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

Big South Fork National River and Recreation Area

GRI Ancillary Map Information Document

Produced to accompany the Geologic Resources Inventory (GRI) Digital Geologic Data for Big South Fork National River and Recreation Area

biso_geology.pdf

Version: 4/28/2016

Geologic Resources Inventory Ancillary Map Information Document for Big South Fork National River and Recreation Area

Table of Contents

Geologic Resources Inventory Map Document 1
About the NPS Geologic Resources Inventory Program 3
GRI Digital Maps and Source Map Citations 5
Quadrangle Index Map 8
Map Unit List 9
Map Unit Descriptions 11
w ater - Water (River and other w ater areas) 11
Qal - Alluvium/alluvial deposits (Holocene and Pleistocene) 11
QTcr - Colluvial blocks of Rockcastle Sandstone (Quaternary and Tertiary) 12
PNsl - Slatestone Formation (Middle Pennsylvanian) 12
PNslss - Slatestone Formation, sandstone (Middle Pennsylvanian) 13
PNw b - Wartburg Sandstone (Low er Pennsylvanian) 13
PNg - Glenmary Shale (Low er Pennsylvanian) 13
PNgcb - Glenmary Shale, Coalfield Sandstone and Burnt Mill Shale, undivided (Low er Pennsylvanian) 14
PNlcf - Low er Crooked Fork Group (Low er Pennsylvanian) 14
PNc - Coalfield Sandstone (Low er Pennsylvanian) 14
PNb - Burnt Mill Shale (Low er Pennsylvanian) 15
PNcr - Crossville Sandstone (Low er Pennsylvanian) 15
PNcrd - Crossville Sandstone and Dorton Shale, undivided (Low er Pennsylvanian) 16
PNd - Dorton Shale (Low er Pennsylvanian) 16
PNgr - Grundy Formation (Low er Pennsylvanian (?)) 17
PNgrcs - Grundy Formation, Corbin Sandstone Member (Low er Pennsylvanian (?)) 18
PNbss - Low er Breathitt Group, unnamed sandstone member (Low er Pennsylvanian) 18
PNgrhp - Grundy Formation, Hazel Patch Sandstone member (Low er Pennsylvanian) 18
PNbrpc - Bee Rock Sandstone, Pine Creek Sandstone member (Low er Pennsylvanian) 18
PNgrbf - Grundy Formation, Barren Fork coal (Low er Pennsylvanian) 19
PNbrrc - Bee Rock Sandstone, Rockcastle Sandstone Member (Low er Pennsylvanian) 19
PNrc - Rockcastle Sandstone (Low er Pennsylvanian) 19
PNrcn - Rockcastle Sandstone, Nemo coal bed (Low er Pennsylvanian (?)) 20
PNfac - Fentress Formation / Alvy Creek Formation (Low er Pennsylvanian (?)) 20
PNacst - Alvy Creek Formation, Stearns coal zone (Low er Pennsylvanian) 22
PNacst2 - Alvy Creek Formation, Stearns No. 2 (Low er Pennsylvanian) 22
PNbssn - Low er Breathitt Group, sandstone member N (Low er Pennsylvanian) 22
PNacst1 - Alvy Creek Formation, Stearns No. 1 (Low er Pennsylvanian) 22
PNvnw s - Vandever Formation, New ton Sandstone, Whitw ell Shale and Sew anee, undivided (Low er Pennsylvanian) 22
PNms - Morgan Springs coal bed (Low er Pennsylvanian) 23
PNsc - Sew anee Conglomerate (Low er Pennsylvanian) 23
PNscb - Sew anee Conglomerate, Saw nee coal bed (Low er Pennsylvanian) 23
PNscg - Sew anee Conglomerate and Gizzard Group (Low er Pennsylvanian) 24
Mp - Pennington Formation / Paragon Formation (Upper Mississippian) 24
Mb - Bangor Limestone (Upper Mississippian) 25

Mbh - Bangor Limestone and Hartselle Formation (Upper Mississippian) ... 25
Mh - Hartselle Formation (Upper Mississippian) ... 26
Mm - Monteagle Limestone (Upper Mississippian) ... 26
Mmk - Monteagle Limestone, Kidder Limestone Member (Upper Mississippian) ... 26
Mmg - Monteagle Limestone, Ste. Genevieve Limestone Member (Upper Mississippian) ... 26
Geologic Cross Sections ... 27
Cross Section A-A' ... 27
Cross Section B-B' ... 27
Cross Section C-C' ... 27
Ancillary Source Map Information ... 28
Corbin 30' x 60' Quadrangle (GM-27) ... 28
Parts of the Barthell SW Quadrangle (336-SW) ... 28
Stratigraphic Column ... 29
Location Map ... 29
Map Legend ... 30
Map Notes ... 30
Burrville Quadrangle (115-SE) ... 31
Stratigraphic Column ... 32
Location Map ... 33
Map Legend ... 33
Honey Creek Quadrangle (128A-NW) ... 34
Stratigraphic Column ... 34
Location Map ... 35
Map Legend ... 36
Map Notes ... 36
Kentucky Geological Survey Oil and Gas Records Database ... 37
Parts of the Oneida North Quadrangle (336-SE) ... 37
Stratigraphic Column ... 38
Location Map ... 39
Map Legend ... 39
Map Notes ... 39
Oneida South Quadrangle (128A-NE) ... 40
Stratigraphic Column ... 41
Location Map ... 41
Map Legend ... 42
Map Notes ... 42
Rugby Quadrangle (128A-SW) ... 43
Stratigraphic Column ... 44
Location Map ... 45
Map Legend ... 45
Map Notes ... 46
Parts of the Sharp Place Quadrangle (335-SE) ... 46
Stratigraphic Column ... 47
Location Map ... 48
Map Symbols ... 48
Map Notes ... 49
Stockton Quadrangle (115-NE) ... 49
Stratigraphic Column ... 50
Location Map ... 51
Map Symbols ... 51
Map Notes ... 52
GRI Digital Data Credits ... 53

Geologic Resources Inventory Map Document

Big South Fork National River and Recreation Area, Tennessee and Kentucky

Document to Accompany GRI Digital Geologic-GIS Data

biso_geology.pdf

Version: 4/28/2016

This document has been developed to accompany the digital geologic-GIS data developed by the Geologic Resources Inventory (GRI) program for Big South Fork National River and Recreation Area, Tennessee and Kentucky (BISO).

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. An index map showing all 7.5' quadrangle maps, park boundary and state boundary is also presented.

3) **Map Unit Listing** – A listing of all geologic map units present on maps for this project, generally listed from youngest to oldest.

4) **Map Unit Descriptions** – Descriptions for all geologic map units. If a unit is present on multiple source maps the unit is listed with its source geologic unit symbol, unit name and unit age followed by the unit's description for each source map.

5) **Geologic Cross Sections** – Geologic cross section graphics with source geologic cross section abbreviation.

6) **Ancillary Source Map Information** – Additional source map information presented by source map. For each source map this may include a stratigraphic column, index map, map legend and/or map notes.

7) **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:

Stephanie O'Meara
Geologist/GIS Specialist/Data Manager
Colorado State University Research Associate, Cooperator to the National Park Service
1201 Oak Ridge Drive, Suite 200
Fort Collins, CO 80525
phone: (970) 491-6655
e-mail: stephanie.omeara@colostate.edu

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 Search Application: http://irma.nps.gov/App/Reference/Search. 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: http://www.nature.nps.gov/geology/inventory, or contact:

Bruce Heise
Inventory Coordinator
National Park Service Geologic Resources Division
P.O. Box 25287
Denver, CO 80225-0287
phone: (303) 969-2017
fax: (303) 987-6792
email: Bruce_Heise@nps.gov

The Geologic Resources Inventory (GRI) program is funded by the National Park Service (NPS) Inventory and Monitoring (I&M) Division.

GRI Digital Maps and Source Map Citations

The GRI digital geologic-GIS maps for Big South Fork National River and Recreation Area, Tennessee and Kentucky (BISO):

The GRI compiled park extent and vicinity map (sources are listed with the individual 7.5' quadrangle+ component maps below). All geologic maps are primarily bedrock geologic maps, however, Quaternary alluvium and related alluvial deposits are present on most maps. GRI maps with no Quaternary units are titled bedrock geologic maps.

Digital Geologic Map of Big South Fork National River and Recreation Area, Tennessee and Kentucky (*GRI MapCode BISO*)

For maps within Kentucky unit descriptions were taken from the following source.

Sparks, T.N., Anderson, W.H., and Yang, X., 2011, Geologic Map of the Corbin 30 x 60 Minute Quadrangle, South-Central Kentucky: Kentucky Geological Survey, Geologic Map Series KGS12_GM-27, scale 1:100,000. (*GRI Source Map ID 74714*).

Individual 7.5' quadrangle, and 7.5' quadrangle plus partial 7.5' quadrangle GRI maps with source publication(s).

Digital Geologic Map of the Barthell Quadrangle and parts of the Oneida North Quadrangle, Kentucky (*GRI MapCode BART*)

Zhang, Q., and Stidham, M., 2006, Spatial Database of the Barthell Quadrangle and part of the Oneida North Quadrangle, Kentucky: Kentucky Geological Survey, Digitally Vectorized Geological Quadrangle DVGQ-12_314, scale 1:24,000. (*GRI Source Map ID 75744*) - The full extent of map was used and all geologic features were captured.

Pomerene, J.B., 1964, Geology of the Barthell Quadrangle and part of the Oneida North Quadrangle, Kentucky: U.S. Geological Survey, Geologic Quadrangle Map GQ-314, scale 1:24,000. (*GRI Source Map ID 1523*) - Mine features and major water area features were captured.

Kentucky Geological Survey, 2016, Oil and Gas Records Database: http://kgs.uky.edu/kgsweb/DataSearching/OilGas/OGSearch.asp (*GRI Source Map ID 76062*) - Oil and gas features within the extent of the Barthell quadrangle, as well as portions of the Oneida North quadrangle within Kentucky were captured from this dataset.

Digital Geologic Map of parts of the Barthell SW Quadrangle, Tennessee (*GRI MapCode BASW*)

Horton, Albert and Hoyal, Mike, 2016, Geologic Map of the Barthell SW Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Map 336-SW, scale 1;24,000. (*GRI Source Map ID 75960*) - The full extent of map was used and all geologic features and major water area features were captured.

Digital Geologic Map of the Bell Farm Quadrangle and parts of the Barthell SW Quadrangle, Kentucky (*GRI MapCode BEFA*)

Zhang, Q., 2006, Spatial Database of the Bell Farm Quadrangle and part of the Barthell Southwest Quadrangle, McCreary and Wayne Counties, Kentucky: Kentucky Geological Survey, Digitally Vectorized Geological Quadrangle DVGQ-12_1496, scale 1:24,000. (*GRI Source Map ID 75743*) - The full extent of map was used and all geologic features were

captured.

Smith, J.H., 1978, Geologic Map of the Bell Farm Quadrangle and part of the Barthell SW Quadrangle, McCreary and Wayne Counties, Kentucky: U.S. Geological Survey, Geologic Quadrangle Map GQ-1496, scale 1:24,000. (*GRI Source Map ID 1517*) - Mine features, contact exposure localities and major water area features were captured.

Kentucky Geological Survey, 2016, Oil and Gas Records Database: http://kgs.uky.edu/kgsweb/DataSearching/OilGas/OGSearch.asp (*GRI Source Map ID 76062*) - Oil and gas features within the extent of the Bell Farm quadrangle, as well as portions of the Barthell SW quadrangle within Kentucky were captured from this dataset.

Digital Bedrock Geologic Map of the Burrville Quadrangle, Tennessee (*GRI MapCode BURR*)

Jewell, J.W., 1972, Geologic Map and Mineral Resources Summary of the Burrville Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 115-SE, scale 1:24,000 (*GRI Source Map ID 67749*) - The full extent of map was used and all geologic features and major water area features were captured.

Digital Bedrock Geologic Map of the Honey Creek Quadrangle, Tennessee (*GRI MapCode HYCR*)

Clendening, Ronald J., and Horton, Albert B., 2010, Geologic Map and Mineral Resources Summary of the Honey Creek Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Map 128A-NW, scale 1;24,000. (*GRI Source Map ID 75621*) - The full extent of the source map was used and all geologic features and major water area features were captured.

Digital Geologic Map of the Nevelsville Quadrangle, Kentucky (*GRI MapCode NEVE*)

Zhang, Q., and Stidham, M., 2006, Spatial Database of the Nevelsville Quadrangle, South-Central Kentucky: Kentucky Geological Survey, Digitally Vectorized Geological Quadrangle DVGQ-12_1326, scale 1:24,000. (*GRI Source Map ID 76061*) - The full extent of the source map was used and all geologic features were captured.

Smith, J.H., 1976, Geologic Map of the Nevelsville Quadrangle, South-Central Kentucky: U.S. Geological Survey, Geologic Quadrangle Map GQ-1326, scale 1:24,000. (*GRI Source Map ID 1520*) - Mine features, contact exposure localities, fold symbols and major water area features were captured.

Kentucky Geological Survey, 2016, Oil and Gas Records Database: http://kgs.uky.edu/kgsweb/DataSearching/OilGas/OGSearch.asp (*GRI Source Map ID 76062*) - Oil and gas features within the extent of the Nevelsville quadrangle were captured from this dataset.

Digital Bedrock Geologic Map of parts of the Oneida North Quadrangle, Tennessee (*GRI MapCode ONNO*)

Horton, A.B., Clendening, R.J., and Hoyal, M.L., 2013, Geologic Map of the Oneida North Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 336-SE, scale 1:24,000. (*GRI Source Map ID 75782*) - The full extent of the source map was used and all geologic features were captured.

Digital Geologic Map of the Oneida South Quadrangle, Tennessee (*GRI MapCode ONSO*)

Clendening, R.J., and Horton, A.B., 2012, Geologic Map of the Oneida South Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 128A-NE, scale 1:24,000. (*GRI Source Map ID 75619*) - The full extent of the source map was used and all geologic features were captured.

Digital Geologic Map of the Rugby Quadrangle, Tennessee (*GRI MapCode RUGB*)

Clendening, R.J., Horton, A.B., Gilmore, D., and Kerrigan, W., 2011, Geologic Map and Mineral Resources Summary of the Rugby Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 128A-SW, scale 1:24,000. (*GRI Source Map ID 75622*) - The full extent of the source map was used and all geologic features and major water area features were captured.

Digital Geologic Map of parts of the Sharp Place Quadrangle, Tennessee (*GRI MapCode SHPL*)

Hoyal, Mike, and Horton, Albert, 2015, Geologic Map of the Sharp Place Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 335-SE, scale 1:24,000. (*GRI Source Map ID 76048*) - The full extent of the source map was used and all geologic features and major water area features were captured.

