

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science Directorate
Geologic Resources Division



Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial

GRI Ancillary Map Information Document

Produced to accompany the Geologic Resources Inventory (GRI) Digital
Geologic-GIS Data for Allegheny Portage Railroad National Historic Site and
Johnstown Flood National Memorial

alpo_jofl_geology.pdf

Version: 5/11/2020

Geologic Resources Inventory Map Document for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial

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Geologic Resources Inventory Map Document



Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial, Pennsylvania

Document to Accompany Digital Geologic-GIS Data

[alpo_jofl_geology.pdf](#)

Version: 5/11/2020

This document has been developed to accompany the digital geologic-GIS data developed by the Geologic Resources Inventory (GRI) program for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial, Pennsylvania (ALPO and JOFL).

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.

This document contains the following information:

- 1) **About the NPS Geologic Resources Inventory Program** – A brief summary of the Geologic Resources Inventory (GRI) Program and its products. Included are web links to the GRI GIS data model, and to the GRI products page where digital geologic-GIS datasets, scoping reports and geology reports are available for download. In addition, web links to the NPS Data Store and GRI program home page, as well as contact information for the GRI coordinator, are also present.
- 2) **GRI Digital Maps and Source Citations** – A listing of all GRI digital geologic-GIS maps produced for this project along with sources used in their completion. In addition, a brief explanation of how each source map was used is provided.
- 3) **Digital Bedrock Geologic-GIS Map of Allegheny Portage Railroad National Historic Site, Johnstown Flood National Memorial and Vicinity**
 - a.) **Map Unit List** – A listing of all bedrock map units present on this map.
 - b.) **Map Unit Descriptions** – Descriptions for all bedrock map units.
- 4) **Digital Geologic-GIS Map of Johnstown Flood National Memorial and portions of Allegheny Portage Railroad National Historic Site**
 - a.) **Map Unit List** – A listing of all map units present on this map.

- b.) **Map Unit Descriptions** – Descriptions for all map units.
- c.) **Ancillary Source Map Information** – Additional source map information present on the source map.
- 5) **GRI Digital Data Credits** – GRI digital geologic-GIS data and ancillary map information document production credits.

For information about using GRI digital geologic-GIS data contact:

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About the NPS Geologic Resources Inventory Program

Background

The Geologic Resources Inventory (GRI) provides geologic map data and pertinent geologic information to support resource management and science-informed decision making in more than 270 natural resource parks throughout the National Park System. 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 GRI is one of 12 inventories funded by the National Park Service (NPS) Inventory and Monitoring Program. The Geologic Resources Division of the NPS Natural Resource Stewardship and Science Directorate administers the GRI. The NPS Geologic Resources Division partners with the Colorado State University Department of Geosciences to produce GRI products. Many additional partners participate in the GRI process by contributing source maps or reviewing products.

The GRI team undertakes three tasks for each park in the Inventory and Monitoring program: (1) conduct a scoping meeting and provide a summary document, (2) provide digital geologic map data in a geographic information system (GIS) format, and (3) provide a GRI report. These products are designed and written for nongeoscientists.

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: <https://www.nps.gov/articles/gri-geodatabase-model.htm>

Geologic Reports: GRI reports synthesize discussions from the original scoping meeting, follow up conference call(s), and subsequent research. Chapters of each report discuss the geologic setting of the park, distinctive geologic features and processes within the park, highlight geologic issues facing resource managers, and describe the geologic history leading to the present-day landscape. Each report also includes a poster illustrating these GRI digital geologic-GIS data.

For a complete listing of GRI products visit the GRI publications webpage: <https://go.nps.gov/gripubs>. GRI digital geologic-GIS data is also available online at the NPS Data Store: <https://irma.nps.gov/DataStore/Search/Quick>. To find GRI data for a specific park or parks select the appropriate park(s), enter "GRI" as a Search Text term, and then select the Search button.

For more information about the Geologic Resources Inventory Program visit the GRI webpage: <https://>

www.nps.gov/subjects/geology/gri.htm. At the bottom of that webpage is a "Contact Us" link if you need additional information. You may also directly contact the program coordinator:

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The Geologic Resources Inventory (GRI) program is funded by the National Park Service (NPS) Inventory and Monitoring (I&M) Division. Learn more about I&M and the 12 baseline inventories at the I&M webpage: <https://www.nps.gov/im/inventories.htm>.

GRI Digital Maps and Source Map Citations

The GRI digital geologic-GIS maps for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial, Pennsylvania (ALPO and JOFL) are presented below. With each map is the source map(s) used to produce the GRI digital geologic-GIS map.

