Adamstown Member
[Cfr](#) - Frederick Formation, Rocky Springs Station Member
[Ce](#) - Elbrook Limestone
[Car](#) - Araby Formation
[Cwac](#) - Waynesboro Formation, Chewsville Member
[Cwak](#) - Waynesboro Formation, Cavetown Member
[Cwar](#) - Waynesboro Formation, Red Run Member
[Ct](#) - Tomstown Formation
[Ctd](#) - Tomstown Formation, Dargan Member
[Ctb](#) - Tomstown Formation, Benevola Member
[Ctf](#) - Tomstown Formation, Fort Duncan Member
[Ctbh](#) - Tomstown Formation, Bolivar Heights Member
[Ccp](#) - Carbonaceous phyllite
[Ca](#) - Antietam Formation
[Ch](#) - Harpers Formation
[Cw](#) - Weverton Formation
[Cs](#) - Sykesville Formation
[Cl](#) - Laurel Formation
[Clc](#) - Loudoun Formation, Conglomerate

Early Cambrian Period and Late Proterozoic Era

[CZlp](#) - Loudon Formation, Phyllite
[CZi](#) - Ijamsville Phyllite, Phyllite
[CZig](#) - Ijamsville Phyllite, Greenstone
[CZil](#) - Ijamsville Phyllite, Metalimestone
[CZmg](#) - Mather Gorge Formation, Metagraywacke

[CZmm](#) - Mather Gorge Formation, Migmatite
[CZmp](#) - Mather Gorge Formation, Phyllonite
[CZms](#) - Mather Gorge Formation, Schist
[CZu](#) - Ultramafic rock
[CZa](#) - Amphibolite and ultramafic rock
[CZg](#) - Metagabbro and metapyroxenite
[CZt](#) - Tuffaceous schist

PROTEROZOIC ERA

Precambrian

[Zc](#) - Catoctin Formation, Greenstone
[Zcs](#) - Catoctin Formation, Metasandstone and phyllite
[Zrd](#) - Metarhyolite dike
[Zmd](#) - Metadiabase dikes
[Zsm](#) - Swift Run Formation, Marble
[Zsp](#) - Swift Run Formation, Phyllite and schist
[Zsg](#) - Swift Run Formation, Metasandstone
[Ybg](#) - Biotite granite gneiss
[Yg](#) - Leucocratic metagranite
[Ygt](#) - Garnetiferous leucocratic metagranite
[Ygp](#) - Quartz plagioclase gneiss
[Yhg](#) - Hornblende monzonite gneiss
[Yp](#) - Garnet graphite paragneiss

Map Unit Descriptions

Descriptions of all geologic map units, generally listed from youngest to oldest, are presented below.

Qa - Alluvium (Holocene)

Cenozoic surficial deposits. Unconsolidated clay, silt, sand, and gravel underlying flood plains. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Qc - Colluvium (Holocene and Pleistocene)

Cenozoic surficial deposits. Cobbles and boulders on mountain slopes. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

QTt - Terraces (Holocene, Pleistocene and Tertiary?)

Cenozoic surficial deposits. Sand, gravel, and boulders underlying flat benches and isolated hills; includes some strath terraces with no deposits. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Kps - Potomac Formation (Lower and Upper Cretaceous)

Sand and clay with plant leaves, stems and trunks in the Coastal Plain Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Jd - Diabase dikes and sills (Early Jurassic)

Black fine- to coarse-grained crystalline diabase in the Culpeper Basin of the Piedmont Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

TRbl - Balls Bluff Siltstone, Lacustrine Member (Upper Triassic)

Red arkosic sandstone in Culpeper Basin of Piedmont Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

TRbs - Balls Bluff Siltstone, Leesburg Member (Upper Triassic)

Pink variegated carbonate conglomerate of Culpeper Basin in the Piedmont Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

TRmp - Manassas Sandstone Formation, Poolsville Member (Upper Triassic)

Red arkosic sandstone, Culpeper Basin, Piedmont Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

TRmt - Manassas Sandstone Formation, Tuscarora Creek Member (Upper Triassic)

Pink variegated carbonate conglomerate, Culpeper Basin, Piedmont Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

TRmr - Manassas Sandstone Formation, Reston Member (Upper Triassic)

Tan quartz-pebble conglomerate, Culpeper Basin, Piedmont Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

MDr - Rockwell Formation (Upper Devonian and Lower Mississippian)

Green to gray sandstone, siltstone, and shale, Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Mp - Purslane Formation (Lower Mississippian)

Red and brown sandstone and pebble conglomerate, Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

DI - Lamprophyre dike (Upper Devonian)

Gray fine-grained quartz-plagioclase rock with biotite crystals, Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Dh - Hampshire Formation (Upper Devonian)

Gray, green, and red sandstone, siltstone and shale. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Df - Foreknobs Formation (Upper Devonian)

Greenish- to reddish-gray conglomeratic sandstone, medium- and coarse-grained sandstone, siltstone, and shale. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Db - Brallier and Scherr Formations (Upper Devonian)

Dark gray, fine-grained sandstone, siltstone, and shale. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Dm - Mahantango Formation (Middle Devonian)

Light gray siltstone, shale, and minor sandstone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Dmn - Marcellus Shale and Needmore Formations (Middle and Lower Devonian)

Gray black shale, calcite-rich shale, and limestone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Do - Oriskany Formation (Lower Devonian)

Light gray sandstone and pebble conglomerate. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

DShk - Helderberg Formation and Keyser Limestone (Lower Devonian and Upper Sillurian)