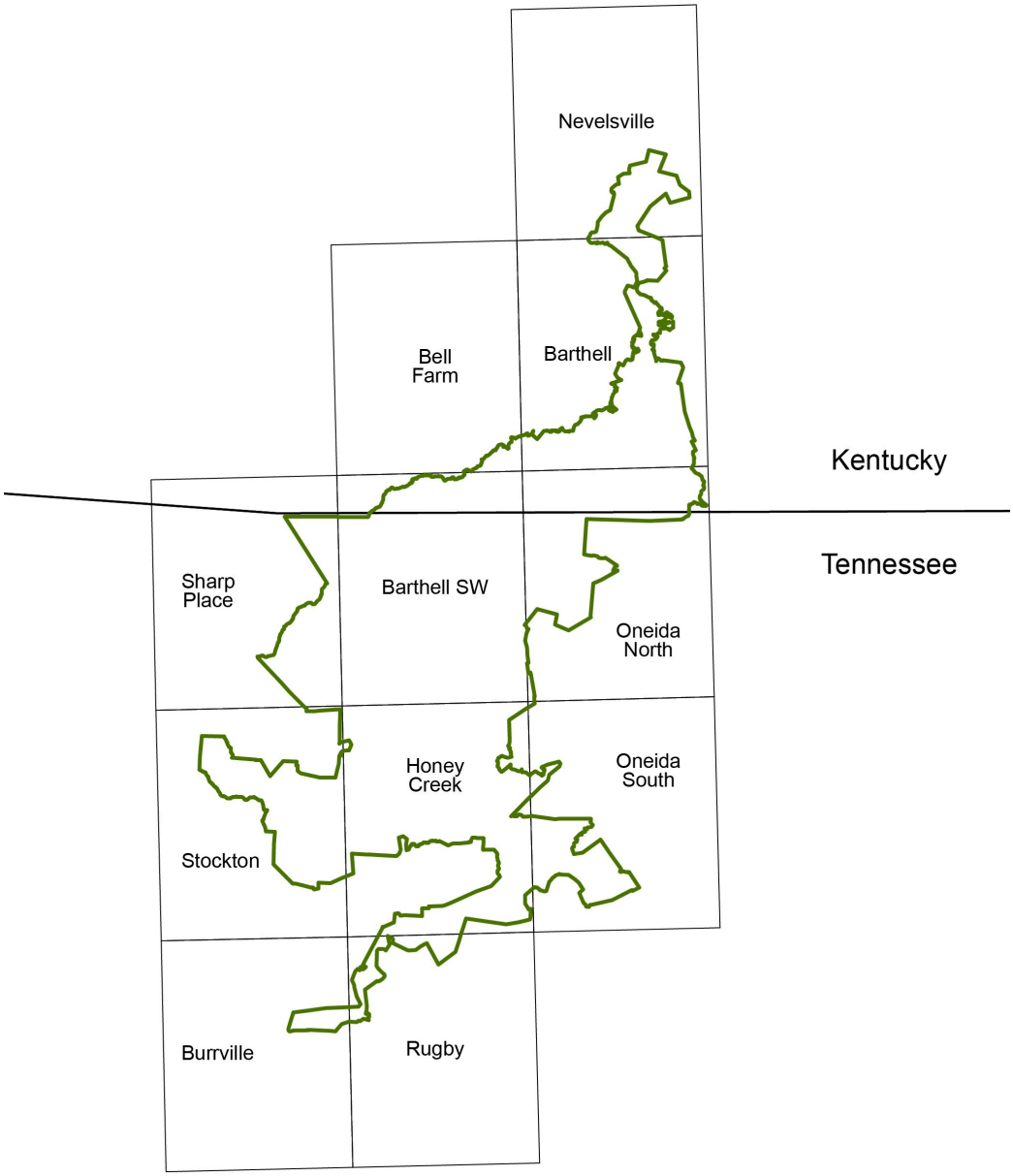
Digital Bedrock Geologic Map of the Stockton Quadrangle, Tennessee (*GRI MapCode STOC*)

Clendening, Ronald J., Horton, Albert B., and Jewell, John W., 2009, Geologic Map of the Stockton Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 115-NE, scale 1:24,000. (*GRI Source Map ID 75620*) - The full extent of the source map was used and all geologic features and major water area features were captured.

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

Quadrangle Index Map

The following index map displays 7.5' quadrangle extents, the Big South Fork National River and Recreation Area (BISO) park boundary in dark green (as of March, 2016), and the state boundary between Tennessee and Kentucky.



Map Unit List

The geologic units present in the digital geologic-GIS data produced for Big South Fork National River and Recreation Area, Tennessee and Kentucky (BISO) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., Qal - Alluvium/alluvial deposits). Units are listed from youngest to oldest, and were possible are grouped based on geologic group. However, to keep some units of the same group together some units of the Breathitt Group and Crab Orchard Mountains Group are not listed in youngest to oldest order. These units are, however, presented in order of youngest to oldest in the unit description section in this document. Information about each geologic unit is also presented in the GRI Geologic Unit Information (BISOUNIT) table included with the GRI geologic-GIS data. Some source unit symbols and names may have been changed in this document and in the GRI digital geologic-GIS data. This was done if a unit was considered to be the same unit as one or more units on other source maps used for this project, and these unit symbols, names and/or ages differed. I n this case a single unit symbol and name, and the unit's now recognized age, was adopted. Source map unit symbols, names and/or ages in a unit descriptions, or on a source map correlation of map units, or other source map figure were not edited.

Cenozoic Era

Quaternary Period

water - Water
Qal - Alluvium/alluvial deposits

Quaternary and Tertiary Periods

QTcr - Colluvial blocks of Rockcastle Sandstone

Paleozoic Era

Pennsylvanian Period

Slatestone Group
- PNsl - Slatestone Formation
- PNslss - Slatestone Formation, sandstone

Crooked Fork Group
- PNwb - Wartburg Sandstone
- PNg - Glenmary Shale
- PNgcb - Glenmary Shale, Coalfield Sandstone and Burnt Mill Shale, undivided
- PNlcf - Lower Crooked Fork Group
- PNc - Coalfield Sandstone
- PNb - Burnt Mill Shale
- PNcr - Crossville Sandstone
- PNcrd - Crossville Sandstone and Dorton Shale, undivided
- PNd - Dorton Shale

Breathitt Group
- PNgr - Grundy Formation
- PNgrcs - Grundy Formation, Corbin Sandstone Member
- PNbss - Lower Breathitt Group, unnamed sandstone member
- PNgrhp - Grundy Formation, Hazel Patch Sandstone member
- PNbrpc - Bee Rock Sandstone, Pine Creek Sandstone member
- PNgrbf - Grundy Formation, Barren Fork coal

PNbrrc - Bee Rock Sandstone, Rockcastle Sandstone Member
PNacst - Alvy Creek Formation, Stearns coal zone
PNacst2 - Alvy Creek Formation, Stearns No. 2
PNbssn - Lower Breathitt Group, sandstone member N
PNacst1 - Alvy Creek Formation, Stearns No. 1

Breathitt Group / Crab Orchard Mountains Group
PNfac - Fentress Formation / Alvy Creek Formation

Crab Orchard Mountains Group
PNrc - Rockcastle Sandstone
PNrcn - Rockcastle Sandstone, Nemo coal bed
PNvnws - Vandever Formation, Newton Sandstone, Whitwell Shale and Sewanee, undivided
PNms - Morgan Springs coal bed
PNsc - Sewanee Conglomerate
PNscb - Sewanee Conglomerate, Sawnee coal bed

Crab Orchard Mountains Group and Gizzard Group
PNscg - Sewanee Conglomerate and Gizzard Group

Mississippian Period
Mp - Pennington Formation / Paragon Formation
Mb - Bangor Limestone
Mbh - Bangor Limestone and Hartselle Formation
Mh - Hartselle Formation
Mm - Monteagle Limestone
Mmk - Monteagle Limestone, Kidder Limestone Member
Mmg - Monteagle Limestone, Ste. Genevieve Limestone Member

Map Unit Descriptions

Descriptions of all geologic map units, generally listed from youngest to oldest, are presented below. Map units present on more than one 7.5' quadrangle source map have a unit description for each 7.5' quadrangle source map the unit is present on. If a unit symbol, name and/or age was changed by the GRI the unit's source map symbol, name and/or age appears with the unit's source map description.

water - Water (River and other water areas)

Water areas such as major rivers and other water bodies (i.e., lakes) were captured from source maps or data where present. However, if major water areas, namely major rivers, were not present in source digital data but did exist within a map's extent (often visible on the map's base), than these areas where captured. For a few source maps that had poor image resolution a U.S. topographic base map of the same year was acquired from the U.S. Geological Survey Map Locator and Downloader website, georeferenced by the GRI, and then used to capture water areas. The addition of major water areas was done primarily so all eleven 7.5' quadrangle maps, as well as the park compiled extent map (see GRI Digital Maps and Source Map Citations) would have connected water areas for major rivers, and to avoid disconnected water areas that would be present if only on a few of the maps had major water areas.

7.5' Quadrangle	Base Map Year	Water Areas
Barthell	1954	digitized by GRI
Barthell SW	1954	digitized by GRI
Bell Farm	1954 and 1955	digitized by GRI
Burrville	1968	present on source map digitized by GRI
Honey Creek	1952	digitized by GRI
Nevelsville	1954, revised 1976	digitized by GRI
Oneida North	1955	present in source digital data
Oneida South	1954	present in source digital data
Rugby	1952	digitized by GRI
Sharp Place	1955	digitized by GRI
Stockton	1954	digitized by GRI

For maps without mapped water areas the existing mapped geologic contacts and other geologic features within these areas were kept, however, these were attributed with "subaqeuous" in the GIS attribute table.

Qal - Alluvium/alluvial deposits (Holocene and Pleistocene)

Qal - Alluvium (Quaternary)
Silt, sand, clay, and gravel. Silt, commonly sandy. Sand, fine to coarse-grained. Clay, partly sandy. Gravel composed of chert, quartz, sandstone, limestone, siltstone, and shale. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

Qal - Surficial deposits (Quaternary)
Consists of boulders, cobbles, pebbles, angular to rounded. Prominent in Big South Fork drainage. Up to 20 feet thick in some areas. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Qal - Surficial deposits (Quaternary)
Consists of boulders, cobbles, pebbles, angular to rounded. Prominent in Big South Fork drainage. Not mapped as separate unit on this quad. Up to 40 feet thick in some areas. (*GRI Source Map ID 75782*) (

parts of Oneida North Quadrangle).

Qal - Surficial deposits (Quaternary)
Colluvial Deposits – Boulders, cobbles, pebbles, angular to rounded, prominent along the New River. Alluvial Deposits – Unconsolidated gravel, sand, silt and clay along present stream valleys. Most prominent along the New River. 0 to 30 feet thick. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

Qal - Surficial deposits (Quaternary)
Alluvial Deposits (Qal) - Unconsolidated gravel, sand, silt and clay along present stream valleys. Most prominent along White Oak Creek. 0 to 30 feet thick. Colluvial Deposits (not mapped) - Boulders, cobbles, pebbles, angular to rounded, prominent along Clear Fork and White Oak creeks in north of map. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

Qal - Surficial deposits (Quaternary)
Consists of boulders, cobbles, pebbles, angular to rounded. Prominent in Pogue Creek, Laurel Fork, Langham Branch and Pennington Branch. Mostly sandstone derived, some limestone in Pogue Creek and Langham Branch. May be up to 20 feet thick, but not mapped on this quad. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

QTcr - Colluvial blocks of Rockcastle Sandstone (Quaternary and Tertiary)

QTrc - Colluvial blocks of Rockcastle Sandstone (Quaternary and Tertiary)
Terrace Deposits - Gravel, sand, clay, and boulders. Gravel composed of well-rounded pebbles of quartz. Sand, fine- to coarse-grained. Clay in seams, beds, and blebs. Locally includes boulders of sandstone and chert 8 to 15 cm (3 to 6 in.) in diameter in Mill Springs area. Mapped along Lake Cumberland. Colluvial Blocks - Rectangular, house-size blocks of sandstone and conglomerate derived from Rockcastle Sandstone Member of Bee Rock Sandstone. Mapped in southern part of quadrangle along the tributaries or banks of the South Fork of the Cumberland River. Too small to be displayed at this scale. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, from Corbin 30' x 60' Quadrangle).

PNsl - Slatestone Formation (Middle Pennsylvanian)

PNsl - Slatestone Formation (Lower Pennsylvanian)
Shale, silty to sandy, gray to grayish-black; sandstone, gray to yellowish-brown, fine to coarse grained, thin to thick-bedded. Formation contains several coal seams, but only the Poplar Creek coal, previously mined, was observed on this quad. One mappable sandstone of the eastern side of the quad occurs about 200 feet up from base. This could be the Stephens or the Petros sandstone. Overall thickness is around 300 feet, but goes up to 360 feet in the subsurface. (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

PNsl - Slatestone Formation (Lower Pennsylvanian)
Shale, silty to sandy, gray to grayish-black; sandstone, yellowish-gray to yellowish-brown, fine to medium-grained, thin to thick-bedded. Formation contains several coal seams but none observed on this map. 0 – 400 feet thick. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNsl - Slatestone Formation (Lower Pennsylvanian)
Shale, silty to sandy, gray to grayish-black; sandstone, yellowish-gray to yellowish-brown, fine to medium-grained, thin to thick-bedded. Formation contains several coal seams but none observed on this

map. Approximately 100 feet exposed above the Poplar Creek Coal strip mine just east of Huffman. (GRI Source Map ID 75622) (Rugby Quadrangle).

PNslss - Slatestone Formation, sandstone (Middle Pennsylvanian)

ss - Slatestone Formation, sandstone (Lower Pennsylvanian)
Mappable sandstone of the eastern side of the quad occurs about 200 feet up from base. This could be the Stephens or the Petros sandstone. (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

PNwb - Wartburg Sandstone (Lower Pennsylvanian)

PNwb - Wartburg Sandstone (Lower Pennsylvanian)
Sandstone, quartzose, light to medium gray, buff to brownish-yellow. Fine to medium grained, thin to thick bedded; cross-bedded in some localities. Silty and slightly micaceous. Only present on eastern side of map. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNwb - Wartburg Sandstone (Lower Pennsylvanian)
Sandstone, quartzose, light to medium gray, buff to brownish –yellow. Fine to medium grained, thin to thick bedded; cross-bedded in some localities. Slightly micaceous, silty. Poplar Creek coal at top of formation was previously mined on this quad. 60 to 110 feet in thickness. (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

PNwb - Wartburg Sandstone (Lower Pennsylvanian)
Sandstone, quartzose, light to medium gray, buff to brownish-yellow. Fine to medium grained, thin to thick bedded; cross-bedded in some localities. Silty and slightly micaceous. Wartburg is split by a shale member in some areas. Poplar Creek Coal near the top of formation. 30 – 150 feet thick. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNwb - Wartburg Sandstone (Lower Pennsylvanian)
Sandstone, quartzose, light to medium gray, buff to brownish-yellow. Fine to medium grained, thin to thick bedded; cross-bedded in some localities. Silty and slightly micaceous. Wartburg is split by a shale member in some areas. Poplar Creek Coal near top of unit. Only present on eastern side of map. Up to 120 feet thick in logs. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNg - Glenmary Shale (Lower Pennsylvanian)

PNgm - Glenmary Shale (Lower Pennsylvanian)
Shale, silty and slightly micaceous, medium gray with some dark gray-black layers. Siltstone in some areas. Only present in southeast quadrant of the Honey Creek quadrangle. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNg - Glenmary Shale (Lower Pennsylvanian)
Shale, silty and slightly micaceous, medium gray to some dark gray-black layers. Siltstone in some areas. 20 – 60 feet thick. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNgm - Glenmary Shale (Lower Pennsylvanian)
Shale, silty and slightly micaceous, medium gray with some dark gray-black layers. Siltstone in some areas. Only present in southeast quadrant of quad. 100+ ft. (GRI Source Map ID 75622) (Rugby Quadrangle).