Digital Bedrock Geologic-GIS Map of Allegheny Portage Railroad National Historic Site, Johnstown Flood National Memorial and Vicinity, Pennsylvania (*GRI MapCode ALPO_JOFL_bedrock*)

Berg, T.M., Edmunds, W.E., Geyer, A.R., and others, compilers, 2001, Digital Bedrock Geology of Pennsylvania, Johnstown 30' x 60' Quadrangle: Pennsylvania Geological Survey, 4th series, Map 1, scale 1:250,000

Berg, T.M., Edmunds, W.E., Geyer, A.R., and others, compilers, 2001, Digital Bedrock Geology of Pennsylvania, Tyronne 30' x 60' Quadrangle: Pennsylvania Geological Survey, 4th series, Map 1, scale 1:250,000

The GRI used a partial extent of the each source map, however, all geologic features within these extents were captured. The source maps listed above are components of the following state map publication,

Berg, T. M., Edmunds, W. E., Geyer, A. R., and others, compilers, 1980, Geologic map of Pennsylvania, PAGS, 4th ser., Map 1, 1:250,000 scale, from source maps (PAGS Map 61) mapped at 1:62,500 scale

Digital Geologic-GIS Map of Johnstown Flood National Memorial and portions of Allegheny Portage Railroad National Historic Site, Pennsylvania (*GRI MapCode JOFL_ALPO*)

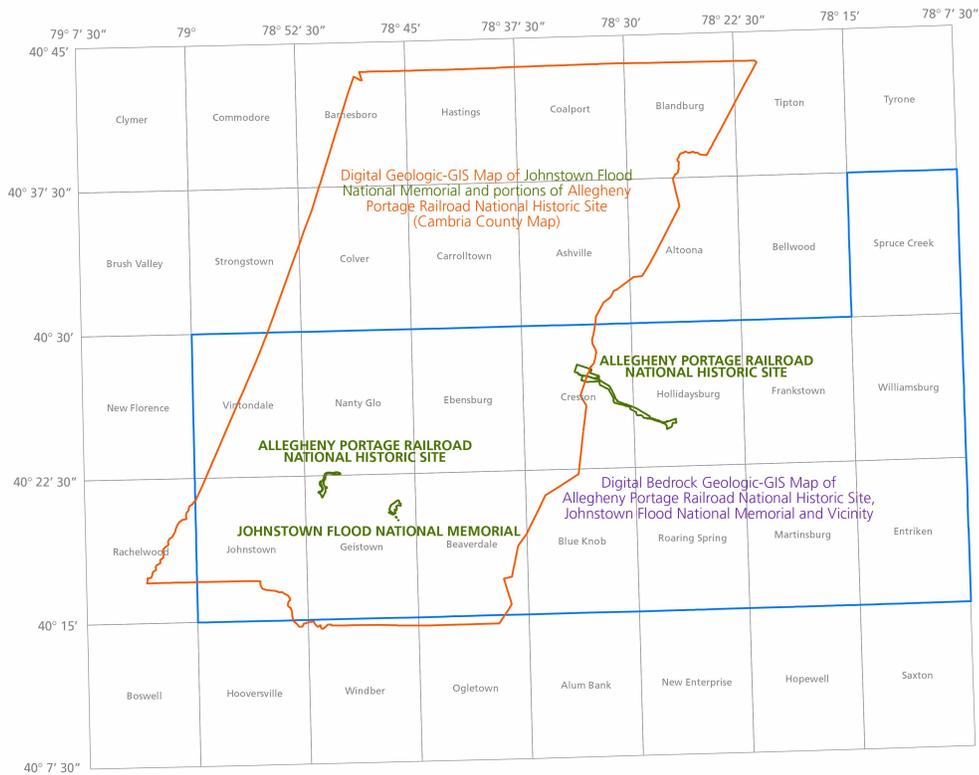
McElroy, Thomas A., 1998, McElroy, Groundwater Resources of Cambria County, Pennsylvania: Pennsylvania Geological Survey, Water Resource Report 67, scale 1:50,000

The GRI used the full extent of the source map, and captured all geologic features within the map's extent. As noted in the source map the map is of Cambria County. Unfortunately, as of the date of this data/map release, May 2020, no comparable geologic map for Blair County, the adjacent county that would cover the remainder of Allegheny Portage Railroad National Historic Site, presently exists.

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

Index Map

The following index map displays the extents of the GRI digital geologic-GIS maps produced for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial (ALPO and JOFL). The extent of the GRI Digital Bedrock Geologic-GIS Map of Allegheny Portage Railroad National Historic Site, Johnstown Flood National Memorial and Vicinity (*GRI MapCode ALPO_JOFL_bedrock*) is outlined in blue, whereas the extent of the GRI Digital Geologic-GIS Map of Johnstown Flood National Memorial and portions of Allegheny Portage Railroad National Historic Site (*GRI MapCode JOFL_ALPO*) is outlined in red. The boundaries for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial (as of April, 2020) are outlined in green.



Index map produced by Stephanie O'Meara (Colorado State University).

Digital Bedrock Geologic-GIS Map of Allegheny Portage Railroad National Historic Site, Johnstown Flood National Memorial and Vicinity

Map Unit List

The bedrock map units present in the Digital Bedrock Geologic-GIS Map of Allegheny Portage Railroad National Historic Site, Johnstown Flood National Memorial and Vicinity (*GRI MapCode* *ALPO_JOFL_bedrock*) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., PNcc - Casselman Formation). Units are listed from youngest to oldest. Information about each geologic unit is also presented in the GRI Geologic Unit Information (*ALPO_JOFLUNIT_bedrock*) table included with the GRI geologic-GIS data.