Gray limestone, shale, and cherty limestone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Stl - Tonoloway Limestone (Upper Silurian)

Gray limestone, dolomite, calcareous shale, and thin sandstone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Sw - Wills Creek Formation (Upper Silurian)

Gray shale, limestone, claystone, and sandstone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Sb - Bloomsburg Formation (Upper Silurian)

Red sandstone, siltstone, and shale. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Sm - McKenzie Formation (Middle and Upper Silurian)

Gray shale, calcareous shale, and limestone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Sk - Keefer Sandstone (Middle Silurian)

Tan and Gray sandstone with *Skolithus linearis*. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Srk - Rosehill Formation and Keefer Sandstone (Middle Silurian)

Undifferentiated. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Sr - Rosehill Formation (Middle Silurian)

Tan and red siltstone, red hematite sandstone, and tan sandstone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

St - Tuscarora Quartzite (Middle and Lower Silurian)

White and gray quartzite, sandstone, and quartz pebble conglomerate. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Oj - Juniata Formation (Late Ordovician)

Maroon sandstone and siltstone. Valley and Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Omu - Martinsburg Formation, Upper Member (Upper and Middle Ordovician)

Brown and green shale, siltstone, and sandstone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Oms - Martinsburg Formation, Stickley Run Member (Upper and Middle Ordovician)

Gray shale and limestone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Oc - Chambersburg Limestone (Middle Ordovician)

Gray argillaceous, nodular limestone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

On - New Market Limestone (Middle Ordovician)

Gray thick-bedded limestone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Op - Pinesburg Station Dolomite (Middle Ordovician)

Gray, cherty, fractured dolomite. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ok - Kensington Tonalite (Middle Ordovician)

Gray garnet-rich, muscovite-biotite tonalite. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ogh - Georgetown Intrusive Suite, Biotite-hornblende tonalite (Middle Ordovician)

Gray foliated biotite-hornblende tonalite containing inclusions of mafic and metasedimentary rock. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ogb - Georgetown Intrusive Suite, Biotite tonalite (Middle Ordovician)

Gray foliated biotite tonalite containing inclusions of mafic and metasedimentary rocks. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ogg - Georgetown Intrusive Suite, Quartz gabbro and quartz diorite (Middle Ordovician)

Dark gray foliated quartz gabbro and quartz diorite. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ogv - Georgetown Intrusive Suite, Serpentine-schist (Middle Ordovician)

Green foliated serpentinite, soapstone, and talc schist. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Odm - Dalecarlia Intrusive Suite, Biotite monzogranite and granodiorite (Middle Ordovician)

Gray foliated biotite monzogranite and granodiorite. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Odt - Dalecarlia Intrusive Suite, Muscovite trondhjemite (Middle Ordovician)

Light gray muscovite trondhjemite; occurs as dikes, sheets and bodies. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Orr - Rockdale Run Formation (Middle and Lower Ordovician)

Gray limestone interbedded with dolomite. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ob - Bear Island Granodiorite (Early Ordovician)

Light gray and white muscovite-biotite granodiorite and pegmatite. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Os - Stonehenge Limestone (Lower Ordovician)

Gray limestone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Oss - Stonehenge Limestone, Stoufferstown Member (Lower Ordovician)

Gray silty, laminated limestone with shale partings. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Oq - Quartz veins (Early Ordovician and Cambrian?)

Massive bodies of white vein quartz. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

OCc - Conococheague Limestone (Lower Ordovician and Upper Cambrian)

Gray limestone interbedded with gray dolomite and sandstone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ccb - Conococheague Limestone, Big Spring Station Member (Upper Cambrian)

Dolomite and dolomitic sandstone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Cfa - Frederick Formation, Adamstown Member (Upper Cambrian)

Silty limestone and silty dolomite. Piedmont, Frederick Valley. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Cfr - Frederick Formation, Rocky Springs Station Member (Upper Cambrian)

Dolomitic limestone, breccia of limestone clasts and sandstone. Piedmont, Frederick Valley. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ce - Elbrook Limestone (Upper and Middle Cambrian)

Interbedded limestone and dolomite. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Car - Araby Formation (Middle and Lower Cambrian)

Gray and brown mottled sandy metasiltstone. Piedmont, Frederick Valley. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Cwac - Waynesboro Formation, Chewsville Member (Lower Cambrian)

Red siltstone and shale. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Cwak - Waynesboro Formation, Cavetown Member (Lower Cambrian)

Gray limestone interbedded with dolomite. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Cwar - Waynesboro Formation, Red Run Member (Lower Cambrian)

Tan sandstone and green shale. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ct - Tomstown Formation (Lower Cambrian)

Grey dolomite: Blue Ridge Province. Undifferentiated. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ctd - Tomstown Formation, Dargan Member (Lower Cambrian)

Gray limestone interbedded with dolomite. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ctb - Tomstown Formation, Bebevola Member (Lower Cambrian)

Light gray dolomite. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ctf - Tomstown Formation, Fort Duncan Member (Lower Cambrian)

Dark gray dolomite with bioturbation structures. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ctbh - Tomstown Formation, Bolivar Heights Member (Lower Cambrian)

Dark gray limestone. Great Valley Section. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ccp - Carbonaceous phyllite (Lower Cambrian)

Dark gray lustrous graphitic phyllite. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ca - Antietam Formation (Lower Cambrian)

Brown iron-rich sandstone. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ch - Harpers Formation (Lower Cambrian)

Gray and green phyllitic metasiltstone. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Chq - Harpers Formation, Quartzite (Cambrian)