PNgcb - Glenmary Shale, Coalfield Sandstone and Burnt Mill Shale, undivided (Lower Pennsylvanian)

PNgcb - Glenmary Shale, Coalfield Sandstone and Burnt Mill Shale (Lower Pennsylvanian)
Glenmary Shale (Lower Pennsylvanian) - Shale, silty and slightly micaceous, medium gray with some dark gray-black layers. Siltstone in some areas. Only present in southeast quadrant of the Honey Creek quadrangle. Coalfield Sandstone (Lower Pennsylvanian) - Sandstone, light brown to gray, fine to medium grained. Only present in the southeastern quadrant of the Honey Creek quadrangle. Burnt Mill Shale (Lower Pennsylvanian) - Mostly dark-gray to light-brown shale, with minor siltstone. Thin sandstone locally present near base. Hooper coal just above base, when present. Only found in higher elevations of southeast quadrant of Honey Creek quadrangle. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNgcb - Glenmary Shale, Coalfield Sandstone and Burnt Mill Shale (Lower Pennsylvanian)
Glenmary Shale (Lower Pennsylvanian) - Shale, silty and slightly micaceous, medium gray with some dark gray-black layers. Siltstone in some areas. Only present in southeast quadrant of quad. 100+ ft. Coalfield Sandstone (Lower Pennsylvanian) - Sandstone, light brown to gray, fine to medium grained. Only present in the southeastern quadrant of the Honey Creek quad. 0 – 60 feet thickness. Burnt Mill Shale (Lower Pennsylvanian) - Mostly dark-gray to light-brown shale, with minor siltstone. Thin sandstone locally present near base. Hooper coal just above base. Only found in higher elevations of southeast quadrant of quad. Thickness as much as 90 feet. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNlcf - Lower Crooked Fork Group (Lower Pennsylvanian)

PNlcf - Lower Crooked Fork Group (Lower Pennsylvanian)
This group consist of everything between the Wartburg sandstone and the Rockcastle Conglomerate. It is undifferentiated on this quad because the section has thinned and the sands are inconsistent. Maximum thickness is 210 feet. Glenmary, Coalfield and Burnt Mill - This subgroup consists of the Glenmary shale, medium to dark-gray, silty and slightly micaceous, with several siltstone and sand stringers; the Coalfield sandstone, thin occurrences of brown to gray, shaly, fine to medium-grained sandstone, fine to medium-grained; the Burnt Mill shale, brown to gray, silty, some sand stringers. Thickness of this section probably no more than 100 to 125 feet.Crossville Sandstone - There is a fairly persistent sandstone in the lower part of this group. Yellowish to brown and gray, slightly micaceous and shaly, fine to medium-grained, some crossbedding. Thick ness varies from 5 to 10 feet up to around 40 feet. Dorton Shale - Shale, gray to olive-gray, micaceous, silty. Sand stringers appear within 10 to 20 feet of the base with a total estimated thickness of up to 50 feet. (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

PNlcf - Lower Crooked Fork Group (Lower Pennsylvanian)
No grouped unit description provided other than the individual unit descriptions for the Glenmary Shale (PNg), Coalfield Sandstone (PNc), Burnt Mill Shale (PNb), Crossville Sandstone (PNcr) and Dorton Shale (PNd) that comprise this unit. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNc - Coalfield Sandstone (Lower Pennsylvanian)

Pc - Coalfield Sandstone (Lower Pennsylvanian)
Sandstone, light-brown to gray, fine-grained. Preserved only at the lookout tower northeast of Burrville. (

GRI Source Map ID 67749) (Burrville Quadrangle).

PNc - Coalfield Sandstone (Lower Pennsylvanian)
Sandstone, light brown to gray, fine to medium grained. Only present in the southeastern quadrant of the Honey Creek quadrangle. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNc - Coalfield Sandstone (Lower Pennsylvanian)
Sandstone, light brown to gray, fine to medium grained. 0 – 60 feet thick. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNc - Coalfield Sandstone (Lower Pennsylvanian)
Sandstone, light brown to gray, fine to medium grained. Only present in the southeastern quadrant of the Honey Creek quad. 0 – 60 feet thickness. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNb - Burnt Mill Shale (Lower Pennsylvanian)

PNb - Burnt Mill Shale (Lower Pennsylvanian)
Shale, brown to gray, silty, some sand stringers. Thickness of this section varies from 0 to 80 feet. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Pb - Burnt Mill Shale (Lower Pennsylvanian)
Shale, gray, thin-bedded, micaceous, silty. Also preserved only northeast of Burrville. (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNb - Burnt Mill Shale (Lower Pennsylvanian)
Mostly dark-gray to light-brown shale, with minor siltstone. Thin sandstone locally present near base. Hooper coal just above base, when present. Only found in higher elevations of southeast quadrant of Honey Creek quadrangle. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNb - Burnt Mill Shale (Lower Pennsylvanian)
Mostly dark-gray to light brown shale, with minor siltstone. Thin sandstone locally present near base. Hopper coal just above base. 20 – 90 feet. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNb - Burnt Mill Shale (Lower Pennsylvanian)
Mostly dark-gray to light-brown shale, with minor siltstone. Thin sandstone locally present near base. Hooper coal just above base. Only found in higher elevations of southeast quadrant of quad. Thickness as much as 90 feet. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNb - Burnt Mill Shale (Lower Pennsylvanian)
Shale, dark-gray to light-brown, minor siltstone. Thin sandstone locally present near base. Thickness up to 60 feet. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

PNcr - Crossville Sandstone (Lower Pennsylvanian)

PNcr - Crossville Sandstone (Lower Pennsylvanian)
Sandstone, yellow, tan, reddish-brown and gray; fine-grained, slightly micaceous. Locally cross-bedded; shaly in parts. Maximum exposed thickness 60 feet. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Pcr - Crossville Sandstone (Lower Pennsylvanian)

Sandstone, yellow, light-brown, reddish-brown and gray, fine-grained, cross-bedded in part, with pronounced Liesegang structure developed on outcrop. (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNcr - Crossville Sandstone (Lower Pennsylvanian)
Sandstone, yellow, tan, reddish-brown and gray; fine-grained, slightly micaceous. Locally cross-bedded; shaly in parts. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNcr - Crossville Sandstone (Lower Pennsylvanian)
Sandstone, yellow, tan, reddish-brown and gray; fine-grained, lightly micaceous. Locally cross bedded; shaly in parts. 0 – 60 feet thick. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNcr - Crossville Sandstone (Lower Pennsylvanian)
Sandstone, yellow, tan, reddish-brown and gray; fine-grained, slightly micaceous. Locally cross-bedded; shaly in parts. Maximum exposed thickness 60 feet. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNcr - Crossville Sandstone (Lower Pennsylvanian)
Sandstone, yellow, tan, reddish-brown and gray: thin to massive bedding fine-grained, slightly micaceous. Locally cross-bedded: shaly in parts. Maximum exposed thickness 60 feet. Hooper coal observed on Divide Road near Pickett/Scott County line. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Pcr - Crossville Sandstone (Lower Pennsylvanian)
Sandstone, yellow, tan, reddish-brown and gray, fine-grained, cross-bedded in part with pronounced Liesegang rings. A pronounced facies change occurs in the northern half of the quadrangle where the sandstone becomes conglomeratic, and changes from a thin-bedded sandstone to one that is thick-to-massive-bedded. Maximum exposed thickness 60 feet. (GRI Source Map ID 75620) (Stockton Quadrangle).

PNcrd - Crossville Sandstone and Dorton Shale, undivided (Lower Pennsylvanian)

Pcf - Crooked Fork Group, Crossville Sandstone and Dorton Shale (Lower Pennsylvanian)
Shale, medium dark gray to olive-gray, micaceous, about 20 to 30 feet thick, overlain by fine-grained sandstone weathered yellowish-orange to yellowish-brown. Thickness 30 to 50+ feet. Crossville Sandstone - Sandstone, yellow, tan, reddish-brown and gray, fine-grained, cross-bedded in part with pronounced Liesegang rings. A pronounced facies change occurs in the northern half of the quadrangle where the sandstone becomes conglomeratic, and changes from a thin-bedded sandstone to one that is thick-to-massive-bedded. Maximum exposed thickness 60 feet. Dorton Shale - Shale, gray to olive-gray, thin-bedded, micaceous, silty. Thickness 20 to 40 feet. (GRI Source Map ID 75620) (Stockton Quadrangle).

PNd - Dorton Shale (Lower Pennsylvanian)

PNd - Dorton Shale (Lower Pennsylvanian)
Shale, gray to olive-gray, micaceous, silty. Sand stringers appear within 10 to 20 feet of the base; exposed thickness up to 80 feet. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Pd - Dorton Shale (Lower Pennsylvanian)
Shale, gray to olive-gray, thin-bedded, micaceous, silty. (*GRI Source Map ID 67749*) (Burrville

Quadrangle).

PNd - Dorton Shale (Lower Pennsylvanian)
Shale, gray to olive-gray, thin-bedded, micaceous, silty. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNd - Dorton Shale (Lower Pennsylvanian)
Shale, gray to olive-gray, thin-bedded, micaceous, silty. 20 – 40 feet thick. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNd - Dorton Shale (Lower Pennsylvanian)
Shale, gray to olive-gray, thin bedded, micaceous, silty. Thickness 20 to 90 feet. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNd - Dorton Shale (Lower Pennsylvanian)
Shale, gray to olive-gray, micaceous, silty. Sand stringers appear within 10 to 20 feet of the base; exposed thickness up to 80 feet. Basal Rex coal observed on adjacent Pall Mall quad to the west. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Pd - Dorton Shale (Lower Pennsylvanian)
Shale, gray to olive-gray, thin-bedded, micaceous, silty. Thickness 20 to 40 feet. (*GRI Source Map ID 75620*) (Stockton Quadrangle).

PNgr - Grundy Formation (Lower Pennsylvanian (?))

PNg - Grundy Formation (Lower Pennsylvanian)
Shale, siltstone, sandstone, and coal. Unit named by Chesnut (1992) for strata from the top of the Bee Rock Sandstone to the base of the Betsie Shale, and mapped as part of the Lee Formation on most 7.5-minute geologic quadrangle maps. In this quadrangle, the unit also includes the upper part (9 to 61 m; 30 to 200 ft) of the Bee Rock Sandstone as defined by Chesnut (1992). Unit as mapped contains four thick sandstones. The Corbin Sandstone Member and Marsh Creek Sandstone Member occur in the upper half of the formation and are mapped separately. The lower two sandstones are unnamed on most 7.5-minute geologic quadrangle maps or designated with a letter and are not mapped on the Corbin map at this scale. Sandstone in lower to middle part mapped in some 7.5-minute quadrangles as Member G, and informally called the Hazel Patch Sandstone (Kilburn, 1956; Greb and Chesnut, 1989), is quartzose, argillaceous, thin- to medium-bedded, often ripple-to planar-bedded, locally massive to cross-bedded, and may be bioturbated. The lower part of the unit also contains Sandstone K, informally known as the Pine Creek Sandstone (Greb and Chesnut, 1989), which is part of the Bee Rock Sandstone, but not correlated extensively enough in the Corbin quadrangle to be used as a reliable formation boundary. The Pine Creek sandstone is quartzose, lenticular, fine- to medium-grained, thin-to medium-bedded, contains sparse quartz pebbles at the base, and is as much as 39 m (130 ft) thick. Each of the sandstone units is cliff-forming. Upper parts of sandstones grade laterally into sandy siltstone and shale. Coals include, in descending order, the Lily (River Gem, Swamp Angel), Gray Hawk, and Barren Fork. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

PNgrcs - Grundy Formation, Corbin Sandstone Member (Lower Pennsylvanian (?))

Pgc - Grundy Formation, Corbin Sandstone Member (Lower Pennsylvanian)
Sandstone. conglomerate, and minor shale. Sandstone, quartzose, fine- to medium-grained, locally coarse-grained, medium- to thick-bedded, massive, and prominently cross-bedded, contains scattered, rounded quartz pebbles as much as 2 cm (3/4 in.) in diameter. Pebbles most common toward base. Unit generally fines upward. Locally forms steep cliffs. Locally composed of two tongues of identical lithology that merge in the Hollyhill and Whitley City 7.5-minute quadrangles. Top of the weathered surface creates broad upland plateau or bench and slope topography. Base of unit is unconformable and locally cuts as much as 12 m (40 ft) into underlying strata (Smith, 1963). Unit was mapped as a member of the Lee Formation on 7.5-minute geologic quadrangle maps, and reclassified as member of the Grundy Formation by Chesnut (1992). Unit mapped near top of the Grundy, pinches out to the east and southwest. (*GRI Source Map ID 74714*) (Bell Farm and parts of Barthell SW Quadrangles, from Corbin 30' x 60' Quadrangle).

PNbss - Lower Breathitt Group, unnamed sandstone member (Lower Pennsylvanian)

ss - Lower Breathitt Group, unnamed sandstone member (Lower Pennsylvanian)
No additional unit description provided. (Barthell and parts of Oneida North Quadrangles, and Nevelsville Quadrangle).

PNgrhp - Grundy Formation, Hazel Patch Sandstone member (Lower Pennsylvanian)

ss (ssk) - Grundy Formation, Hazel Patch Sandstone member (Lower Pennsylvanian)
Quartzose, argillaceous, thin- to medium-bedded, often ripple-to planar-bedded, locally massive to cross-bedded, and may be bioturbated. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

Unit symbol is "ss" on the Corbin 30' x 60' quadrangle map, however, the unit isn't differentiated from other units that have the same "ss" unit symbol. The unit is denoted as "ssk" in the KYGS digital data.

PNbrpc - Bee Rock Sandstone, Pine Creek Sandstone member (Lower Pennsylvanian)

ss (ssk) - Bee Rock Sandstone, Pine Creek Sandstone member (Lower Pennsylvanian)
Quartzose, lenticular, fine- to medium-grained, thin-to medium-bedded, contains sparse quartz pebbles at the base, and is as much as 39 m (130 ft) thick. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

Unit symbol is "ss" on the Corbin 30' x 60' quadrangle map, however, the unit isn't differentiated from other units that have the same "ss" unit symbol. The unit is denoted as "ssg" in the KYGS digital data.

PNgrbf - Grundy Formation, Barren Fork coal (Lower Pennsylvanian)

bf - Grundy Formation, Barren Fork coal (Lower Pennsylvanian)
No additional unit description provided. Unit at or near base of Grundy Formation (PNgr). (Barthell and parts of Oneida North Quadrangles, and Nevelsville Quadrangle).