Paleozoic Era

Pennsylvanian Period

[PNcc](#) - Casselman Formation

[PNcg](#) - Glenshaw Formation

[PNa](#) - Allegheny Group

[PNp](#) - Pottsville Group

Mississippian Period

[Mmc](#) - Mauch Chunk Formation

[Mb](#) - Burgoon Sandstone

[Mp](#) - Pocono Formation

Mississippian and Devonian Periods

[MDso](#) - Shenango Formation through Oswayo Formation, undivided

[MDr](#) - Rockwell Formation

Devonian Period

[Dck](#) - Catskill Formation

[Df](#) - Foreknobs Formation

[Ds](#) - Scherr Formation

[Dbh](#) - Brailer and Harrell Formations, undivided

[Dh](#) - Hamilton Group

[Doo](#) - Onondaga and Old Port Formations, undivided

Devonian and Silurian Periods

[DSkt](#) - Keyser and Tonoloway Formations, undivided

Silurian Period

[Swm](#) - Wills Creek Formation through Mifflintown Formation, undivided

[Swc](#) - Wills Creek Formation

[Sbm](#) - Bloomsburg and Mifflintown Formations, undivided

[Sc](#) - Clinton Group

[St](#) - Tuscarora Formation

Ordovician Period

[Oj](#) - Juniata Formation

[Obe](#) - Bald Eagle Formation

[Or](#) - Reedsville Formation

[Ocl](#) - Coburn Formation through Loysburg Formation, undivided

[Oba](#) - Bellefonte and Axemann Formations, undivided

[Ons](#) - Nittany and Stonehenge/Larke Formations, undivided

Cambrian Period

[Cg](#) - Gatesburg Formation

[Cw](#) - Warrior Formation

[Cph](#) - Pleasant Hill Formation

[Cwb](#) - Waynesboro Formation

Map Unit Descriptions

Descriptions of all bedrock geologic map units, listed from youngest to oldest, are presented below. Unit descriptions were taken from the source map [Geologic Map of Pennsylvania \(1980\)](#).

PNcc - Casselman Formation (Pennsylvanian)

Cyclic sequences of shale, siltstone, sandstone, red beds, thin, impure limestone, and thin, non-persistent coal; red beds are associated with landslides; base is at top of Ames limestone.

PNcg - Glenshaw Formation (Pennsylvanian)

Cyclic sequences of shale, sandstone, red beds, and thin limestone and coal; includes four marine limestone or shale horizons; red beds are involved in landslides; base is at top of Upper Freeport coal.

PNa - Allegheny Group (Pennsylvanian)

PNa - Allegheny Formation (Pennsylvanian)

Cyclic sequences of sandstone, shale, limestone, clay, and coal; includes valuable clay deposits and Vanport Limestone; commercially valuable Freeport, Kittanning, and Brookville-Clarion coals present; base is at bottom of Brookville-Clarion coal.

PNp - Pottsville Group (Pennsylvanian)

PNp - Pottsville Formation (Pennsylvanian)

Predominantly gray sandstone and conglomerate; also contains thin beds of shale, claystone, limestone, and coal; includes Olean and Sharon conglomerates of northwestern Pennsylvania; thin marine limestones present in Beaver, Lawrence, and Mercer Counties; minable coals and commercially valuable high-alumina clays present locally.

Mmc - Mauch Chunk Formation (Mississippian)

Grayish-red shale, siltstone, sandstone, and some conglomerate; some local nonred zones. Includes Loyalhanna Member (crossbedded, sandy limestone) at base in south-central and southwestern Pennsylvania; also includes Greenbrier Limestone Member, and Wymps Gap and Deer Valley Limestones, which are tongues of the Greenbrier. Along Allegheny Front from Blair County to Sullivan County, Loyalhanna Member is greenish-gray, calcareous, crossbedded sandstone.

Mb - Burgoon Sandstone (Mississippian)

Buff, medium-grained, cross-bedded sandstone; includes shale and coal; in places, contains conglomerate at base; contains plant fossils; equivalent to Pocono Formation of Ridge and Valley province.

Mp - Pocono Formation (Mississippian)

Light-gray to buff or light-olive-gray, medium-grained, cross-bedded sandstone and minor siltstone; commonly conglomeratic at base and in middle; medial conglomerate, where present, is used to divide into Mount Carbon and Beckville Members; equivalent to Burgoon Sandstone of Allegheny Plateau.

MDso - Shenango Formation through Oswayo Formation, undivided (Mississippian and Devonian)

Greenish-gray, olive, and buff sandstone and siltstone, and gray shale in varying proportions; includes "Pocono" ("Knapp") and Oswayo of earlier workers; difficult lithologic distinction between Oswayo and "Knapp"- "Pocono" south and east of type area at Olean, N. Y.; contains marine fossils; includes lateral equivalents of Shenango Formation, Cuyahoga Group, Corry Sandstone, Bedford Shale, and Cussewago Sandstone, plus Oswayo Formation.

MDr - Rockwell Formation (Mississippian and Devonian)

Buff, fine- to medium-grained, crossbedded, argillaceous sandstone and dark-gray shale; includes some carbonaceous shale, sporadic conglomerate beds, and diamictite; included in lower "Pocono" of earlier workers.

Dck - Catskill Formation (Devonian)

Grayish-red sandstone, siltstone, shale, and mudstone; locally conglomeratic; contains gray sandstone in upper part; lithologies arranged in fining-upward cycles; equivalent to the Hampshire Formation south of Pennsylvania.

Df - Foreknobs Formation (Devonian)

Interbedded sandstone, siltstone, and shale; gray to olive gray, red near top; substantial brownish-gray sandstone; some marine fossils; a few conglomerate beds at base and top.