For further description of unit, see report. ([OFR 01-188B](#))

Cw - Weverton Formation (Lower Cambrian)

Owens Creek Member – light gray and white quartzite and quartz-pebble

Maryland Heights Member – Gray quartzite and dark metasiltstone

Buzzard Knob Member – Gray and blue quartzite with pebbles, metagraywacke and metasiltstone. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Cs - Sykesville Formation (Lower Cambrian)

Gray quartzofeldspathic matrix with fragments and bodies of metamorphosed sedimentary, volcanic, and igneous rocks. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CI - Laurel Formation (Lower Cambrian)

Gray quartzofeldspathic matrix with fragments of meta-arenite and muscovite biotite schist. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Clc - Loudoun Formation, Conglomerate (Lower Cambrian)

Dark gray and blue variegated cobble and pebble conglomerate; clasts composed of vein quartz, quartzite, red jasper, greenstone, and gneiss. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZlp - Loudoun Formation, Phyllite (Lower Cambrian, Neoproterozoic)

Gray, black, cream, and pink variegated phyllite. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZi - Ijamsville Phyllite (Lower Cambrian? and Neoproterozoic?)

Blue and purple phyllite, slate, and phyllonite with vein quartz. Westminster Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZig - Ijamsville Phyllite, Greenstone (Lower Cambrian? and Neoproterozoic?)

Green schistose basaltic volcanic rock. Westminster Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Czil - Ijamsville Phyllite, Metalimestone (Lower Cambrian? and Neoproterozoic?)

Light gray thin-bedded silty limestone with black phyllite. Westminster Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZmg - Mather Gorge Formation, Metagraywacke (Lower Cambrian and Neoproterozoic)

Gray metagraywacke interbedded with schist. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZmm - Mather Gorge Formation, Migmatite (Lower Cambrian and Neoproterozoic)

Mixture of former partial melt of dark gray quartzose schist (older paleosome) and light gray and white quartz plagioclase granitoid (younger leucosome). Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZmp - Mather Gorge Formation, Phyllonite (Lower Cambrian and Neoproterozoic)

Gray and green lustrous chlorite-sericite phyllonite with white vein quartz. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZms - Mather Gorge Formation, Schist (Lower Cambrian and Neoproterozoic)

Gray, green, and brown quartz-rich schist and mica gneiss interbedded with metagraywacke and calc-silicate rock. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZu - Ultramafic rock (Lower Cambrian and Neoproterozoic)

Dark and light green serpentinite, soapstone, and talc schist. Potomac Terrane. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZa - Amphibolite and ultramafic rock (Lower Cambrian and Neoproterozoic)

Dark green and black amphibolite and ultramafic rock. Potomac Terrane. Bodies and Fragments of rock within the Sykesville, Laurel, and Mather Gorge Formations. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZg - Metagabbro and metapyroxenite (Lower Cambrian and Neoproterozoic)

Dark metagabbro and metapyroxenite. Potomac Terrane. Bodies and Fragments of rock within the Sykesville, Laurel, and Mather Gorge Formations. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

CZt - Tuffaceous schist (Lower Cambrian and Neoproterozoic)

Hornblende-plagioclase-quartz-muscovite felsic tuffaceous schist. Potomac Terrane. Bodies and Fragments of rock within the Sykesville, Laurel, and Mather Gorge Formations. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Zc - Catoctin Formation, Greenstone (Neoproterozoic)

Green metamorphosed basaltic lava flows. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Zcs - Catoctin Formation, Phyllite and sandstone (Neoproterozoic)

Gray variegated vesicular and blebby phyllite and tan medium-grained sandstone. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Zct - Catoctin Formation, Phyllite (Neoproterozoic)

For further description of unit, see report. ([OFR 01-188B](#))

Zcm - Catoctin Formation, Marble (Neoproterozoic)

For further description of unit, see report. ([OFR 01-188B](#))

Zrd - Metarhyolite dike (Neoproterozoic)

Tan fine-grained felsite with feldspar crystals. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Zmd - Metadiabase dike (Neoproterozoic)

Green schistose metadiabase. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Zsm - Swift Run Formation, Marble (Neoproterozoic)

Pink and tan massive to schistose marble. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Zsp - Swift Run Formation, Phyllite (Neoproterozoic)

Tan sandy sericitic phyllite. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Zsq - Swift Run Formation, Metasandstone (Neoproterozoic)

Tan medium-grained metasandstone with cobbles and pebbles of vein quartz. Blue Ridge Province. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ybg - Biotite granite gneiss (Mesoproterozoic)

Light gray foliated granite gneiss with black specks of biotite. Blue Ridge Basement Complex. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Yg - Leucocratic metagranite (Mesoproterozoic)

Light-gray foliated metagranite. Blue Ridge Basement Complex. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ygt - Garnetiferous leucocratic metagranite (Mesoproterozoic)

Light gray foliated meta-granite with red spots of garnet. Blue Ridge Basement Complex. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Ygp - Quartz-plagioclase gneiss (Mesoproterozoic)

White massive gneiss. Blue Ridge Basement Complex. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Yhg - Hornblende monzonite gneiss (Mesoproterozoic)

Tan to dark foliated gneiss with greenish black hornblende crystals. Blue Ridge Basement Complex. ([OFR01-188A](#))

For further description of unit, see report. ([OFR01-188B](#))