PNbrrc - Bee Rock Sandstone, Rockcastle Sandstone Member (Lower Pennsylvanian)

PNbrr - Bee Rock Sandstone, Rockcastle Sandstone Member (Lower Pennsylvanian)
Sandstone, conglomerate, and minor shale. Sandstone, quartzose, fine- to coarse-grained, commonly conglomeratic with white, rounded quartz pebbles as much as 13 cm (5 in.) in diameter, generally less than 1 cm (3/8 in.) in diameter (Smith, 1963), thin- to thick-bedded, locally massive, prominently cross-bedded, with sparse giant crossbeds. Unit generally fines upward. Forms steep cliffs, especially in the Cumberland River Valley. Forms ledge of waterfall at Cumberland Falls State Resort Park, and numerous natural arches (McGrain, 1955; Smith, 1963). Unit was mapped as a member of the Lee Formation on 7.5-minute geologic quadrangle maps, and was made part of the Bee Rock Sandstone by Chesnut (1992). Base of unit is sharp and unconformable with underlying strata, but generally covered by colluvium from overlying cliffs. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

PNrc - Rockcastle Sandstone (Lower Pennsylvanian)

PNr - Rockcastle Sandstone (Lower Pennsylvanian)
Sandstone, gray, tan and yellow, fine to coarse-grained. Partly conglomeratic in in lower portion, cross-bedded with medium to massive bedding. Shale break in middle portion in some areas. Nemo coal seam was observed on this quad near No Business Creek. In thickest locales the upper 30 to 40 feet can grade to alternating gray, fine-grained sandstone and sandy, micaceous shale. Thickness varies greatly from 80 to 260 feet. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Pr - Rockcastle Conglomerate (Lower Pennsylvanian)
Sandstone, gray, light-brown, and yellow, fine- to coarse-grained, commonly conglomeratic, cross-bedded, medium- to thick bedded. Locally present in the middle of the formation is gray, silty shale, commonly no thicker than 20 feet, that contains the Nemo coal. Upper 30 feet of formation consists of interbedded gray and light-brown, thin-bedded, fine-grained sandstone, and gray, micaceous, silty and sandy shales. (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNr - Rockcastle Conglomerate (Lower Pennsylvanian)
Sandstone, gray, tan, and yellow, fine- to coarse-grained with most of the formation conglomeratic, cross-bedded, medium, thick, and massive bedded. Locally present in the middle of the formation is gray, silty shale, seldom exceeding 20 feet in thickness, which may contain the Nemo coal. The upper 30 feet of the formation is nominally composed of alternating gray and tan, thin-bedded, fine-grained sandstone, and gray, micaceous, silty and sandy shales. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNr - Rockcastle Conglomerate (Lower Pennsylvanian)
Sandstone, gray, tan and yellow, fine to coarse-grained. Conglomeratic in part in lower portion, cross-bedded with medium to massive bedding. Shale break in middle portion in some areas, but the Nemo coal seam was not observed on this quad. In thickest locales the upper 30 to 40 feet can grade to

alternating gray, fine-grained sandstone and sandy micaceous shale. Thickness varies greatly from 80 to 220 feet. (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

PNr - Rockcastle Conglomerate (Lower Pennsylvanian)
Sandstone, gray, tan, and yellow, fine- to coarse-grained with most of the formation conglomeratic, cross-bedded, medium, thick, and massive bedded. Locally present in the middle of the formation is gray, silty shale, seldom exceeding 20 feet in thickness, which may contain the Nemo coal. The upper 30 feet of the formation is nominally composed of alternating gray and tan, thin-bedded, fine-grained sandstone, and gray, micaceous, silty and sandy shales. Thickness up to 220 feet. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNr - Rockcastle Conglomerate (Lower Pennsylvanian)
Sandstone, gray, tan, and yellow, fine- to coarse-grained with most of the formation conglomeratic, cross-bedded, medium, thick, and massive bedded. Locally present in the middle of the formation is gray, silty shale, seldom exceeding 20 feet in thickness, which may contain the Nemo coal. The upper 30 feet of the formation is nominally composed of alternating gray and tan, thin-bedded, fine-grained sandstone, and gray, micaceous, silty and sandy shales. Thickness 120 to 230 feet. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNr - Rockcastle Sandstone (Lower Pennsylvanian)
Sandstone. gray, tan and yellow, fine to coarse-grained. Partly conglomeratic in lower portion, cross-bedded with medium to massive bedding. Shale break in middle portion but not observed on this quad except in well logs. Nemo coal seam not observed on this quad. The upper 30 to 40 feet can grade to alternating gray, fine-grained sandstone and sandy. micaceous shale. Thickness varies from about 100 to 200 feet. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Pr - Rockcastle Conglomerate (Lower Pennsylvanian)
Sandstone, gray, tan, and yellow, fine- to coarse-grained with most of the formation conglomeratic, cross-bedded, medium, thick, and massive bedded. Locally present in the middle of the formation is gray, silty shale, seldom exceeding 20 feet in thickness, which may contain the Nemo coal. The upper 30 feet of the formation is nominally composed of alternating gray and tan, thin-bedded, fine-grained sandstone, and gray, micaceous, silty and sandy shales. Thickness 160 to 195 feet. (*GRI Source Map ID 75620*) (Stockton Quadrangle).

PNrcn - Rockcastle Sandstone, Nemo coal bed (Lower Pennsylvanian (?))

n - Rockcastle Sandstone, Nemo coal bed (Lower Pennsylvanian)
No additional unit description provided. Unit within the Rockcastle Sandstone (PNrc). (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNfac - Fentress Formation / Alvy Creek Formation (Lower Pennsylvanian (?))

PNac - Alvy Creek Formation (Lower Pennsylvanian)
Shale, siltstone, sandstone, and coal. Shale, carbonaceous, sandy; fragments of fossil plants common; grades into fine-grained siltstone and sandstone. Siltstone, clayey to sandy; thin- to thick-bedded, fine-grained; commonly contains ferruginous stringers. Sandstones, generally thin (less than 6 m; 20 ft), lenticular, quartzose and micaceous; often argillaceous, fine- to medium-grained; usually thin-bedded. Unit commonly weathers to gentle slopes. Base unconformable, but generally covered by colluvium from overlying cliffs. Base unconformable, with channels cut into underlying Paragon Formation. Unit was mapped as part of the Lee Formation on most 7.5-minute geologic quadrangle maps, the Beattyville

Shale in the Barthell (Pomerene, 1964) and Cumberland Falls (Smith, 1963) 7.5-minute quadrangles, and was renamed Alvy Creek by Chesnut (1992). In this quadrangle, the unit is equivalent to strata between the top of the Mississippian and the base of the Rockcastle Sandstone Member. Where units equivalent to the Rockcastle were not mapped, the boundary between the Alvy Creek and overlying Grundy Formation has been estimated. Coals include, in descending order, the Beaver Creek and individual beds in the Stearns zone (No. 2 and No. 1 coals). (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

PNf - Fentress Formation (Lower Pennsylvanian)
The entire formation has a maximum thickness of 320 feet. Thickness ranges from 60 to 160 feet. Because of the inconsistency of the sands it is broken into the lower Crab Orchard and Gizzard Groups on this quad, both undifferentiated. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

PNf - Fentress Formation (Lower Pennsylvanian)
Mapped as the Fentress because of the difficulty in separating the constituent sands in this area. Consists of everything below the Rockcastle down to the Mississippian. Vandever - Shale, silty, sandy, micaceous. Significant sandstone, 20 to 30 feet, tan, fine to medium grained, location varies within the shale but can be directly beneath the Rockcastle in the southern half of the quad. Difficult to distinguish from the Newton with any certainty. Mostly known from well logs. Morgan Springs coal near top when present. Newton - Sandstone, tan, fine to medium grained, cross-bedded in part. Separates the Vandever and Whitwell shales. Can be up to 30 feet or more in thickness. Whitwell - Shale, silty, brown to gray, similar to Vandever, Sewanee coal near base when present. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

PNf - Fentress Formation (Lower Pennsylvanian)
The entire formation has a maximum thickness of 500 feet including the subsurface. On the surface the thickness ranges from under 300 to 400 feet. Because of the inconsistency of the sands it is broken into the lower Crab Orchard and Gizzard Groups, both undifferentiated. Lower Crab Orchard Group - This sequence consists of the Vandever shale through the Sewanee Conglomerate above the Gizzard Group. Intermittent through this zone is a large sandstone, gray to brown, fine to medium-grained, thin to medium bedding, ranges from 20 to 100 feet thick and occurs from 20 to 80 feet below the Rockcastle. Another massive sand occurs below the first, gray to brown, fine to coarse-grained, thin to massive bedding. The occurrence ranges from 80 feet below to continuous deposition. These sand could be the sand within the Vandever and the Newton sandstone or the Sewanee sandstone. The shale zones are interspersed with fairly thin sands, gray to brown, fine to medium grained, thin bedded. Gizzard Group - This group consist of the Signal Point shale, the Warren Point sandstone and the Raccoon Mountain formation. Correlations are insufficient to definitely say that the zone just above the Pennington is either the Raccoon Mountain or the Warren Point. A massive sand, gray to brown, medium to coarse-grained, cross-bedded in part, does occur just above the Pennington on the west side of the quad just above Williams creek. The Warren Point is conglomeratic in part but no pebbles were seen in this section. The shales in this zone are gray to brown, silty. (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

PNf - Fentress Formation (Lower Pennsylvanian)
Mapped as the Fentress Formation because of the difficulty in separating the constituent sands in this area. Found only on western most parts of this quadrangle, the Fentress Formation consists of all rock units seen below the Rockcastle. (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

PNf - Fentress Formation (Lower Pennsylvanian)
The Fentress Formation is undifferentiated in this area, except for the Vandever shale which always occurs directly beneath the Rockcastle sandstone, although the base of the Vandever is difficult to determine. The Fentress consists of a series of shales and sands that are predominantly covered. The

Sewanee and Warren Point sandstones are mostly unrecognizable in this area. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Pf - Fentress Formation (Lower Pennsylvanian)
Shale, gray, silty and sandy, micaceous, thin-bedded. Includes several sandstones, white and tan, thin-bedded, fine-grained, often argillaceous and silty, micaceous, ripple marked, occasionally cross-bedded and containing shale pebbles. Several coals occur in the formation, the Morgan Springs coal at the top of the formation and the Wilder, Lower Wilder and White Oak coals in the lower half of the formation. Thickness 125 to 200+ feet. (*GRI Source Map ID 75620*) (Stockton Quadrangle).

PNacst - Alvy Creek Formation, Stearns coal zone (Lower Pennsylvanian)

st - Alvy Creek Formation, Stearns coal zone (Lower Pennsylvanian)
No additional unit description provided. Unit within the Alvy Creek Formation (PNfac). (Barthell and parts of Oneida North Quadrangles).

PNacst2 - Alvy Creek Formation, Stearns No. 2 (Lower Pennsylvanian)

st2 - Alvy Creek Formation, Stearns No. 2 (Lower Pennsylvanian)
No additional unit description provided. Unit within the Alvy Creek Formation (PNfac). (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle).

PNbssn - Lower Breathitt Group, sandstone member N (Lower Pennsylvanian)

ssN - Lower Breathitt Group, sandstone member N (Lower Pennsylvanian)
No additional unit description provided. (Nevelsville Quadrangle).

PNacst1 - Alvy Creek Formation, Stearns No. 1 (Lower Pennsylvanian)

st1 - Alvy Creek Formation, Stearns No. 1 (Lower Pennsylvanian)
No additional unit description provided. Unit within the Alvy Creek Formation (PNfac). (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle).

PNvnws - Vandever Formation, Newton Sandstone, Whitwell Shale and Sewanee, undivided (Lower Pennsylvanian)

PNvnw - Vandever, Newton, Whitwell (Lower Pennsylvanian)
Upper part that equates to the Vandever formation is a silty, sandy, micaceous shale. A significant sandstone, 0 to 30 feet, tan, fine to medium grained, occurs in various locations within the shale but can be directly beneath the Rockcastle. Difficult to distinguish from the Newton sand with any certainty. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Pvnw - Vandever, Newton (?) and Whitwall Formations (Lower Pennsylvanian)
Shale, gray, silty and sandy, micaceous, thin-bedded; with units of sandstone, white and light-brown, thin-bedded, fine-grained, commonly argillaceous, micaceous, and ripple marked, one of which directly underlies the Rockcastle Conglomerate throughout a considerable area and is as thick as 30 feet. Morgan Springs coal at or near top of formation; Sewanee coal near base. The Newton Sandstone, which separates the Whitwell and Vandever Formations in much of the Cumberland Plateau, cannot be recognized with certainty in this quadrangle. It may be represented by one or more of the sandstone units within this map unit, but it cannot be mapped separately. (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNvnw - Vandever, Newton, Whitwall, undifferentiated (Lower Pennsylvanian)
Mostly consists of the Vandever shale on this map. Vandever is silty, sandy, slightly micaceous. Contains an intermittent sandstone, fine to medium-grained, of up to 40 feet in thickness as shown on the logs, which makes it difficult to distinguish from the Newton sandstone. The Newton is not directly observed on this map and the estimated locations are covered with colluvium in the northern part of the map along Clear Fork Creek. The 90 foot thickness of the exposure is estimated from the Honey Creek quad and Rugby well logs. (*GRI Source Map ID 75622*) (Rugby Quadrangle).

PNvnw - Vandever, Newton, Whitwall, Sewanee, undifferentiated (Lower Pennsylvanian)
Vandever, Newton, Whitwell, Sawanee, undifferentiated (Lower Pennsylvanian) - Upper part that equates to the Vandever formation is a silty, sandy, micaceous shale. A significant sandstone. 0 to 10 feet, tan. fine to medium grained. occurs in various locations within the shale but can be directly beneath the Rockcastle. Sands are gray, fine to medium grained. Difficult to distinguish the Newton sand with any certainty. Differentiating the Sewanee from the underlying Warren Point is highly problematic. No coal seams. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).
Unit mapped with the Sewanee on the Sharp Place Quadrangle.

PNms - Morgan Springs coal bed (Lower Pennsylvanian)

ms - Morgan Springs coal bed (Lower Pennsylvanian)
No additional unit description provided. Morgan Springs coal at or near the top of the Vandever Formation (PNvnws). (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNsc - Sewanee Conglomerate (Lower Pennsylvanian)

Ps - Sewanee Conglomerate (Lower Pennsylvanian)
Sandstone, light-gray, fine- to medium-grained, thin- to medium-bedded, cross-bedded, micaceous, with carbonaceous flecks in the upper 10 feet. Only upper 40 feet of formation crops out; in subsurface, lower part of formati and contains abundant quartz pebbles. In the extreme northwestern part of the quadrangle the Sewanee abruptly inter-fingers with silty shale (Fentress Formation). (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNscb - Sewanee Conglomerate, Sawnee coal bed (Lower Pennsylvanian)

s - Sewanee Conglomerate, Sawnee coal bed (Lower Pennsylvanian)
No additional unit description provided. Unit within the Sewanee Conglomerate (PNsc). (*GRI Source Map ID 67749*) (Burrville Quadrangle).

PNscg - Sewanee Conglomerate and Gizzard Group (Lower Pennsylvanian)

PNsg - Sewanee Conglomerate and Gizzard Group (Lower Pennsylvanian)
The Sewanee is included with the Gizzard Group, again because of the difficulty in differentiating the formations. Both the Sewanee and the Warren Point are conglomeratic In part and neither sand has the consistency and thickness that is shown further to the south. Sands are light gray to brown; fine to coarse grained, containing quartz pebbles in some areas. Thin to medium bedding, cross-bedded and slightly micaceous. Assuming that the lower part of this group is covered, the thickness ranges from 0 to 160 feet. The shales are gray to brown with thin sandstone stringers. The presence of the Raccoon Mountain shale undetermined. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

PNsg - Sewanee Conglomerate and Gizzard Group (Lower Pennsylvanian)
Sewanee Conglomerate - sandstone, light gray, fine to medium grained, thin to medium bedded, cross-bedded, micaceous. Thickness varies from 0 feet in the northern half of the quad to 100 + feet, in southern half of quad, shown in subsurface logs. Outcrops are less than 100 feet thick. Signal Point - shale, gray, silty, with small stringers of sandstone. Wilder coal is in upper part but was not seen in this quad. Signal Point is 0 to 60+ feet as shown in logs. In places the Sewanee unconformably overlies the Warren Point sandstone. Wilder coal near top of shale where present. Warren Point - sandstone, light to dark gray, fine to medium grained, contains quartz pebbles. Becomes shaly in the northern part of the quad and is indistinguishable from the upper Fentress formation. 0 to 100+feet from logs. Raccoon Mountain - shale, gray, silty, with small sandstone stringers. Lost to erosion of Pennington formation in areas where the Warren Point sandstone unconformably overlies the Pennington. White Oak coal is in this formation but not seen in the field on this quad. 0 to 50 feet in thickness from logs. (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

Unit is present in source map stratigraphic column, however, the unit isn't present on the map area, and thus isn't as a unit in the GRI digital geologic-GIS data. The unit description denotes the unit thickness varies from zero in the northern half of the quad to 100+ feet in southern half of the quad. Unit is stated to "show" in subsurface logs.