Ds - Scherr Formation (Devonian)

Chiefly siltstone; some fine-grained sandstone, shale, and mudstone; light olive gray; marine fossils.

Dbh - Brallier and Harrell Formations, undivided (Devonian)

In descending order, the Brallier Formation and Harrell Formation.

Brallier Formation

Medium gray, planar-bedded siltstone interbedded with light-olive shale; sparse marine fauna.

Harrell Formation

Black shale (Burket Member) and dark-gray shale.

Dh - Hamilton Group (Devonian)

Includes, in descending order, the Mahantango Formation and Marcellus Formation.

Mahantango Formation

Gray, brown, and olive shale and siltstone; marine fossils. Includes the following members, in descending order: Tully—argillaceous limestone; Sherman Ridge, Montebello (sandstone), Fisher Ridge, Dalmatia, and Turkey Ridge. In south-central Pennsylvania, includes Clearville, Frame,

Chaneysville, and Gander Run Members. Characterized by coarsening-upward cycles.

Marcellus Formation

Black shale; sparse marine fauna and siderite concretions. Contains local limestone ("Purcell") member. Tioga bentonite included at base in eastern Pennsylvania.

Doo - Onondaga and Old Port Formations, undivided (Devonian)

Includes, in descending order, the Onondaga Formation, Ridgeley Member of Old Port Formation and Shriver, Mandata, Corriganville, and New Creek Members of Old Port Formation, undivided.

Onondaga Formation

Medium-gray calcareous shale; marine fossils; medium-gray argillaceous limestone of Selinsgrove Member at top; called "Needmore Formation" west of 78° longitude; Tioga bentonite at top.

Ridgeley Member of Old Port Formation

Fine- to very coarse grained, light-gray sandstone ("Oriskany" of earlier workers).

Shriver, Mandata, Corriganville, and New Creek Members of Old Port Formation, undivided

Limestone, chert, shale, and siliceous siltstone. In Fulton County, limestone and chert of the Licking Creek Member replaces the Shriver and Mandata.

DSkt - Keyser and Tonoloway Formations, undivided (Devonian and Silurian)

In descending order, the Keyser Formation and Tonoloway Formation.

Keyser Formation

Medium-gray, crystalline to nodular, fossiliferous limestone; upper part laminated and mud cracked; not present east of Harrisburg; passes into lower Coeymans, Rondout, and Decker Formations in the east.

Tonoloway Formation

Medium-gray, laminated, mud-cracked limestone containing some medium-dark- or olive-gray shale interbeds; lower part passes into Wills Creek Formation east and south; passes into Bossardville and Poxono Island beds in the east.

Swm - Wills Creek Formation through Mifflintown Formation, undivided (Silurian)

Includes, in descending order, the Wills Creek Formation ([Swc](#)), and Bloomsburg and Mifflintown Formations, undivided ([Sbm](#)).

Swc - Wills Creek Formation (Silurian)

Variiegated gray, grayish-red, yellowish-gray and greenish-gray, interbedded calcareous shale, siltstone, shaly limestone, and dolomite; passes into Bloomsburg Formation in the southeast; not present east of Harrisburg.

Sbm - Bloomsburg and Mifflintown Formations, undivided (Silurian)

Includes, in descending order, the Bloomsburg Formation, and Mifflintown Formation.

Bloomsburg Formation

Grayish-red and greenish-gray shale, siltstone, and very fine to coarse-grained sandstone; some

calcareous mudstone in central Pennsylvania; thins to west and is replaced by Mifflintown beds; thickens eastward, replacing overlying Wills Creek and Tonoloway Formations and underlying Mifflintown Formation.

Mifflintown Formation

Interbedded dark-gray shale and medium-gray fossiliferous limestone; equivalent to "McKenzie" and "Rochester" of earlier workers; not present east of Harrisburg.

Sc - Clinton Group (Silurian)

Predominantly Rose Hill Formation. Above Rose Hill is Keefer Formation.

Rose Hill Formation

Light-olive-gray to brownish-gray, fossiliferous shale; locally, limestone occurs near top; includes dark-reddish-gray, very fine to coarse-grained, ferruginous sandstone; east of Harrisburg, equivalent to Lizard Creek Member of Shawangunk Formation.

Keefer Formation

Light- to dark-gray, fossiliferous sandstone, hematitic, oolitic sandstone, and shale; not recognized east of Harrisburg.

St - Tuscarora Formation (Silurian)

Light- to medium-gray quartzite and quartzitic sandstone and minor interbedded shale and siltstone, locally conglomeratic in lower part; includes (to the northwest) interbedded red and non-red sandstone (Castanea Member) at top; east of Harrisburg, equivalent to Minsi and Weiders Members of Shawangunk Formation.

Oj - Juniata Formation (Ordovician)

Grayish-red, very fine to medium-grained, cross-bedded sandstone, and grayish-red siltstone and shale; merges with underlying Bald Eagle Formation to the south; not present east of Susquehanna River, except at Spitzenberg Hill area (Berks County).

Obe - Bald Eagle Formation (Ordovician)

Gray to olive-gray and grayish-red, fine- to coarse-grained, cross-bedded sandstone, siltstone, and shale; some conglomerate (Lost Run Member); not present east of Susquehanna River, except at Spitzenberg Hill area (Berks County).

Or - Reedsville Formation (Ordovician)

Olive-gray to dark-gray shale, siltstone, and fine-grained, thin-bedded sandstone having graded bedding; upper sandstone is very fossiliferous; includes Antes Formation (black calcareous shale) at base along Nittany Arch.