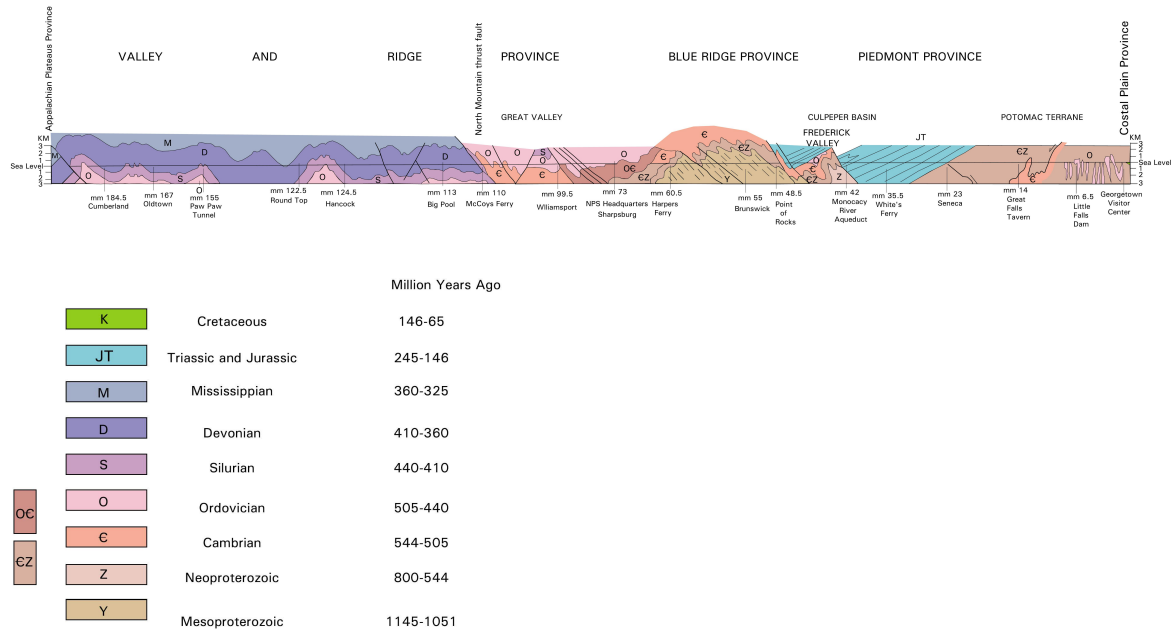
Yp - Garnet-graphite paragneiss (Mesoproterozoic)

Rusty schist with garnet crystals and flakes of graphite. Blue Ridge Basement Complex. ([OFR 01-188A](#))

For further description of unit, see report. ([OFR 01-188B](#))

Geologic Cross Section

The geologic cross section present in the source data for Chesapeake and Ohio Canal National Historic Park, District of Columbia, Virginia, Maryland, and West Virginia (CHOH) is presented below.



Extracted from: ([OFR 01-188A](#))

GRI Source Map Citations

The GRI digital geologic-GIS map for Chesapeake and Ohio Canal National Historic Park, District of Columbia, Virginia, Maryland, and West Virginia (CHOH) was compiled from the following sources:

Chapter A - Geologic Map

Southworth, S., Brezinski, D.K., Orndorff, R.K., Chirico, P.G., and Lagueux, K., 2001, Digital Geologic Map and Database of the Chesapeake and Ohio Canal National Historic Park, District of Columbia, Virginia, Maryland, and West Virginia: U.S. Geological Survey, Open File Report 2001-188A, 1:24,000 scale. ([OFR 01-188A](#)) (GRI Source Map 771)

Chapter B - Geologic Report and Figures

Southworth, S., Brezinski, D.K., Orndorff, R.K., Chirico, P.G., and Lagueux, K., 2001, Geology of the Chesapeake and Ohio Canal National Historical Park and Potomac River Corridor, District of Columbia, Maryland, West Virginia, and Virginia: U.S. Geological Survey, Open File Report 2001-188B. ([OFR 01-188B](#)) (GRI Source Map 771)

Additional information pertaining to each source map is also presented in the Source Map Information (MAP) table included with the GRI geology-GIS data.

Geologic Map - USGS Open File Report 2001-188A

Southworth, S., Brezinski, D.K., Orndorff, R.K., Chirico, P.G., and Lagueux, K., 2001, Digital Geologic Map and Database of the Chesapeake and Ohio Canal National Historic Park, District of Columbia, Virginia, Maryland, and West Virginia: U.S. Geological Survey, Open File Report 2001-188A, 1:24,000 scale. (OFR 01-188A) (GRI Source Map 771)

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[Map Unit List](#)

[Geologic Provinces](#)

[Index Maps](#)