Mp - Pennington Formation / Paragon Formation (Upper Mississippian)

Mp - Paragon Formation (Upper Mississippian)
Unit consists of rocks assigned to Pennington Formation during U.S. Geological Survey–Kentucky Geological Survey cooperative mapping project, 1960-78 (Ettensohn and others, 1984). Shale, sandstone, limestone, dolomite, and siltstone. Shale, clayey, plastic; locally calcareous; rarely fossiliferous. Sandstone, very fine-to medium-grained, quartzose, micaceous; partly calcareous; in part gradational with siltstone. Limestone, micrograined to coarse-grained, bioclastic, fossiliferous; locally oolitic; locally silty and sandy. Dolomite, very finely crystalline, silty, calcareous, with mineral-lined and mineral-filled vugs. Siltstone, locally calcareous; commonly gradational with sandstone. Common erosional thinning of Paragon by post-Mississippian Paleozoic erosion. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

Mp - Pennington Formation (Upper Mississippian)
Limestone, gray, medium and thick-bedded, fossiliferous, and shale, red, maroon, olive-gray, and olive-green, thin-bedded and blocky. Maximum exposed thickness 160 feet. (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Mp - Pennington Formation (Upper Mississippian)
Limestone, gray, medium and thick-bedded, fossiliferous (gastropods), and shale, red, maroon, olive-gray, and olive-green, thin-bedded and blocky. Maximum exposed thickness 160 feet. (*GRI Source Map*

ID 75621) (Honey Creek Quadrangle).

Mp - Pennington Formation (Upper Mississippian)
Limestone, gray, medium to thick-bedded; shale, maroon, gray, olive-green, thin to thick-bedded. Dolomite, gray to buff color, maximum exposed thickness 100 feet, 320 feet in subsurface. (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

Mp - Pennington Formation (Upper Mississippian)
Limestone, gray, medium and thick-bedded, fossiliferous, and shale, red, maroon, olive-gray, and olive-green, thin-bedded and blocky; Dolomite, yellowish-brown, very fine grained. Pennington mostly covered on this quad and undifferentiated. Pennington has erosional surface and inferred thickness ranges from 160 to 300 feet. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Mp - Pennington Formation (Upper Mississippian)
Limestone, gray, medium and thick-bedded, fossiliferous (gastropods), and shale, red, maroon, olive-gray, and olive-green, thin-bedded and blocky. Maximum exposed thickness 160 feet. (*GRI Source Map ID 75620*) (Stockton Quadrangle).

Mb - Bangor Limestone (Upper Mississippian)

Mba - Bangor Limestone (Upper Mississippian)
Limestone and shale. Limestone, very fine-to coarse-grained, bioclastic, fossiliferous; partly argillaceous; partly sandy and silty; rarely cherty. Shale, in thin partings, mainly in upper part of formation. In eastern part of outcrop area, combined with underlying Hartselle Formation during the U.S. Geological Survey–Kentucky Geological Survey cooperative mapping project, 1960-78. (*GRI Source Map ID 74714*) (Bell Farm and parts of Barthell SW Quadrangles, from Corbin 30' x 60' Quadrangle).

Mbh - Bangor Limestone and Hartselle Formation (Upper Mississippian)

Mbha - Bangor Limestone and Hartselle Formation (Upper Mississippian)
Combined unit (individual rock units not mapped separately for this quadrangle).

Mba - Bangor Limestone - Limestone and shale. Limestone, very fine-to coarse-grained, bioclastic, fossiliferous; partly argillaceous; partly sandy and silty; rarely cherty. Shale, in thin partings, mainly in upper part of formation. In eastern part of outcrop area, combined with underlying Hartselle Formation during the U.S. Geological Survey–Kentucky Geological Survey cooperative mapping project, 1960-78.
Mha - Hartselle Formation - Shale and sandstone. Shale, clayey, plastic; partly calcareous, partly silty. Sandstone, very fine- to medium-grained, quartzose; slightly micaceous; partly argillaceous; locally calcareous; rarely fossiliferous. Sandstone content decreases eastward across outcrop area. In eastern part of outcrop area, combined with overlying Bangor Limestone during the U.S. Geological Survey–Kentucky Geological Survey cooperative mapping project, 1960-78.

(*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

Mbh - Bangor Limestone/Hartselle Sandstone (Upper Mississippian)
Limestone, brown to gray, coarse crystalline, fossiliferous; massive bedded. This limestone is only seen near the northern border near Lang ham Branch area and the SW corner of quad near Pogue Creek. Covered in most areas. Total thickness up to 120 feet. Hartselle sand was not directly observed on this quad but is exposed on Pall Mall quad to the west. Thin bedded, fine to medium, grayish-yellow where

visible. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Mh - Hartselle Formation (Upper Mississippian)

Mha - Hartselle Formation (Upper Mississippian)
Shale and sandstone. Shale, clayey, plastic; partly calcareous, partly silty. Sandstone, very fine- to medium-grained, quartzose; slightly micaceous; partly argillaceous; locally calcareous; rarely fossiliferous. Sandstone content decreases eastward across outcrop area. In eastern part of outcrop area, combined with overlying Bangor Limestone during the U.S. Geological Survey–Kentucky Geological Survey cooperative mapping project, 1960-78. (*GRI Source Map ID 74714*) (Bell Farm and parts of Barthell SW Quadrangles, from Corbin 30' x 60' Quadrangle).

Mm - Monteagle Limestone (Upper Mississippian)

Mm - Monteagle Limestone (Upper Mississippian)
Massive limestone, brown to gray, fossiliferous, oolitic in parts. Total exposed thickness up to 60 feet. (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Mmk - Monteagle Limestone, Kidder Limestone Member (Upper Mississippian)

Mmk - Monteagle Limestone, Kidder Limestone Member (Upper Mississippian)
Limestone, minor siltstone, and shale. Limestone, micro-grained to medium-grained, bioclastic, commonly oolitic; thin- to thick-bedded, massive; in part cross-bedded and silty; some calcareous siltstone and thin clay shale interbeds. Contains abundant fragments of brachiopods, blastoids, and crinoids; three correlative crinoid-rich zones commonly present. Basal contact placed at top of limestone and chert breccia of underlying Ste. Genevieve Limestone Member. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

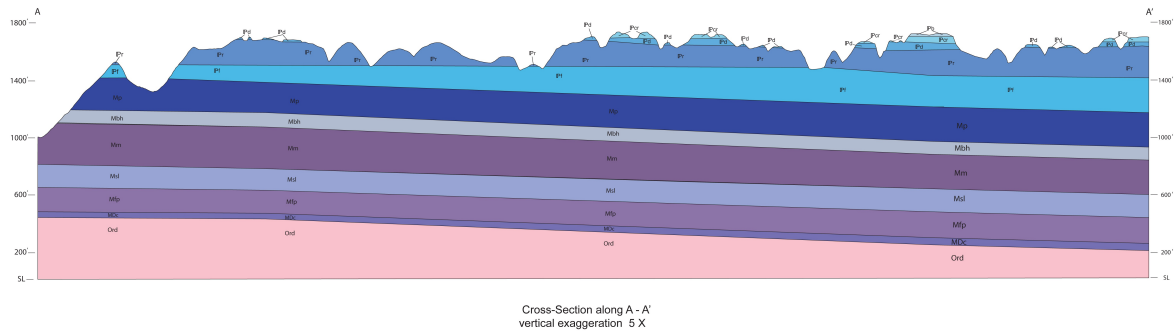
Mmg - Monteagle Limestone, Ste. Genevieve Limestone Member (Upper Mississippian)

Mmg - Monteagle Limestone, Ste. Genevieve Limestone Member (Upper Mississippian)
Limestone and chert. Limestone, micro-grained to medium-grained; commonly oolitic, sandy and silty; thin- to thick-bedded, commonly cross-bedded. One or more beds of limestone and chert breccia present in upper part of unit. Black chert nodules 8 to 10 cm (3 to 4 in.) in diameter common. Basal unit consists of chert breccia 0.3 to 1.8 m (1 to 6 ft) thick correlative to Lost River Chert of Elrod (1899). Limestone contains abundant microfossils, brachiopods, horn corals, crinoids, colonial corals, and blastoids. (*GRI Source Map ID 74714*) (Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and Nevelsville Quadrangle, from Corbin 30' x 60' Quadrangle).

Geologic Cross Sections

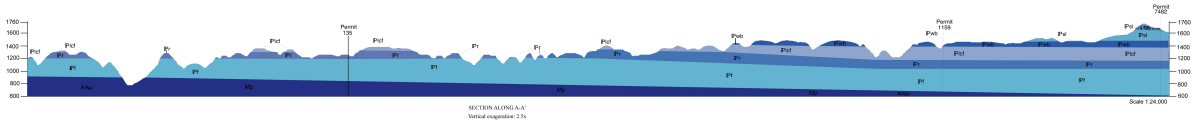
The geologic cross sections present in the GRI digital geologic-GIS data produced for Big South Fork National River and Recreation Area, Tennessee and Kentucky (BISO) are presented below. Note that some cross section abbreviations (e.g., A - A') have been changed from their source map abbreviation in the GRI data so that each cross section abbreviation in the GRI digital geologic-GIS data is unique. Cross section graphics were scanned at a high resolution and can be viewed in more detail by zooming in (if viewing the digital format of this document).

Cross Section A-A'



Extracted from: (GRI Source Map ID 76048) (Sharp Place Quadrangle).

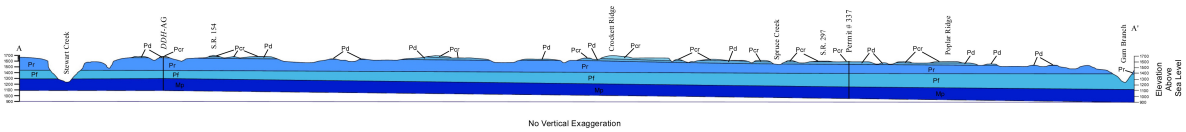
Cross Section B-B'



Cross section A-A' on source map.

Extracted from: (GRI Source Map ID 75782) (Oneida North Quadrangle).

Cross Section C-C'



Cross section A-A' on source map.

Extracted from: (GRI Source Map ID 75620) (Stockton Quadrangle).

Ancillary Source Map Information

Additional or ancillary map information present on source geologic maps or data used by the Geologic Resources Inventory (GRI) Program in the production of digital geologic-GIS data for Big South Fork National River and Recreation Area, Tennessee and Kentucky (BISO) are presented below. For the source geologic maps and digital data for the Barthell and parts of Oneida North Quadrangles, Bell Farm and parts of Barthell SW Quadrangles, and the Nevelsville Quadrangle, all maps within Kentucky, no additional relevant ancillary information was captured or was available. Thus, source geologic maps and digital data for these maps are not present in this section.

Corbin 30' x 60' Quadrangle (GM-27)

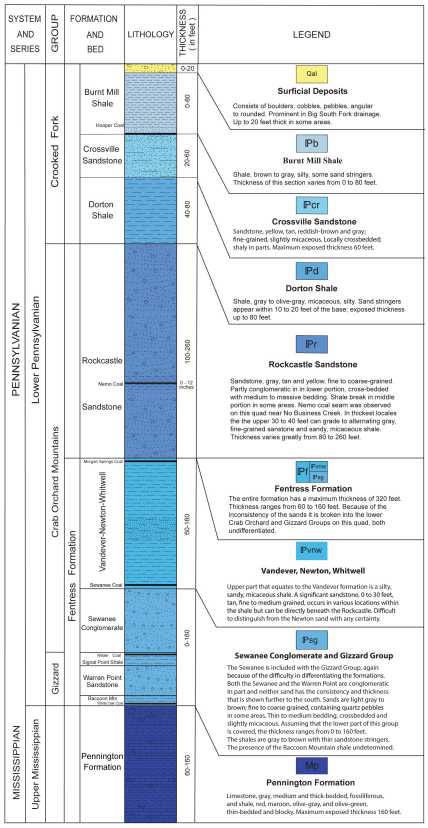
Sparks, T.N., Anderson, W.H., and Yang, X., 2011, Geologic Map of the Corbin 30 x 60 Minute Quadrangle, South-Central Kentucky: Kentucky Geological Survey, Geologic Map Series KGS12_GM-27, scale 1:100,000. (*GRI Source Map ID 74714*).

Only unit descriptions for geologic units within the extent of the Barthell, Bell Farm, and Nevelsville quadrangles, as well as portions of the Barthell SW and Oneida North quadrangles within Kentucky were used from this source. No other information from this source was used by the GRI.

Parts of the Barthell SW Quadrangle (336-SW)

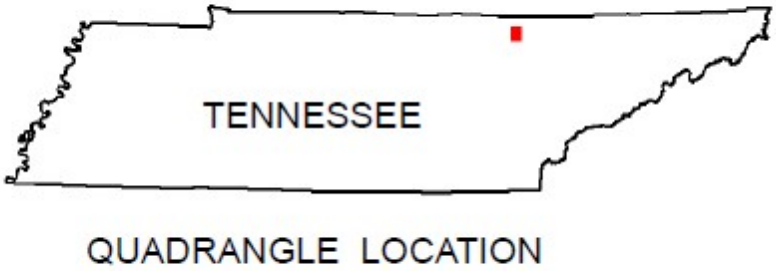
Horton, Albert and Hoyal, Mike, 2016, Geologic Map of the Barthell SW Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Map 336-SW, scale 1;24,000. (*GRI Source Map ID 75960*).

Stratigraphic Column



Extracted from: (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Location Map



Extracted from: (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Map Legend

Extracted from: (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Map Notes

The Barthell Southwest quadrangle is located primarily in Scott County with a small portion of the southwest corner located in Pickett and Fentress counties on Tennessee's Cumberland Plateau. The Cumberland Plateau is a relatively flat area of Paleozoic rocks extending from northern Alabama and Georgia through East Tennessee into Virginia. The project area is in the Southwestern Appalachians Level lll Ecoregion (68) of the Conterminous United States (Griffith, Omernik, and Azevedo, 1998). Open low mountains and tablelands of considerable relief characterize the Cumberland Plateau. The rocks in the Oneida North quadrangle range from the Mississippian Pennington Formation to the Pennsylvanian Slatestone Formation.

The Barthell SW quadrangle was selected as a priority area for geologic mapping because it is in an area of heavy public use, containing part of the Big South Fork National River and Recreation Area (BSFNRRA). The National Park Service (NPS) held geologic scoping meetings in June of 2007. The NPS identified a number of management issues in the BSFNRRA. These included development of nonfederal minerals that lie under federal surfaces, potential for development and urban growth in the park and surrounding communities, transportation corridors, environmentally sensitive sites and facilities, mineral resource availability, and lack of available geologic data. Based upon their management needs, the NPS recommended the Barthell SW quadrangle as a priority for accelerated mapping. This is the seventh of eight quadrangles to be mapped that encompass the BSFNRRA.