Ocl - Coburn Formation through Loysburg Formation, undivided (Ordovician)

Includes, in descending order, the Coburn Formation, Salona Formation, Nealmont Formation, Valentine Member of Benner Formation, Benner Formation, Snyder Formation, Hatter Formation and Loysburg Formation.

Coburn Formation

Medium-gray to very dark gray, very fossiliferous limestone and shaly limestone;

Salona Formation

Very dark gray to black, nonfossiliferous shaly limestone and calcareous shale containing metabentonite beds.

Nealmont Formation

Medium-gray fossiliferous limestone (calcarenite-Rodman Member) overlying thin-bedded shaly limestone (calcilutite-Center Hall Member).

Valentine Member of Benner Formation

Chemically pure limestone; occurs at top of Benner Formation.

Benner Formation

Light- to dark-gray, thick-bedded limestone (calcilutite); includes chemically pure Valentine Member (Obv) at top, and, below, the less pure Valley View Member, which contains metabentonite beds. All laterally equivalent to impure limestones of Oak Hall Member; Stover Member at base is dark-gray limestone (calcilutite) having dolomite streaks; Benner is called "Linden Hall" by some workers.

Snyder Formation

Light- to medium-gray limestone, laminated to medium-bedded; has mud cracks, oolites, and dolomitic layers.

Hatter Formation

Medium-gray, fossiliferous, argillaceous limestone, laminated and dolomitic.

Loysburg Formation

Light- to medium-gray, medium-bedded limestone (Clover Member) overlying laminated, alternating limestone, dolomitic limestone, and dolomite (Milroy ["tiger-striped"] Member).

Oba - Bellefonte and Axemann Formations, undivided (Ordovician)

Includes, in descending order, the Bellefonte and Axemann Formations.

Bellefonte Formation

Medium-gray, brownish-weathering, medium-bedded dolomite and minor sandstone; very fine grained Tea Creek Member above, and crystalline Coffee Run Member below.

Axemann Formation

Medium-gray fossiliferous limestone.

Ons - Nittany and Stonehenge/Larke Formations, undivided (Ordovician)

Includes, in descending order, the Nittany Formation and Stonehenge/Larke Formations.

Nittany Formation

Medium- to dark-gray, thick-bedded dolomite containing chert and siliceous oolites.

Stonehenge/Larke Formation

Medium-gray, medium-bedded to laminated, fossiliferous, oolitic limestone containing edgewise conglomerate; to the west, Stonehenge is laterally equivalent to medium- to dark-gray, coarsely crystalline dolomite (Larke).

Cg - Gatesburg Formation (Cambrian)

Gray dolomite, limestone, and sandstone. Includes the Mines Member and four lower members.

Mines Member of Gatesburg Formation

Gray dolomite containing siliceous "oolites" and chert having cryptozoan stromatolites.

Lower members of Gatesburg Formation

Includes, in descending order; cyclic repetitions of sandstone and dolomite ("upper sandstone" member); fossiliferous, laminated to massive limestone and dolomite (Ore Hill Member); cyclic repetitions of sandstone and dolomite ("lower sandstone" member); and thick-bedded crystalline dolomite (Stacy Member).

Cw - Warrior Formation (Cambrian)

Gray, thin- to medium-bedded, fossiliferous, cyclic limestone bearing stromatolites; interbedded with thick-bedded crystalline dolomite and some sandstone.

Cph - Pleasant Hill Formation (Cambrian)

Gray, thin-bedded, argillaceous limestone interbedded with shale, siltstone, and sandstone.

Cwb - Waynesboro Formation (Cambrian)

Greenish-gray and grayish-purple shale interbedded with greenish-gray sandstone and conglomerate; occurs in Henrietta fault block only.

Digital Geologic-GIS Map of Johnstown Flood National Memorial and portions of Allegheny Portage Railroad National Historic Site

Map Unit List

The geologic map units present in the Digital Geologic-GIS Map of Johnstown Flood National Memorial and portions of Allegheny Portage Railroad National Historic Site (*GRI MapCode JOFL_ALPO*) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., Qal - Alluvium). Units are listed from youngest to oldest. Information about each geologic unit is also presented in the GRI Geologic Unit Information (JOFL_ALPOUNIT) table included with the GRI geologic-GIS data.

Cenozoic Era

Quaternary Period

[Qal](#) - Alluvium

Paleozoic Era

Pennsylvanian Period

[PNcc](#) - Casselman Formation

[PNcg](#) - Glenshaw Formation

[PNa](#) - Allegheny Group

[PNp](#) - Pottsville Group

Mississippian Period

[Mmc](#) - Mauch Chunk Formation

[MI](#) - Loyalhanna Formation

[Mb](#) - Burgoon Sandstone

Mississippian and Devonian Periods

[MDr](#) - Rockwell Formation

Devonian Period

[Dck](#) - Catskill Formation

Map Unit Descriptions

Descriptions of all geologic map units, listed from youngest to oldest, are presented below. Unit descriptions were taken from the source map [Groundwater Resources of Cambria County](#).

Qal - Alluvium (Quaternary)

Poorly to well-sorted, unconsolidated deposits of clay, silt, sand, gravel, and boulders.

Well Yields: No data available.

Quality of Water: No data available.