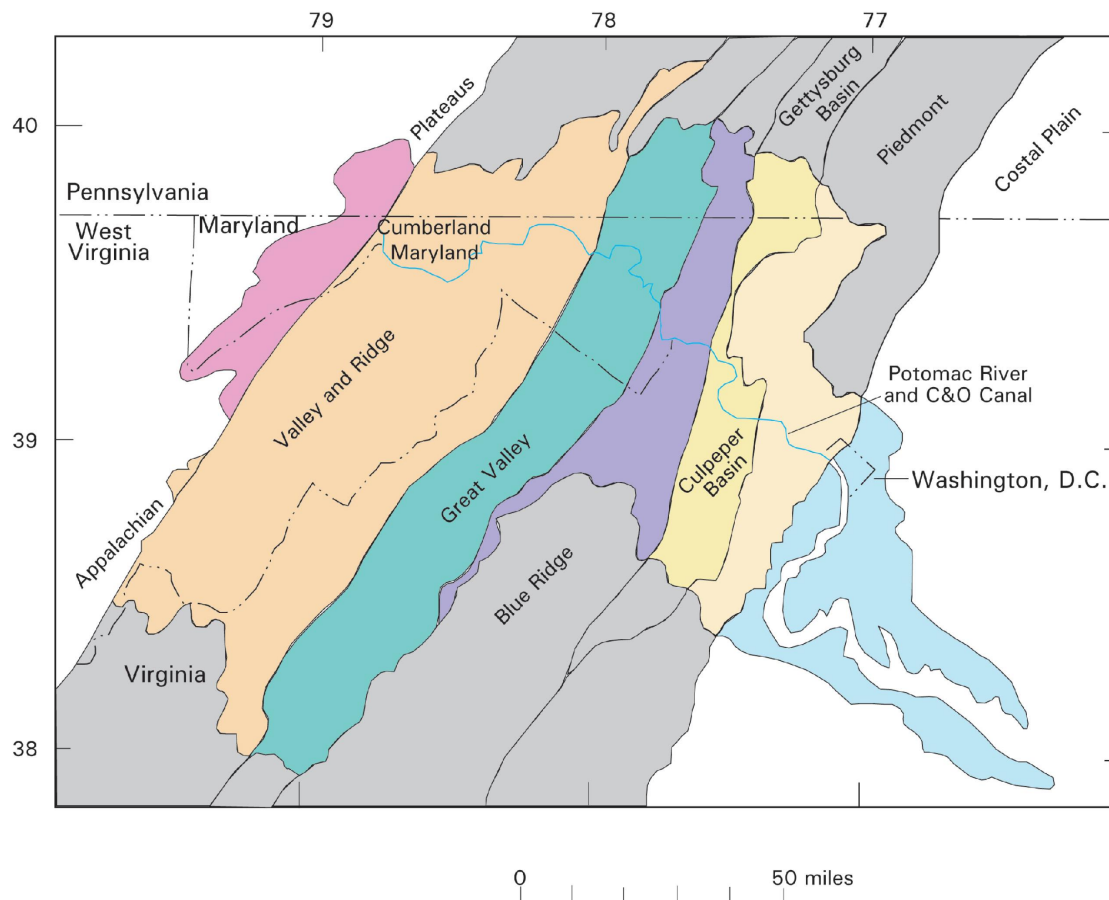
[Map Legend](#)

[References](#)