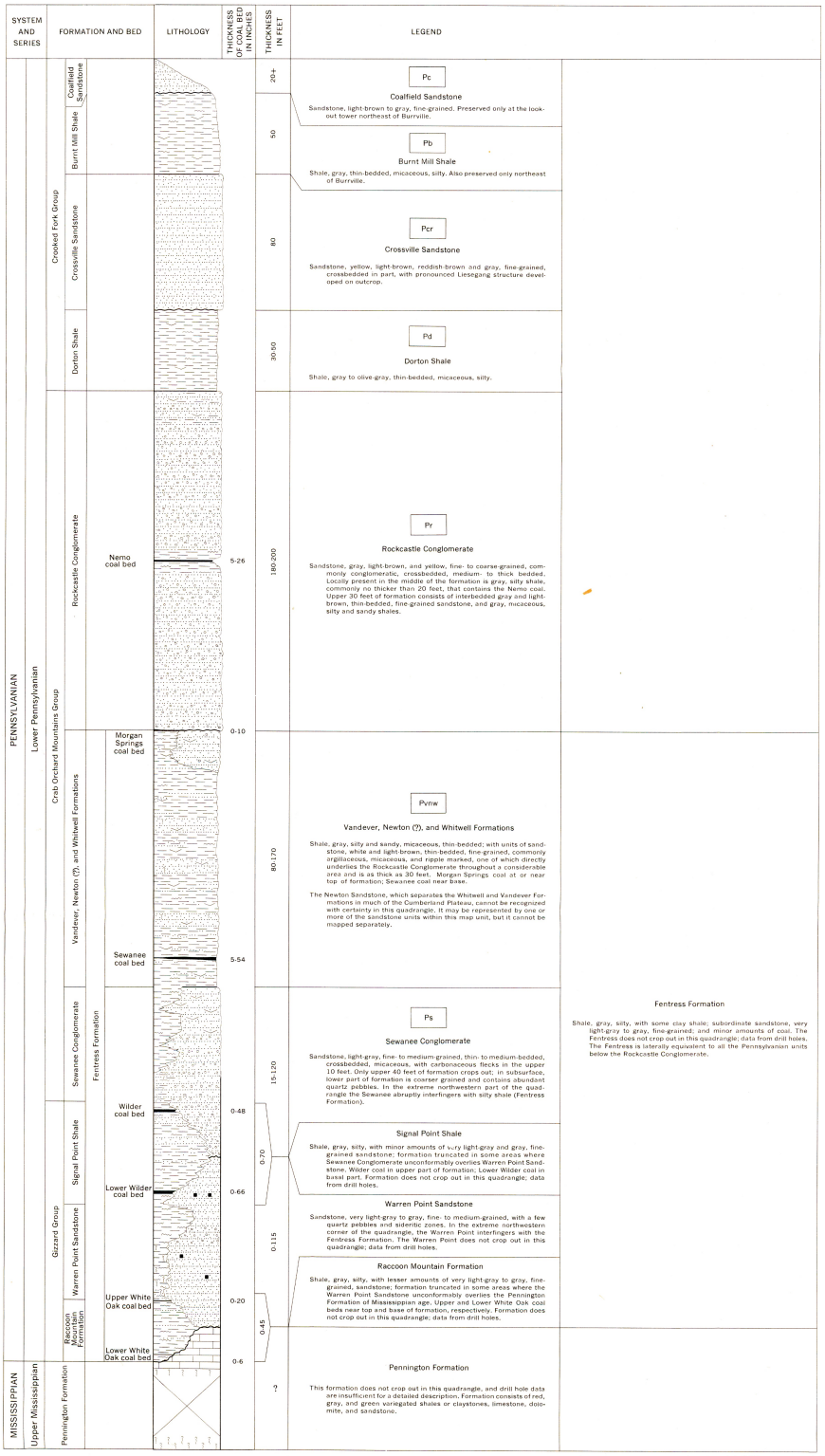
This geologic map was funded by the National Park Service.

Extracted from: (*GRI Source Map ID 75960*) (parts of Barthell SW Quadrangle).

Burrville Quadrangle (115-SE)

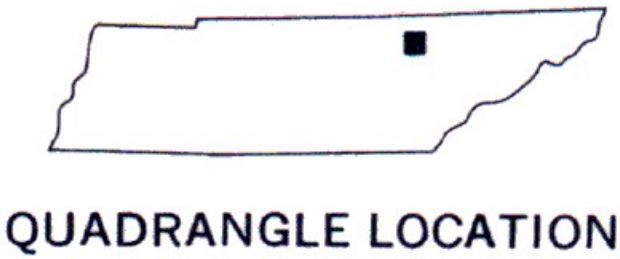
Jewell, J.W., 1972, Geologic Map and Mineral Resources Summary of the Burrville Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 115-SE, scale 1:24,000 (*GRI Source Map ID 67749*).

Stratigraphic Column



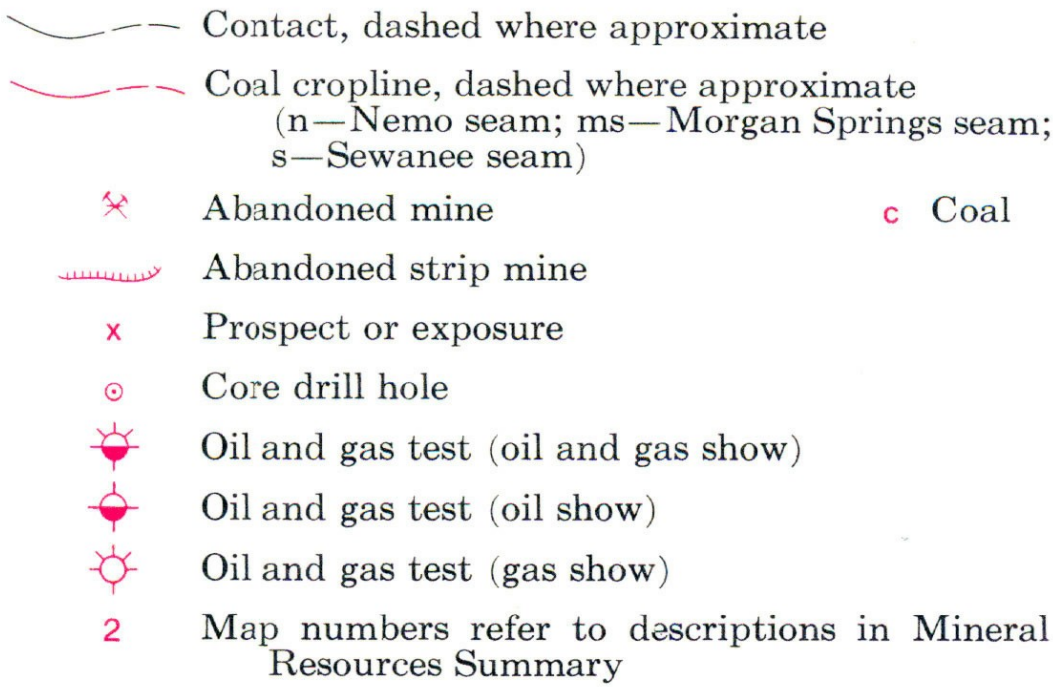
Extracted from: (*GRI Source Map ID 67749*) (Burrville Quadrangle).

Location Map



Extracted from: (*GRI Source Map ID 67749*) (Burrville Quadrangle).

Map Legend

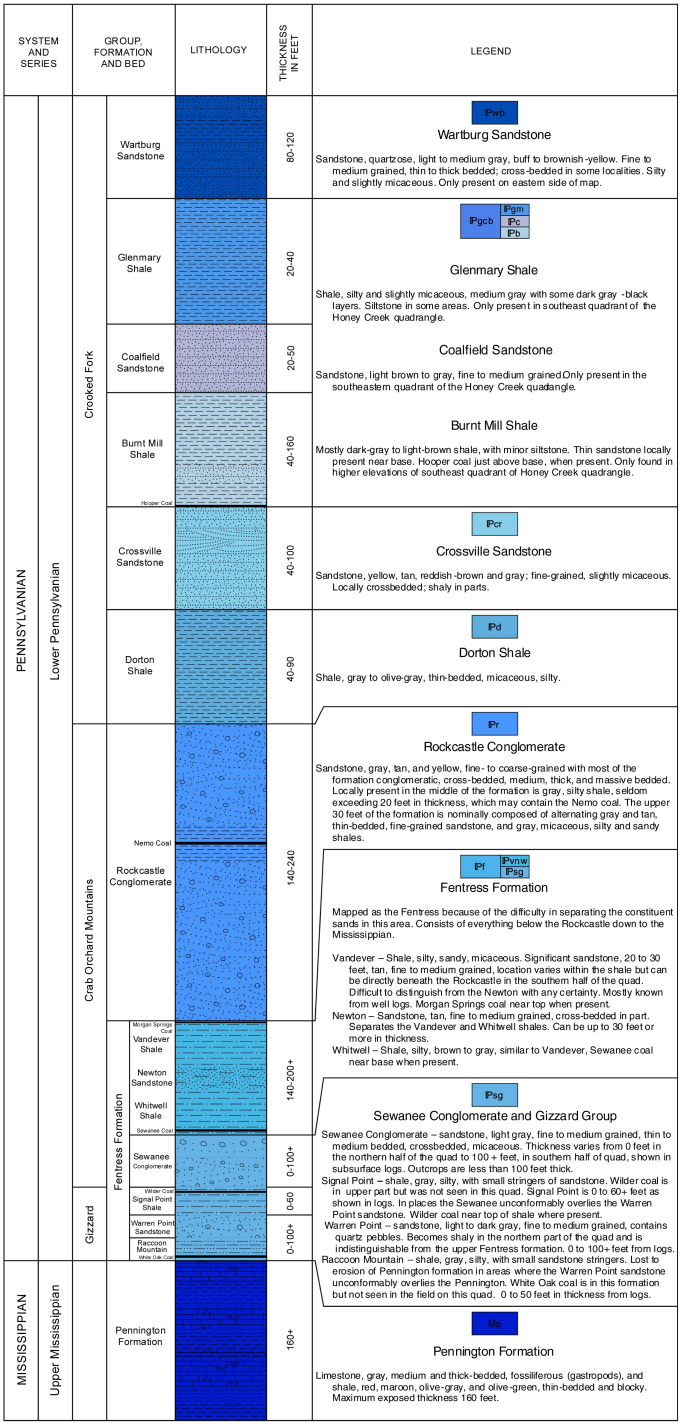


Extracted from: (*GRI Source Map ID 67749*) (Burrville Quadrangle).

Honey Creek Quadrangle (128A-NW)

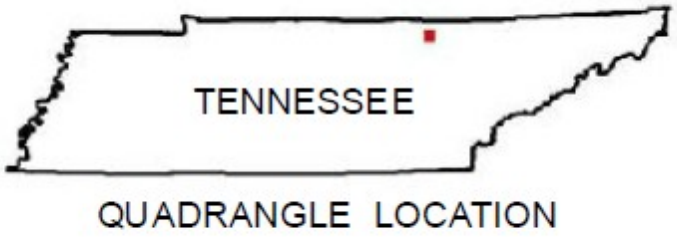
Clendening, Ronald J., and Horton, Albert B., 2010, Geologic Map and Mineral Resources Summary of the Honey Creek Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Map 128A-NW, scale 1;24,000. (*GRI Source Map ID 75621*).

Stratigraphic Column



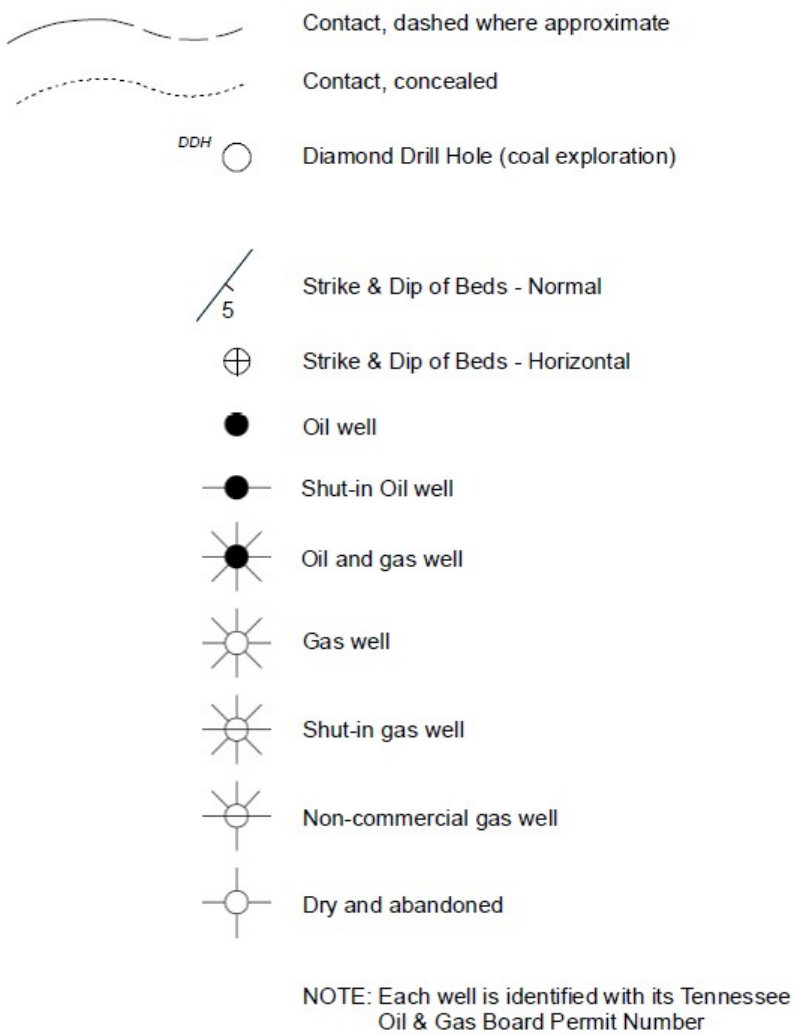
Extracted from: (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

Location Map



Extracted from: (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

Map Legend



Extracted from: (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

Map Notes

The Honey Creek quadrangle is located in Fentress, Scott and Morgan counties on Tennessee's Cumberland Plateau. The Cumberland Plateau is a relatively flat area of Paleozoic rocks extending from northern Alabama and Georgia through East Tennessee into Virginia. The project area is in the Southwestern Appalachians Level III Ecoregion (68) of the Conterminous United States (Griffith, Omemik, and Azevedo, 1998). Open low mountains and tablelands of considerable relief characterize the Cumberland Plateau. The rocks in the Honey Creek quadrangle range from the Mississippian Pennington Formation to the Pennsylvanian Glenmary Shale.

The Honey Creek quadrangle was selected as a priority area for geologic mapping because it is in an

area of heavy public use, containing part of the Big South Fork National River and Recreation Area (BSFNRRA). The National Park Service (NPS) held geologic scoping meetings in June of 2007. NPS identified a number of management issues in the BSFNRRA. These including development of nonfederal minerals that lie under federal surfaces, potential for development and urban growth in the park and surrounding communities, transportation corridors, environmentally sensitive sites and facilities, mineral resource availability, and lack of available geologic data. Based on their management needs, NPS recommended the Honey Creek quadrangle as a priority for accelerated mapping. This is the first of a series of eight quadrangles to be mapped that encompass the BSFNRRA.

This geologic map was funded in part by the USOS National Cooperative Geologic Mapping Program under Cooperative Agreement No. G09AC00268.

Extracted from: (*GRI Source Map ID 75621*) (Honey Creek Quadrangle).

Kentucky Geological Survey Oil and Gas Records Database

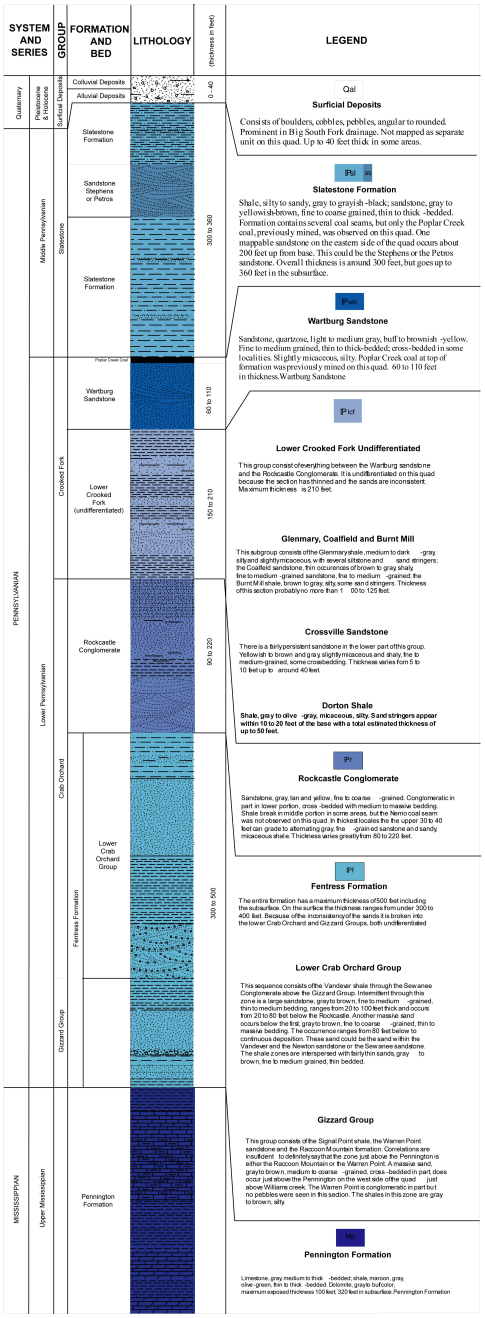
Kentucky Geological Survey, 2016, Oil and Gas Records Database: http://kgs.uky.edu/kgsweb/DataSearching/OilGas/OGSearch.asp (*GRI Source Map ID 76062*).