PNcc - Casselman Formation (Pennsylvanian)

Thin-bedded, green and red, commonly calcareous claystone; thin-bedded, gray siltstone; locally massive, fine- to medium-grained, gray sandstone; freshwater limestone; and thin non-persistent coal.

Well Yields: Reported yields of 55 wells range from 0 to 32 gal/min. The medium yield is 10 gal/min. Seven non-domestic wells have reported yields ranging from 3.5 to 23 gal/min and a median yield of 13 gal/min.

Quality of Water: Water is typically hard to very hard; about half of 14 wells tested produce water high in iron and manganese.

PNcg - Glenshaw Formation (Pennsylvanian)

Olive-gray to dark-gray, thinly bedded, fossiliferous marine limestone and clay shale; red claystone; locally massive; fine- to coarse-grained sandstone; minor amounts of freshwater limestone; and thin coal.

Well Yields: Reported yields of 91 wells range from 0 to 30 gal/min. The median reported yield is 12 gal/min.

Quality of water: Water is generally hard; high concentrations of iron and manganese are common.

PNa - Allegheny Group (Pennsylvanian)

Olive-gray to gray to dark-gray clay shale, silt shale, and siltstone; light-gray, thin- to massively bedded, fine- to coarse-grained sandstone; gray siltstone; nodules of limestone and siderite; local gray conglomerate; coal; clay; and nodular limestone in upper half.

Well Yields: Reported yields of 45 wells range from 0 to 180 gal/min. The median reported yield is 12 gal/min. Five non-domestic wells have reported yields ranging from 12 to 180 gal/min and a median yield of 60 gal/min.

Quality of Water: Water is typically hard to very hard; three of six wells tested have excessive concentrations of iron, and one well has high sulfate.

PNp - Pottsville Group (Pennsylvanian)

Predominately gray sandstone; minor amounts of shale, siltstone, claystone, coal, and black shale.

Well Yields: Of three wells inventoried, one well has a reported yield of 15 gal/min, and two wells have reported yields of 14 gal/min.

Quality of Water: Of two wells tested, one yields water of good quality, and one yields water high in iron and manganese.

Mmc - Mauch Chunk Formation (Mississippian)

Mostly grayish-red shale, siltstone, sandstone, and some conglomerate; fossiliferous Wymps Gap limestone occurs in south.

Well Yields: Reported yields of four wells range from 3 to 10 gal/min.

Water Quality: Of two wells tested, one yields water high in iron.

MI - Loyalhanna Formation (Mississippian)

Highly crossbedded, gray, siliceous limestone.

Well Yields: No data available.

Water Quality: No data available.

Mb - Burgoon Sandstone (Mississippian)

Buff, crossbedded, medium-grained sandstone; local occurrences of conglomerate at the base.

Well Yields: No data available.

Water Quality: No data available.

MDr - Rockwell Formation (Mississippian and Devonian)

Interbedded medium-light-gray or light-olive-gray to buff sandstone and dark shale; some thin red or greenish shale and greenish-black or bluish-black marine shale.

Well Yields: No data available.

Water Quality: No data available.

Dck - Catskill Formation (Devonian)

Grayish-red sandstone, siltstone, and shale.

Well Yields: No data available.

Water Quality: No data available.

Ancillary Source Map Information

The following section presents ancillary source map information associated with the source maps used for the Digital Geologic-GIS Map of Johnstown Flood National Memorial and portions of Allegheny Portage Railroad National Historic Site.

Groundwater Resources of Cambria County (Water Resource Report 67)

The formal citation for this source.

McElroy, Thomas A., 1998, McElroy, Groundwater Resources of Cambria County, Pennsylvania: Pennsylvania Geological Survey, Water Resource Report 67, scale 1:50,000

Prominent graphics associated with this source are presented below.