Map Unit List - USGS Open File Report 2001-188A

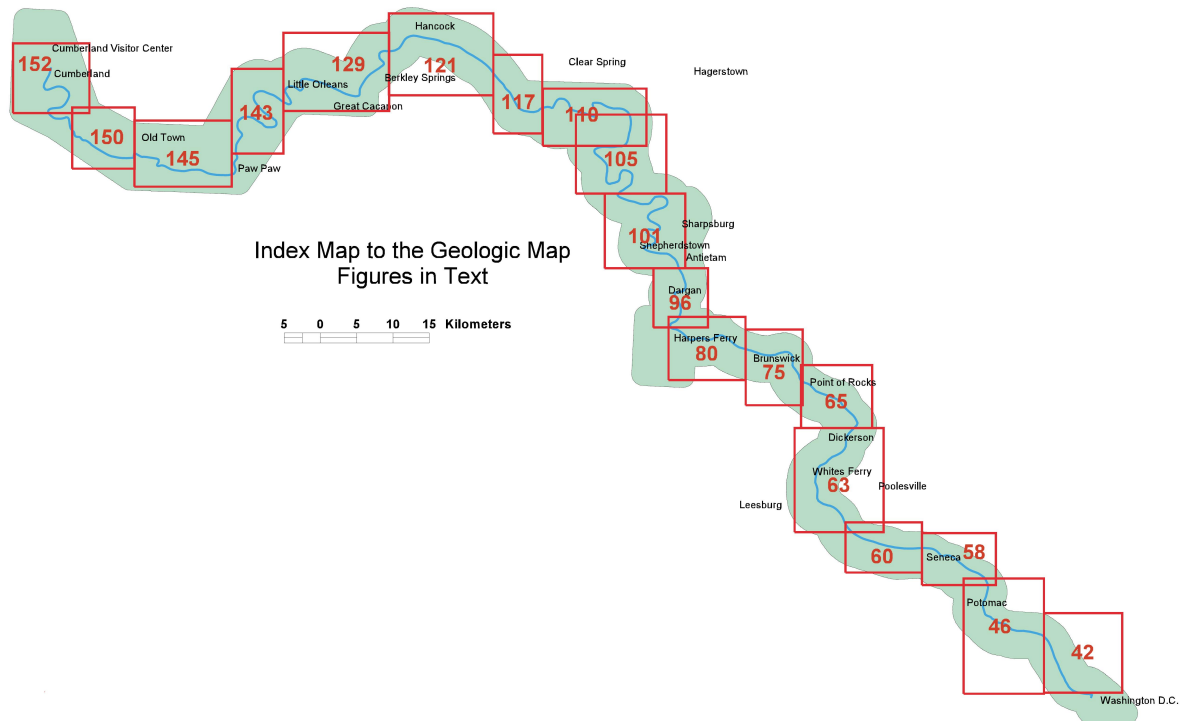
CENOZOIC SURFICIAL DEPOSITS		PEIDMONT	
Qa	Alluvium (Holocene) - Unconsolidated clay, silt, sand, and gravel underlying flood plains	Cfa	Frederick Formation (Upper Cambrian) - -
Qc	Colluvium (Holocene and Pleistocene) - Cobbles and boulders on mountain slopes	Cfr	Adamstown Member - Silty limestone and silty dolomite
QTI	Terraces (Holocene, Pleistocene, and Tertiary?) - - Sand, gravel, and boulders underlying flat benches and isolated hills; includes some strat terraces with no deposits		Rocky Springs Station Member - Dolomitic limestone, breccia of limestone, chert, and sandstone
COASTAL PLAIN PROVINCE			Grayish black shale
Kps	Potomac Formation (Lower and Upper Cretaceous) - - Sand and clay with plant leaves, stems, and trunks		Undifferentiated
PIEDMONT PROVINCE		Car	Anby Formation (Middle and Lower Cambrian) - Gray and brown mottled sandy metasilstone
CULPEPER BASIN			Tomsonton Formation (Lower Cambrian) - - Light gray dolomite
Jd	Diorite dikes and sills (Early Jurassic) - - Black fine- to coarse-grained crystalline diorite	WESTMINSTER TERRANE	
TRbl	Balls Bluff Silstone (Upper Triassic) - -	CZi	Janetville Phyllite (Lower Cambrian? and Neoproterozoic?) - -
TRba	Lacustrine Member - Red arkosic sandstone	CZig	Phyllite-Elate and purple phyllite, slate, and phyllonite with vein quartz
	Leesburg Member-Pink variegated carbonate conglomerate	CZig	Greenstone-Green schistose basaltic volcanic rock
TRmp	Manassas Sandstone (Upper Triassic) - -	CZil	Meladiorite-Light gray fine-bedded silty limestone with black phyllite
	Pocahontas Member - - Red arkosic sandstone	POTOMAC TERRANE	
TRml	Tuscarora Creek Member-Pink variegated carbonate conglomerate	DI	Lamprophyre dikes (Late Devonian) - - Gray fine-grained quartz-plagioclase rock with biotite crystals
TRmr	Reston Member - - Tan quartz-pebble conglomerate	DI	Kennington Tonalite (Middle Ordovician) - - Gray garnet-rich, muscovite-biotite tonalite
VALLEY AND RIDGE PROVINCE			Georgetown Intrusive Suite (Middle Ordovician) - -
MP	Purcell Formation (Lower Mississippi) - - Red and brown sandstone and pebble conglomerate	Ogh	Gray foliated biotite-hornblende tonalite containing inclusions of mafic and metasedimentary rock
MDr	Rockwell (Upper Devonian and Lower Mississippian) - - Green to gray sandstone, siltstone, and shale	Ogb	Gray foliated biotite tonalite containing inclusions of mafic and metasedimentary rocks
Dh	Hampshire Formation (Upper Devonian) - - Gray, green, and red sandstone, siltstone, and shale	Ogv	Dark gray foliated quartz gabbro and quartz diorite
Dr	Potomac Formation (Upper Devonian) - - Greenish- to reddish-gray conglomerate sandstone, medium- and coarse-grained sandstone, siltstone, and shale	Ogv	Green foliated serpentinite, soapstone, and talc schist
Db	Brallier Formation (Upper Devonian) - - Dark gray, fine-grained sandstone, siltstone, and shale	Odin	Dalcarina Intrusive Suite (Middle Ordovician) - -
Dm	Mahantango Formation (Middle Devonian) - - Light gray siltstone, shale, and minor sandstone	Odi	Gray foliated biotite monzonite and granodiorite
Dmn	Marcellus Shale and Needmore Formations (Middle and Lower Devonian) - - Gray black shale, calcite-rich shale, and limestone	Odi	Light gray muscovite trondhjemite, occurs as dikes, sheets and bodies of
Do	Oriskany Formation (Lower Devonian) - - Light gray sandstone and pebble conglomerate	Ob	Clarendon Granite (Early Ordovician) - - Light gray foliated biotite-muscovite monzonite
DShk	Helderberg Formation and Keyser Limestone (Lower Devonian and Upper Silurian) - - Gray limestone, shale, and cherty limestone	Ob	Boat Island Granodiorite (Early Ordovician?) - - Light gray and white muscovite-biotite granodiorite and pegmatite
Sil	Tonoloway Limestone (Upper Silurian) - - Gray limestone, dolomite, calcareous shale, and thin sandstone	Oq	Quartz (Early Ordovician and Cambrian?) - - Massive bodies of white vein quartz
Sw	Willis Creek Formation (Upper Silurian) - - Gray shale, limestone, claystone, and sandstone		Amphibolite (Cambrian) - - Green foliated epidote-plagioclase-hornblende amphibolite, metamorphosed mafic volcanic rock
Sb	Blomestein Formation (Upper Silurian) - - Red sandstone, siltstone, and shale	Ca	Skyview Formation (Lower Cambrian) - - Gray quartzofeldspathic matrix with fragments and bodies of metamorphosed sedimentary, volcanic, and igneous rocks
Sm	Mckenzie Formation (Middle and Upper Silurian) - - Gray shale, calcareous shale, and limestone	CI	Larzel Formation (Lower Cambrian) - - Gray quartzofeldspathic matrix with fragments of metacarbonate and muscovite biotite schist
Sk	Keefer Sandstone (Middle Silurian) - - Tan and Gray sandstone with SKOLITHUS LINEARIS	CZmg	Malheur Group Formation (Lower Cambrian and Neoproterozoic) - -