Only oil and gas features within the extent of the Barthell, Bell Farm and Nevelsville 7.5' quadrangles, as well as extents within the Oneida North and Barthell SW 7.'5 quadrangles in Kentucky were captured from this dataset.

Parts of the Oneida North Quadrangle (336-SE)

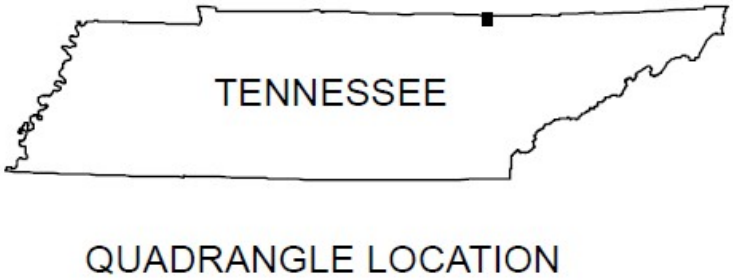
Horton, A.B., Clendening, R.J., and Hoyal, M.L., 2013, Geologic Map of the Oneida North Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 336-SE, scale 1:24,000. (*GRI Source Map ID 75782*).

Stratigraphic Column



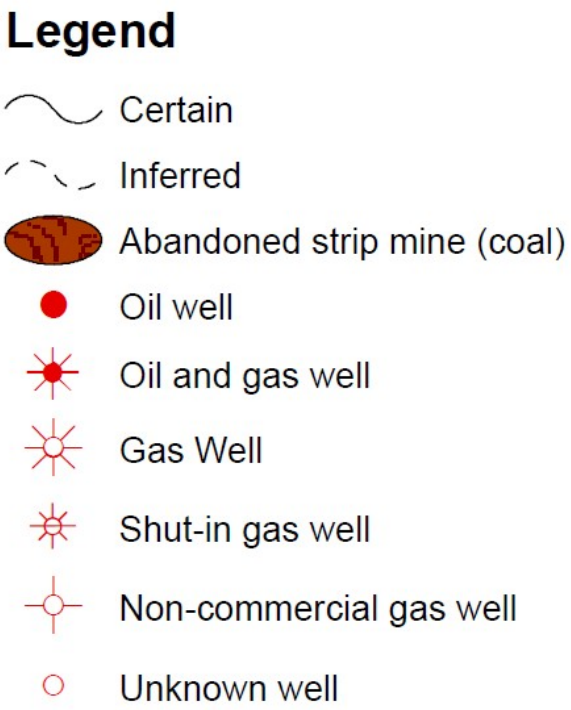
Extracted from: (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

Location Map



Extracted from: (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

Map Legend



Extracted from: (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

Map Notes

The Oneida North quadrangle is located in Scott County on Tennessee's Cumberland Plateau. The

Cumberland Plateau is a relatively flat area of Paleozoic rocks extending from northern Alabama and Georgia through East Tennessee into Virginia. The project area is in the Southwestern Appalachians Level III Ecoregion (68) of the Conterminous United States (Griffith, Omernik, and Azevedo, 1998). Open low mountains and tablelands of considerable relief characterize the Cumberland Plateau. The rocks in the Oneida North quadrangle range from the Mississippian Pennington Formation to the Pennsylvanian Slatestone Formation.

Oneida North quadrangle was selected as a priority area for geologic mapping because it is in an area of heavy public use, containing part of the Big South Fork National River and Recreation Area (BSFNRRA). The National Park Service (NPS) held geologic scoping meetings in June of 2007. The NPS identified a number of management issues in the BSFNRRA. These included development of nonfederal minerals that lie under federal surfaces, potential for development and urban growth in the park and surrounding communities, transportation corridors, environmentally sensitive sites and facilities, mineral resource availability, and lack of available geologic data. Based upon their management needs, the NPS recommended the Oneida North quadrangle as a priority for accelerated mapping. This is the sixth of eight quadrangles to be mapped that encompass the BSFNRRA.

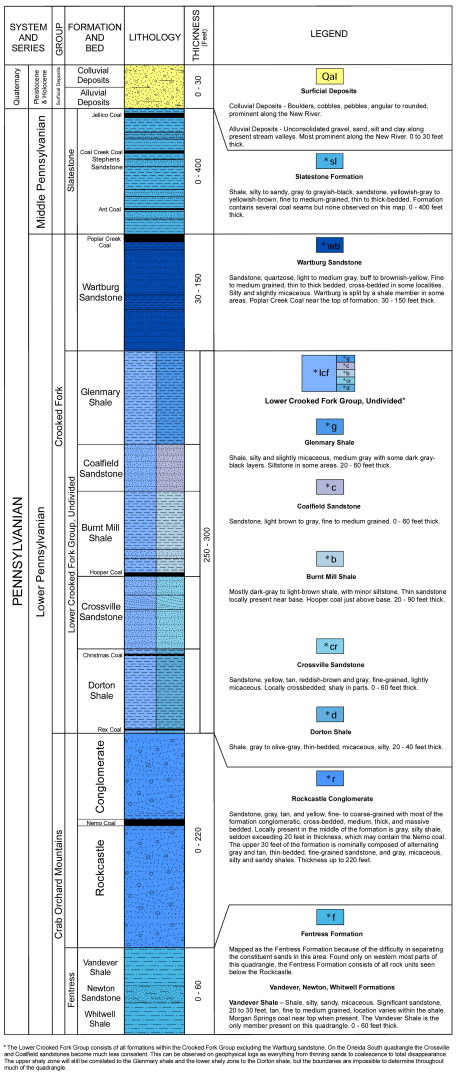
This geologic map was funded by the National Park Service.

Extracted from: (*GRI Source Map ID 75782*) (parts of Oneida North Quadrangle).

Oneida South Quadrangle (128A-NE)

Clendening, R.J., and Horton, A.B., 2012, Geologic Map of the Oneida South Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 128A-NE, scale 1:24,000. (*GRI Source Map ID 75619*).

Stratigraphic Column

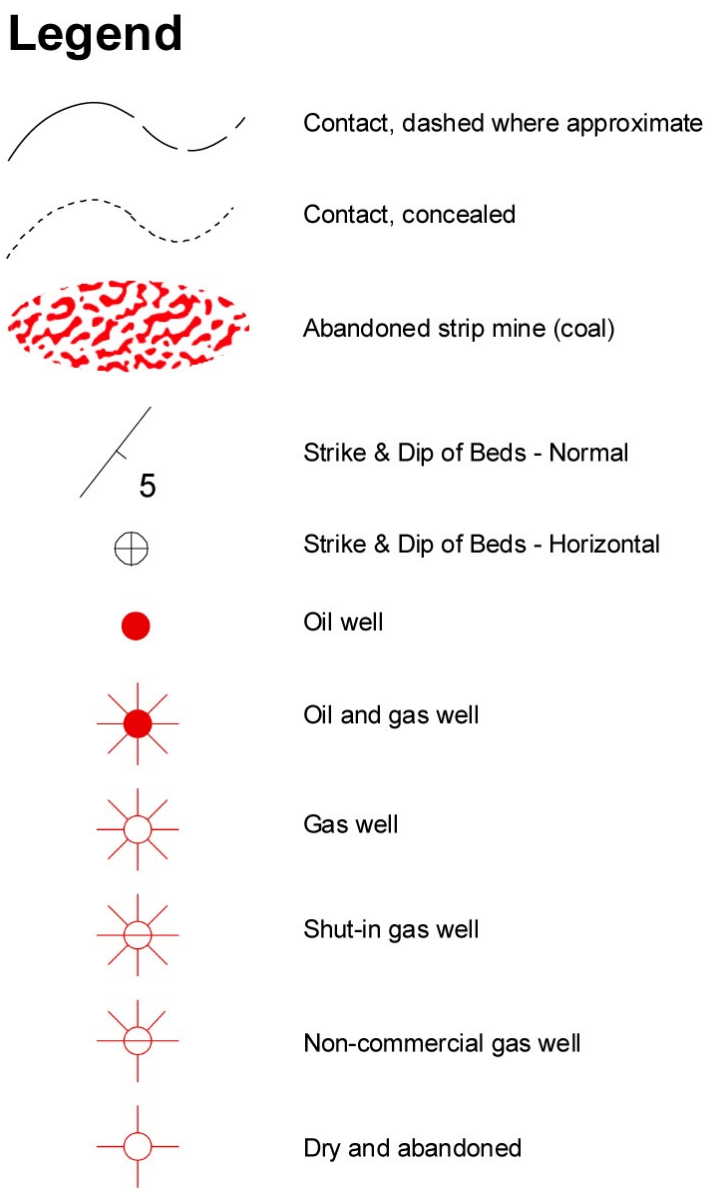


Extracted from: (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

Location Map

Extracted from: (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

Map Legend



Extracted from: (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

Map Notes

The Oneida South quadrangle is located in Scott County on Tennessee's Cumberland Plateau. The Cumberland Plateau is a relatively flat area of Paleozoic rocks extending from northern Alabama and

Georgia through East Tennessee into Virginia. The project area is in the Southwestern Appalachians Level III Ecoregion (68) of the Conterminous United States (Griffith, Omernik, and Azevedo, 1998). Open low mountains and tablelands of considerable relief characterize the Cumberland Plateau. The rocks in the Oneida South quadrangle range from the Pennsylvanian Fentress Formation to the Pennsylvanian Slatestone Formation.

The Oneida South quadrangle was selected as a priority area for geologic mapping because it is in an area of heavy public use, containing part of the Big South Fork National River and Recreation Area (BSFNRRA). The National Park Service (NPS) held geologic scoping meetings in June of 2007. NPS identified a number of management issues in the BSFNRRA. These including development of nonfederal minerals that lie under federal surfaces, potential for development and urban growth in the park and surrounding communities, transportation corridors, environmentally sensitive sites and facilities, mineral resource availability, and lack of available geologic data. Based on their management needs, NPS recommended the Oneida South quadrangle as a priority for accelerated mapping. This is the first of a series of eight quadrangles to be mapped that encompass the BSFNRRA.

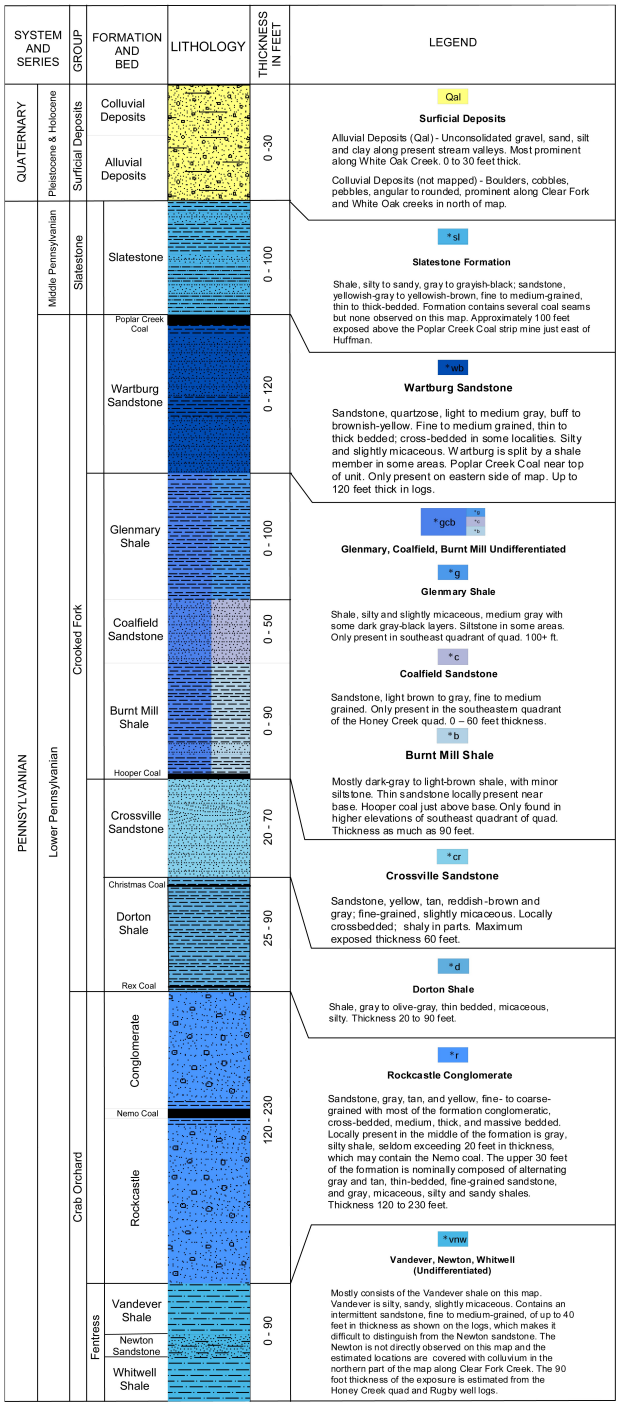
This geologic map was funded by the National Park Service.

Extracted from: (*GRI Source Map ID 75619*) (Oneida South Quadrangle).

Rugby Quadrangle (128A-SW)

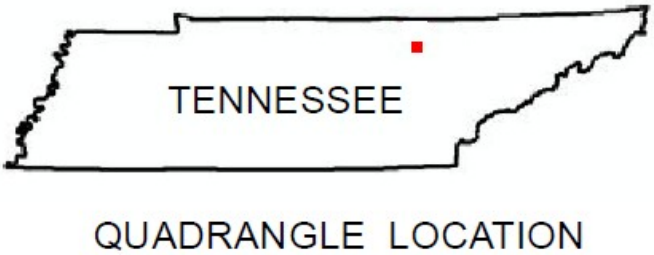
Clendening, R.J., Horton, A.B., Gilmore, D., and Kerrigan, W., 2011, Geologic Map and Mineral Resources Summary of the Rugby Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 128A-SW, scale 1:24,000. (*GRI Source Map ID 75622*).

Stratigraphic Column



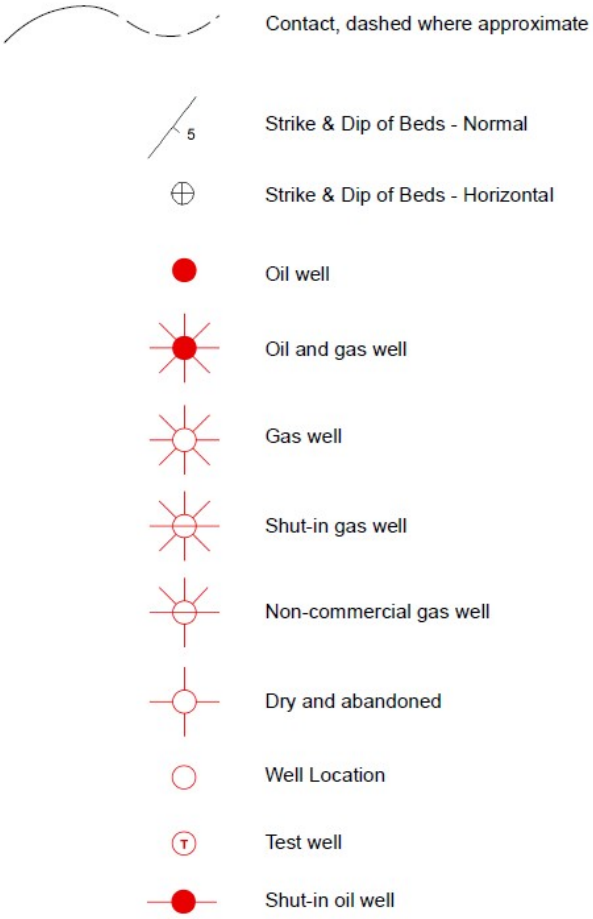
Extracted from: (*GRI Source Map ID 75622*) (Rugby Quadrangle).