Explanation

| | UNIT | GEOLOGIC DESCRIPTION | WELL YIELDS | QUALITY OF WATER ¹ |
|---------------|--|---|--|---|
| QUATERNARY | ALLUVIUM Qa1 | Poorly to well-sorted, unconsolidated deposits of clay, silt, sand, gravel, and boulders. | No data available. | No data available. |
| PENNSYLVANIAN | CASSELMAN FORMATION Pcc | Thin-bedded, green and red, commonly calcareous claystone; thin-bedded, gray siltstone; locally massive, fine- to medium-grained, gray sandstone; freshwater limestone; and thin, nonpersistent coal. | Reported yields of 55 wells range from 0 to 32 gal/min. The median yield is 10 gal/min. Seven nondomestic wells have reported yields ranging from 3.5 to 23 gal/min and a median yield of 13 gal/min. | Water is typically hard to very hard; about half of 14 wells tested produce water high in iron and manganese. |
| | CONEMAUGH GROUP GLENSHAW FORMATION Pcg | Olive-gray to dark-gray, thinly bedded, fossiliferous marine limestone and clay shale; red claystone; locally massive, fine- to coarse-grained sandstone; minor amounts of freshwater limestone; and thin coal. | Reported yields of 91 wells range from 0 to 30 gal/min. The median reported yield is 12 gal/min. | Water is generally hard; high concentrations of iron and manganese are common. |
| | ALLEGHENY GROUP Pa | Olive-gray to gray to dark-gray clay shale, silt shale, and siltstone; light-gray, thin- to massively bedded, fine- to coarse-grained sandstone; gray siltstone; nodules of limestone and siderite; local gray conglomerate; coal; clay; and nodular limestone in upper half. | Reported yields of 45 wells range from 0 to 180 gal/min. The median reported yield is 12 gal/min. Five nondomestic wells have reported yields ranging from 12 to 180 gal/min and a median yield of 60 gal/min. | Water is typically hard to very hard; three of six wells tested have excessive concentrations of iron, and one well has high sulfate. |
| | POTTSVILLE GROUP Pp | Predominantly gray sandstone; minor amounts of shale, siltstone, claystone, coal, and black shale. | Of three wells inventoried, one well has a reported yield of 15 gal/min, and two wells have reported yields of 14 gal/min. | Of two wells tested, one yields water of good quality, and one yields water high in iron and manganese. |
| | MAUCH CHUNK FORMATION Mmc | Mostly grayish-red shale, siltstone, sandstone, and some conglomerate; fossiliferous Wymps Gap limestone occurs in south. | Reported yields of four wells range from 3 to 10 gal/min. | Of two wells tested, one yields water high in iron. |
| MISSISSIPPIAN | LOYALHANNA FORMATION Ml | Highly crossbedded, gray, siliceous limestone. | No data available. | No data available. |
| | BURGOON SANDSTONE Mb | Buff, crossbedded, medium-grained sandstone; local occurrences of conglomerate at the base. | No data available. | No data available. |
| | ROCKWELL FORMATION Mdr | Interbedded medium-light-gray or light-olive-gray to buff sandstone and dark shale; some thin red or greenish shale and greenish-black or bluish-black marine shale. | No data available. | No data available. |
| DEVONIAN | CATSKILL FORMATION Dck | Grayish-red sandstone, siltstone, and shale. | No data available. | No data available. |

¹The terms "high" or "excessive concentrations" are based on drinking water standards of the Environmental Protection Agency (1990).

Graphic from source map: [Groundwater Resources of Cambria County](#)

Symbols



Contact

Includes approximately located and inferred contacts; dotted where concealed.



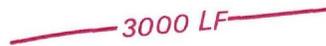
Thrust fault

Sawteeth on upper plate.



Fault

Queried where uncertain. Apparent stratigraphic displacement indicated: U, up; D, down.



Base of the Lower Freeport coal



Base of the Lower Kittanning coal

Structure contours

Queried where uncertain. Altitudes in feet above mean sea level. Contour interval 50 feet.



Anticline

Showing axial-plane trace and direction of plunge.



Syncline

Showing axial-plane trace and direction of plunge.

379

Water well and county well number

374

Water well sampled for chemical analysis and county well number

5

Spring and county spring number

8

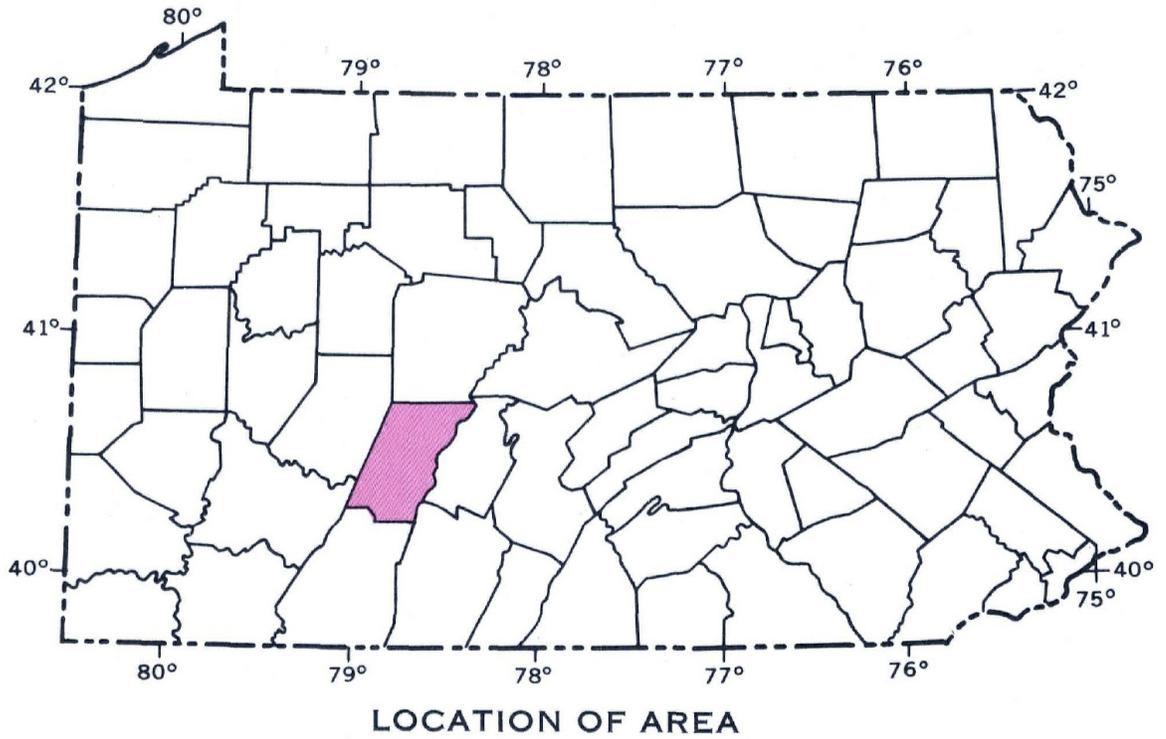
Spring sampled for chemical analysis and county spring number