Srk	Roschill Formation and Keefer Sandstone, undifferentiated		Melagroywacke - - Gray melagroywacke interbedded with schist
Sr	Roschill Formation (Middle Silurian) - - Tan and red siltstone, red hematite sandstone, and tan sandstone	CZmm	Migmatite - - Mixture of former partial melt of dark gray quartzite-schist (older paleosome) and light gray and white quartz plagioclase granitoid (younger leucosome)
Sf	Tuscarora Quartzite (Middle and Lower Silurian) - - White and gray quartzite, sandstone, and quartz pebble conglomerate	CZmp	Phyllonite-Gray and green basinal diorite-schistose phyllonite with white vein quartz
Oj	Juniata Formation (Late Ordovician) - - Maroon sandstone and siltstone	CZma	Schist - - Gray, green, and brown quartz-rich schist and mica gneiss interbedded with melagroywacke and calc-silicate rock
GREAT VALLEY SECTION		CZu	Ultramafic rock (Lower Cambrian and Neoproterozoic) - - Dark and light green serpentinite, soapstone, and talc schist
Omu	Martinsburg Formation (Upper and Middle Ordovician) - -	CZa	Bodies and fragments of rock within the Skyview, Laurel, and Malheur Group Formations (Lower Cambrian and Neoproterozoic) - -
Oms	Upper Member - - Brown and green shale, siltstone, and sandstone	CZg	Dark green and black amphibolite and ultramafic rock
Oc	Chambersburg Limestone (Middle Ordovician) - - Gray argillaceous, nodular limestone	CZi	Dark melagroywacke and metagreywacke
On	New Market Limestone (Middle Ordovician) - - Gray thick-bedded limestone		Hornblende-plagioclase-quartz-muscovite felsic tuffaceous schist
Op	Pinesburg Station Dolomite (Middle Ordovician) - - Gray, cherty, fractured dolomite		Green soapstone and actinolite-chlorite schist
Orr	Roschill Run Formation (Middle and Lower Ordovician) - - Gray limestone interbedded with dolomite	BLUE RIDGE PROVINCE	
Os	Stonewall Limestone (Lower Ordovician) - - Gray limestone	CI	Tomsonton Formation (Lower Cambrian) - - Gray dolomite
Oss	Stratford Member - - Gray silty, laminated limestone with shale partings	Cgp	Carbonaceous phyllite (Lower Cambrian) - - Dark gray laminar graphitic phyllite
OCc	Conococheague Limestone (Lower Ordovician and Upper Cambrian) - - Gray limestone interbedded with gray dolomite and sandstone	Ca	Antietam Formation (Lower Cambrian) - - Brown iron-rich sandstone
Ccb	Big Spring Member (Upper Cambrian) - - Dolomitic and dolomitic sandstone	Ch	Harpers Formation (Lower Cambrian) - - Gray and green phyllite metasilstone
Ce	Elbrook Limestone (Upper and Middle Cambrian) - - Interbedded limestone and dolomite		Light gray and brown thin bedded sandstone
Waynesboro Formation (Lower Cambrian) - -		Cw	Waynesboro Formation (Lower Cambrian) - -
Cwac	Chesapeake Member - - Red siltstone and shale		Oreous Creek Member - - Light gray and white quartzite and quartzpebble
Cwak	Carleton Member - - Gray limestone interbedded with dolomite		Maryland Heights Member - - Gray quartzite and dark metasilstone
Cwag	Red Run Member - - Tan sandstone and green shale		Buzzard Knob Member - - Gray and blue quartzite with pebbles, melagroywacke and metasilstone
	Undifferentiated		Undifferentiated
Cld	Tomsonton Formation (Lower Cambrian) - -	CIc	Landon Formation (Lower Cambrian) -
Cltb	Benevola Member - - Light gray dolomite		Conglomerate - - Dark gray and blue variegated cobble and pebble conglomerate; matrix composed of vein quartz, quartzite, red Jasper, greenstone, and gneiss
Cltf	Fort Duncan Member - - Dark gray dolomite with bioturbation structures	CZlp	Phyllite - - Gray, black, cream, and pink variegated phyllite
Cltb	Bolivar Heights Member - - Dark gray limestone		Calcutt Formation (Neoproterozoic) - -
	Undifferentiated	Zr	Greenstone - - Green metamorphosed basaltic lava flows
		Zrk	Phyllite and sandstone - - Gray variegated vesicular and bubbly phyllite and tan medium-grained sandstone
		Zrd	Melagroywacke dikes (Neoproterozoic) - - Tan fine-grained felsite with feldspar crystals
		Zmd	Melagroywacke dikes (Neoproterozoic) - - Green schistose melagroywacke
			Swift Run Formation (Neoproterozoic) - -
		Zam	Marble - - Pink and tan massive to schistose marble
		Zap	Phyllite - - Tan sandy varietic phyllite
			Schist - - Tan quartz varietic schist
		Zak	Metasandstone - - Tan medium-grained metasandstone with cobbles and pebbles of vein quartz
			Blue Ridge Basement Complex (Mesoproterozoic) -
		Ybg	Biotite granite gneiss - - Light gray foliated granite gneiss with black specks of biotite
		Yg	Leucocratic metagranite - - Light-gray foliated metagranite
		Ygl	Garnetiferous leucocratic metagranite - - Light gray foliated metagranite with red spots of garnet
		Yqp	Quartz plagioclase gneiss - - White massive gneiss
		Yhg	Hornblende monzonite gneiss - - Tan to dark foliated gneiss with greenish black hornblende crystals
		Yp	Gneiss graphitic paragneiss - - Rusty schist with garnet crystals and flakes of graphite