Location Map



Extracted from: (*GRI Source Map ID 75622*) (Rugby Quadrangle).

Map Legend



Extracted from: (*GRI Source Map ID 75622*) (Rugby Quadrangle).

Map Notes

The Rugby quadrangle is located in Scott and Morgan counties on Tennessee's Cumberland Plateau. The Cumberland Plateau is a relatively flat area of Paleozoic rocks extending from northern Alabama and Georgia through East Tennessee into Virginia. The project area is in the Southwestern Appalachians Level III Ecoregion (68) of the Conterminous United States (Griffith, Omernik, and Azevedo, 1998). Open low mountains and tablelands of considerable relief characterize the Cumberland Plateau. The rocks in the Rugby quadrangle range from the Pennsylvanian Fentress Formation, which consists of only the Vandever-Newton-Whitwell sequence on Rugby to the Pennsylvanian Slatestone Group and some overlying Quaternary alluvium.

The Rugby quadrangle was selected as a priority area for geologic mapping because it is in an area of heavy public use, containing part of the Big South Fork National River and Recreation Area (BSFNRRA). The National Park Service (NPS) held geologic scoping meetings in June of 2007. NPS identified a number of management issues in the BSFNRRA. These including development of nonfederal minerals that lie under federal surfaces, potential for development and urban growth in the park and surrounding communities, transportation corridors, environmentally sensitive sites and facilities, mineral resource availability, and lack of available geologic data. Based on their management needs, NPS recommended the Stockton quadrangle as a priority for accelerated mapping. This is the third of a series of eight quadrangles to be mapped that encompass the BSFNRRA.

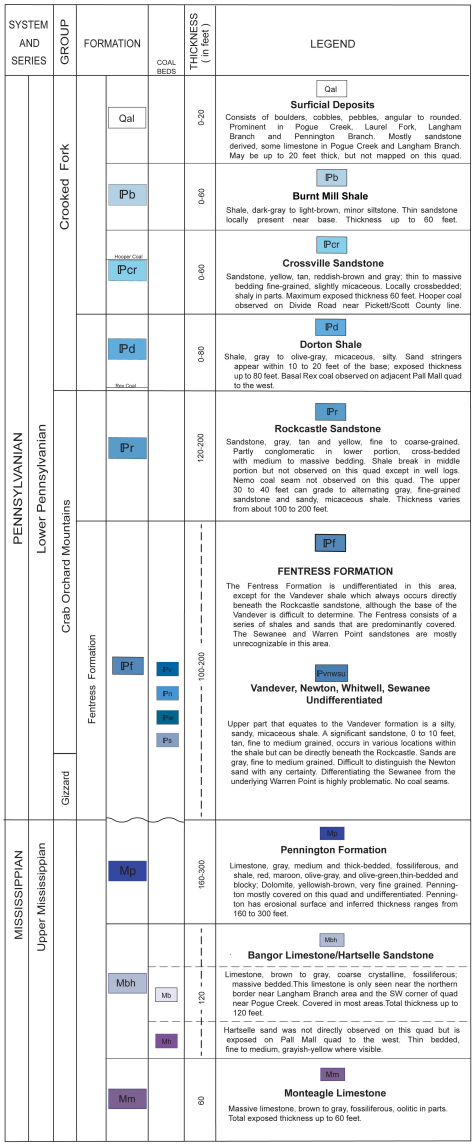
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program under Cooperative Agreement No. G10AC00367.

Extracted from: (*GRI Source Map ID 75622*) (Rugby Quadrangle).

Parts of the Sharp Place Quadrangle (335-SE)

Hoyal, Mike, and Horton, Albert, 2015, Geologic Map of the Sharp Place Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 335-SE, scale 1:24,000. (*GRI Source Map ID 76048*).

Stratigraphic Column

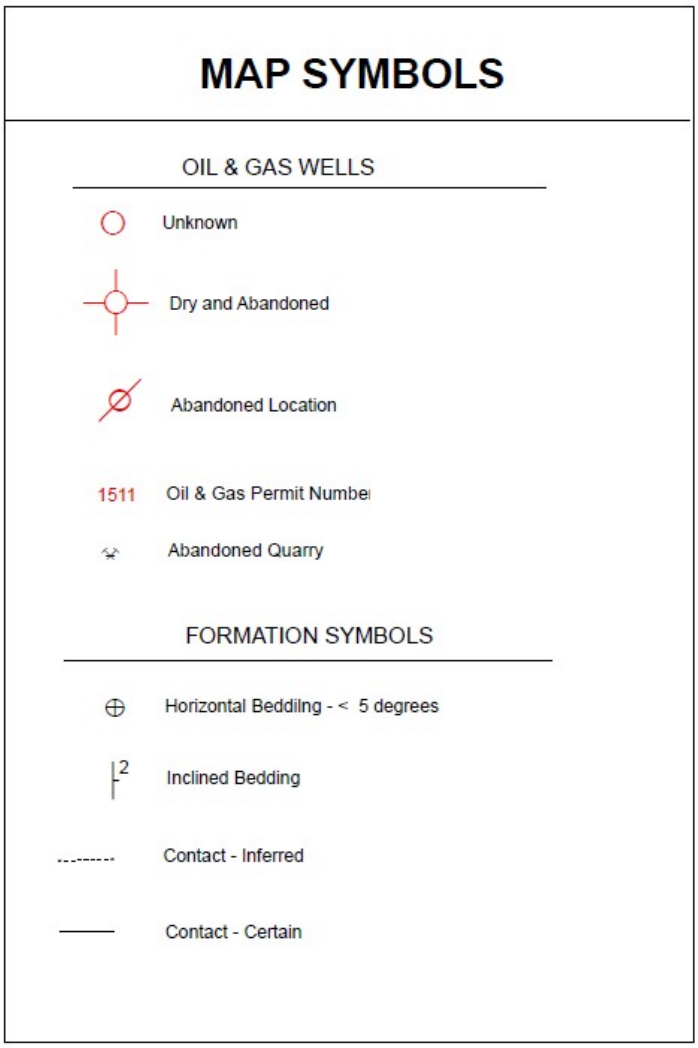


Extracted from: (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Location Map

Extracted from: (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Map Symbols



Extracted from: (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Map Notes

The Sharp Place quadrangle lies in southern Kentucky and Fentress, Pickett and Scott Counties on Tennessee's Cumberland Plateau. The Cumberland Plateau is a relatively flat area of Paleozoic rocks extending from northern Alabama and Georgia through East Tennessee into Virginia. The project area is in the Southwestern Appalachians Level III Ecoregion (68) of the Conterminous United States (Griffith, Omernik, and Azevedo, 1998). Open low mountains and tablelands of considerable relief characterize the Cumberland Plateau. The rocks in the Sharp Place quadrangle range from the Mississippian Monteagle Formation to the Pennsylvanian Burnt Mill Shale.

The Sharp Place quadrangle was selected as a priority area for geologic mapping because it is in an area of heavy public use, containing part of the Big South Fork National River and Recreation Area (BSFNRRA). The National Park Service (NPS) held geologic scoping meetings in June of 2007. NPS identified a number of management issues in the BSFNRRA. These included development of nonfederal minerals that lie under federal surfaces, potential for development and urban growth in the park and surrounding communities, transportation corridors, environmentally sensitive sites and facilities, mineral resource availability, and lack of available geologic data. Based on their management needs, NPS recommended the Sharp Place quadrangle as a priority for accelerated mapping. This is the last of a series of eight quadrangles that were mapped to encompass the BSFNRRA.

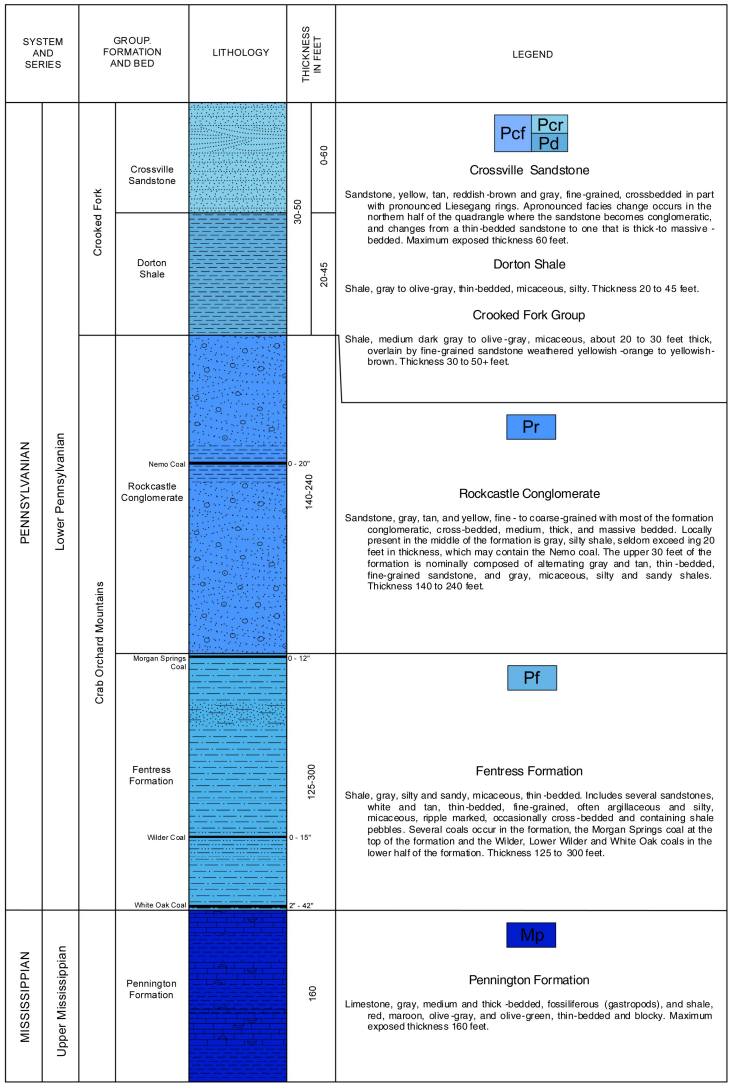
Research and mapping funded by the National Park Service under proposal BISO2015-0005. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U. S. Government.

Extracted from: (*GRI Source Map ID 76048*) (Sharp Place Quadrangle).

Stockton Quadrangle (115-NE)

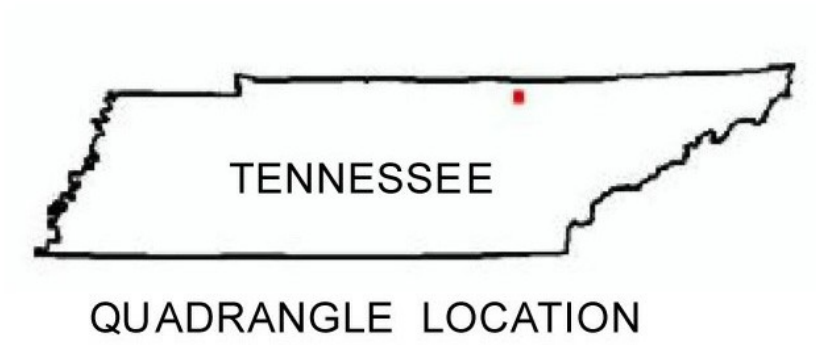
Clendening, Ronald J., Horton, Albert B., and Jewell, John W., 2009, Geologic Map of the Stockton Quadrangle, Tennessee: Tennessee Division of Geology, Geologic Quadrangle Map 115-NE, scale 1:24,000. (*GRI Source Map ID 75620*).

Stratigraphic Column



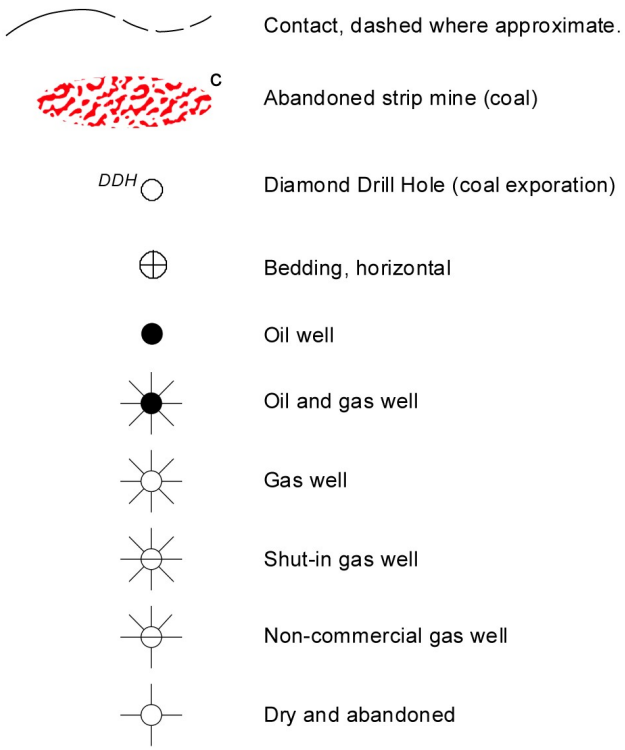
Extracted from: (*GRI Source Map ID 75620*) (Stockton Quadrangle).

Location Map



Extracted from: (*GRI Source Map ID 75620*) (Stockton Quadrangle).

Map Symbols



Extracted from: (*GRI Source Map ID 75620*) (Stockton Quadrangle).

Map Notes

The Stockton quadrangle lies entirely in Fentress County on Tennessee's Cumberland Plateau. The Cumberland Plateau is a relatively flat area of Paleozoic rocks extending from northern Alabama and Georgia through East Tennessee into Virginia. The project area is in the Southwestern Appalachians Level III Ecoregion (68) of the Conterminous United States (Griffith, Omernik, and Azevedo, 1998). Open low mountains and tablelands of considerable relief characterize the Cumberland Plateau. The rocks in the Stockton quadrangle range from the Mississippian Pennington Formation to the Pennsylvanian Crossville Sandstone.

The Stockton quadrangle was selected as a priority area for geologic mapping because it is in an area of heavy public use, containing part of the Big South Fork National River and Recreation Area (BSFNRRA). The National Park Service (NPS) held geologic scoping meetings in June of 2007. NPS identified a number of management issues in the BSFNRRA. These including development of nonfederal minerals that lie under federal surfaces, potential for development and urban growth in the park and surrounding communities, transportation corridors, environmentally sensitive sites and facilities, mineral resource availability, and lack of available geologic data. Based on their management needs, NPS recommended the Stockton quadrangle as a priority for accelerated mapping. This is the first of a series of eight quadrangles to be mapped that encompass the BSFNRRA.

Research supported by the U. S. Geological Survey, National Cooperative Geologic Mapping Program, under USGS award number 08HQAG0112. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U. S. Government.

Extracted from: (*GRI Source Map ID 75620*) (Stockton Quadrangle).

GRI Digital Data Credits

This document was developed and completed by Stephanie O'Meara and Chase Winters (Colorado State University) for the NPS Geologic Resources Division (GRD) Geologic Resources Inventory(GRI) Program. Quality control of this document by Stephanie O'Meara and James Winter (Colorado State University).

The information in this document was compiled from GRI source maps, and intended to accompany the digital geologic-GIS map(s) and other digital data for Big South Fork National River and Recreation Area, Tennessee and Kentucky (BISO) developed by Stephanie O'Meara, James Winters and Georgia Hybels (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.

GRI finalization by Stephanie O'Meara.

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