14

Mine drainage sampled for chemical analysis and identification number

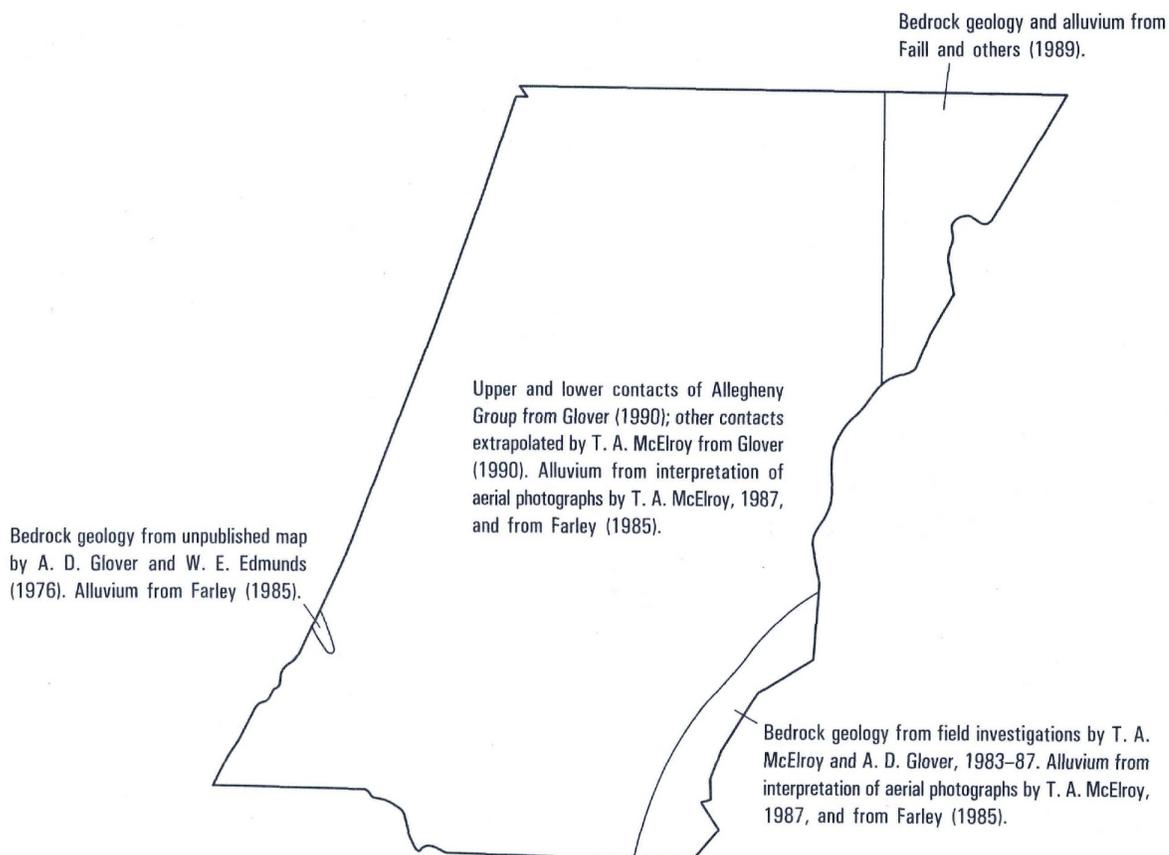
Graphic from source map: [Groundwater Resources of Cambria County](#)

Location of Area Map



Graphic from source map: [Groundwater Resources of Cambria County](#)

Index of Geologic Mapping



INDEX TO GEOLOGIC MAPPING

Graphic from source map: [Groundwater Resources of Cambria County](#)

Map Notes

Base map from U.S. Geological Survey 1:50,000 topographic map of Cambria County, 1986.

Hydrogeology by T.A. McElroy, 1984-1989.

Geology compiled by T.A. McElroy from sources shown in "[Index of Geologic Mapping](#)."

Structure contours and location of faults by Glover (1990).

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Francis W. Nanna and James H. Dolimpio, Cartographers.

Text from source map: [Groundwater Resources of Cambria County](#)

GRI Digital Data Credits

This document was developed and completed by Stephanie O'Meara (Colorado State University) for the NPS Geologic Resources Division (GRD) Geologic Resources Inventory (GRI) Program. Quality control of this document by Ron Karpilo (Colorado State University). Graphic updates by Jake Suri (Colorado State University). The document was updated from a previous version of the document produced by Elaine Jacobs (Colorado State University) and Stephanie O'Meara.

The information in this document was compiled from GRI source maps, and intended to accompany the digital geologic-GIS maps and other digital data for Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial, Pennsylvania (ALPO and JOFL) developed by Stephanie O'Meara and Jake Suri (Colorado State University; see the [GRI Digital Maps and Source Map Citations](#) section of this document for all sources used by the GRI in the completion of this document and related GRI digital geologic-GIS maps. Earlier version of the GRI digital geologic-GIS data by Stephanie O'Meara and Melissa Copfer (Colorado State University).

GRI finalization by Stephanie O'Meara.

GRI scoping provided by Bruce Heise (NPS GRD, Lakewood, Colorado).