Extracted from: [\(OFR 01-188A\)](#)

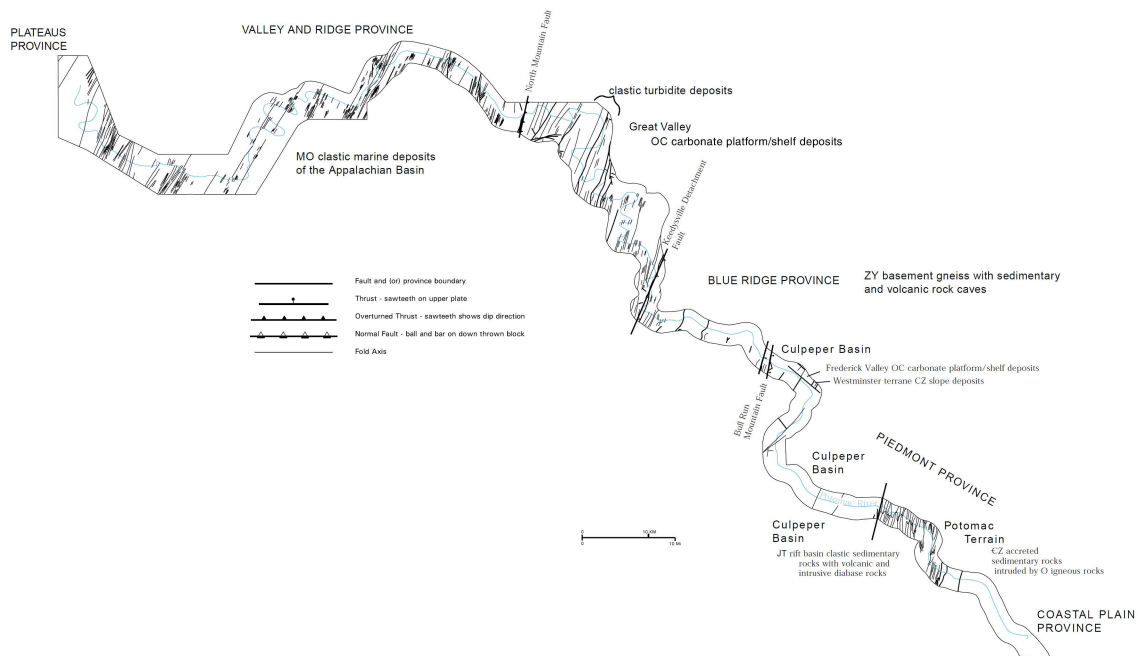
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Index Maps - USGS Open File Report 2001-188A



Extracted from: ([OFR 01-188A](#))



Extracted from: ([OFR 01-188A](#))

Map Legend - USGS Open File Report 2001-188A

	Towns
	Access Points
	Mile Markers
	Faults
	Contacts
	Major Roads

Extracted from: ([OFR 01-188A](#))

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Table of Contents

Introduction

Historical Background

Geologic Setting

 Physiography

 Geology

 Bedrock

 Cenozoic Landscape and Surficial Deposits

 Introduction

 River Morphology

 Recent Flood Plain Alluvium

 Alluvial Terraces

 Abandoned Entrenched Meanders

 Alluvial and Colluvial Terraces

 Colluvium

 Karst Landforms

 Fossils Along the C&O Canal

 Introduction

 Piedmont Province

 Frederick Valley

 Culpeper Basin

 Blue Ridge Province

 Valley and Ridge Province

 Cambrian fossils

 Ordovician fossils

 Silurian fossils

 Devonian fossils

 Mississippian fossils

Engineering Geology

 Introduction

 Bedrock Excavation

 Locks

 Lock Stone

 Aqueducts

 Culverts and Waste Weirs

Canal Prism and Towpath
Dams
Bedrock Tunnel
Cement
Control of Geology on Engineering

Geologic Guide

Piedmont Province

Potomac Terrane

Introduction

Georgetown to Glen Echo Park Area MM 0 to MM 7
Glen Echo Park Area to Swains Lock MM 7 to MM 16.6
Swains Lock to Seneca MM 16.6 to MM 22.7

Culpeper Basin

Introduction

Seneca to Edwards Ferry MM 22.8 to MM 30.8
Edwards Ferry to Monocacy Aqueduct MM 30.8 to MM 42.2
Monocacy Aqueduct to Point of Rocks MM 42.5 to MM 48.2

Westminster Terrane

Frederick Valley Synclinorium

Blue Ridge Province

Introduction

Point of Rocks to Brunswick MM 48.2 to MM 55
Brunswick to Fort Duncan MM 55 to MM 62.5

Valley and Ridge Province

Great Valley

Introduction

Fort Duncan to Antietam Creek MM 62.5 to MM 69
Antietam Creek to Big Slackwater MM 69 to MM 85.5
Big Slackwater to Williamsport MM 85.5 to MM 99.5
Williamsport to McCoys Ferry MM 99.5 to MM 110

West of the North Mountain Fault

Introduction

McCoys Ferry to Licking Creek Aqueduct MM 110 to MM 116
Licking Creek Aqueduct to Round Top Cement Mill MM 116 to MM 127.5
Round Top Cement Mill to Sideling Hill Aqueduct MM 127.5 to MM 137
Sideling Hill Aqueduct to Paw Paw Tunnel MM 141 to MM 156
Paw Paw Tunnel to Old Town MM 156 to MM 167
Oldtown to Spring Gap MM 167 to MM 173.5
Spring Gap to Cumberland MM 173.5 to MM 184.5

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PLATE [Plate is in [OFR 01-188A](#)]

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