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

Natchez Trace Parkway (Tennessee Portion Maps)

GRI Ancillary Map Information Document

Produced to accompany the Geologic Resources Inventory (GRI) Digital Geologic Data for Natchez Trace Parkway

natr_tn_geology.pdf

Version: 5/19/2022

Geologic Resources Inventory Map Document for Natchez Trace Parkway

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Geologic Resources Inventory Map Document

Natchez Trace Parkway, Tennessee

Document to Accompany Digital Geologic-GIS Data

natr_tn_geology.pdf

Version: 5/19/2022

This document has been developed to accompany the digital geologic-GIS data developed by the Geologic Resources Inventory (GRI) program for Natchez Trace Parkway, Tennessee (NATR).

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 Map 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. Of note, this data is only of the Tennessee portion of the parkway, excluding the portions of the Cypress Inn quadrangle that are in Tennessee.

3) **Map Unit List** – A listing of all geologic map units present on maps that comprise the 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) **Ancillary Source Map Information** – Additional source map information presented by source map.

6) **GRI Digital Data Credits** – GRI digital geologic-GIS data and ancillary map information document production credits.

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

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About the NPS Geologic Resources Inventory Program

Background

The Geologic Resources Inventory (GRI) provides geologic map data and pertinent geologic information to support resource management and science-informed decision making in more than 270 natural resource parks throughout the National Park System. Geologic resources for management consideration include both the processes that act upon the Earth and the features formed as a result of these processes. Geologic processes include: erosion and sedimentation; seismic, volcanic, and geothermal activity; glaciation, rockfalls, landslides, and shoreline change. Geologic features include mountains, canyons, natural arches and bridges, minerals, rocks, fossils, cave and karst systems, beaches, dunes, glaciers, volcanoes, and faults.

The GRI is one of 12 inventories funded by the National Park Service (NPS) Inventory and Monitoring Program. The Geologic Resources Division of the NPS Natural Resource Stewardship and Science Directorate administers the GRI. The NPS Geologic Resources Division partners with the Colorado State University Department of Geosciences to produce GRI products. Many additional partners participate in the GRI process by contributing source maps or reviewing products.

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

Products

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

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

For detailed information regarding GIS parameters such as data attribute field definitions, attribute field codes, value definitions, and rules that govern relationships found in the data, refer to the NPS Geology-GIS Data Model document available at: https://www.nps.gov/articles/gri-geodatabase-model.htm

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

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

For more information about the Geologic Resources Inventory Program visit the GRI webpage: https://www.nps.gov/subjects/geology/gri.htm. At the bottom of that webpage is a "Contact Us" link if you need additional information. You may also directly contact the program coordinator:

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

GRI Digital Maps and Source Map Citations

The GRI compiled digital geologic-GIS map for Natchez Trace Parkway, Tennessee (NATR). Of note, this data is only of the Tennessee portion of the parkway, excluding the portions of the Cypress Inn quadrangle that are in Tennessee.

Digital Geologic-GIS Map of the Tennessee portion of Natchez Trace Parkway, Tennessee (*GRI MapCode NATR*)

The above map was compiled from fifteen 7.5' quadrangle component GRI digital geologic-GIS maps, each listed below. With each map is also listed the source map used to produced the individual component GRI digital geologic-GIS map. The full extent of each source map was used, and all geologic features within the extent were captured.

Digital Geologic-GIS Map of the Bellevue Quadrangle, Tennessee (*GRI MapCode BELV*)

Wilson, C.W., Jr., and Miller, R.A., 1980, Geologic Map and Mineral Resources Summary of the Bellevue Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 308-SW, scale 1:24,000 (Bellevue Quadrangle). (*GRI Source Map ID 68220*).

Digital Geologic-GIS Map of the Collinwood Quadrangle, Tennessee (*GRI MapCode COLL*)

Marcher, M.V., Barnes, R.H., and Colvin, J.M., Jr., 1963, Geologic Map and Mineral Resources Summary of the Collinwood Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 43-NW, scale 1:24,000 (Collinwood Quadrangle). (*GRI Source Map ID 68267*).

Digital Geologic-GIS Map of the Fairview Quadrangle, Tennessee (*GRI MapCode FAIR*)

Wilson, C.W., Jr., 1972, Geologic Map and Mineral Resources Summary of the Fairview Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 56-NE, scale 1:24,000 (Fairview Quadrangle). (*GRI Source Map ID 68304*).

Digital Geologic-GIS Map of the Gordonsburg Quadrangle, Tennessee (*GRI MapCode GORD*)

Colvin, J.M., Jr., and Marcher, M.V., 1964, Geologic Map and Mineral Resources Summary of the Gordonsburg Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 50-SW, scale 1:24,000 (Gordonsburg Quadrangle). (*GRI Source Map ID 68324*).

Digital Geologic-GIS Map of the Greenfield Bend Quadrangle, Tennessee (*GRI MapCode GRBE*)

Wilson, C.W., Jr., and Miller, R.A., 1965, Geologic Map and Mineral Resources Summary of the Greenfield Bend Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 50-NE, scale 1:24,000 (Greenfield Bend Quadrangle). (*GRI Source Map ID 68333*).

Digital Geologic-GIS Map of the Henryville Quadrangle, Tennessee (*GRI MapCode HNRY*)

Marcher, M.V., Lounsbury, R.E., and Larson, L.T., 1965, Geologic Map and Mineral Resources Summary of the Henryville Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 51-NW, scale 1:24,000 (Henryville Quadrangle). (*GRI Source Map ID 68342*).

Digital Geologic-GIS Map of the Leipers Fork Quadrangle, Tennessee (*GRI MapCode LEFO*)

Morrow, W.E., Wilson, C.W., Jr., and Hershey, R.E., 1693, Geologic Map and Mineral Resources Summary of the Leipers Fork Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 63-NW, scale 1:24,000 (Leipers Fork Quadrangle). (*GRI Source Map ID 68371*).

Digital Geologic-GIS Map of the Ovilla Quadrangle, Tennessee (*GRI MapCode OVIL*)

Marcher, M.V., Colvin, J.M., Jr., and Barnes, R.H., 1963, Geologic Map and Mineral Resources Summary of the Ovilla Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 42-SE, scale 1:24,000 (Ovilla Quadrangle). (*GRI Source Map ID 68436*).

Digital Geologic-GIS Map of the Primm Springs Quadrangle, Tennessee (*GRI MapCode PRSP*)

Colvin, J.M., Jr., Wilson, C.W., Jr., and Hershey, R.E., 1965, Geologic Map and Mineral Resources Summary of the Primm Springs Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 56-SW, scale 1:24,000 (Primm Springs Quadrangle). (*GRI Source Map ID 68459*).

Digital Geologic-GIS Map of the Riverside Quadrangle, Tennessee (*GRI MapCode RIVE*)

Wilson, C.W., Jr., Marcher, M.V., Colvin, J.M., Jr., and Barnes, R.H., 1962, Geologic Map and Mineral Resources Summary of the Riverside Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 42-NE, scale 1:24,000 (Riverside Quadrangle). (*GRI Source Map ID 68467*).

Digital Geologic-GIS Map of the Sunrise Quadrangle, Tennessee (*GRI MapCode SUNR*)

Colvin, J.M., Jr., 1970, Geologic Map and Mineral Resources Summary of the Sunrise Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 50-NW, scale 1:24,000 (Sunrise Quadrangle). (*GRI Source Map ID 68512).*

Digital Geologic-GIS Map of the Theta Quadrangle, Tennessee (*GRI MapCode THET*)

Wilson, C.W., Jr., Colvin, J.M., Jr., and Fullerton, D.S., 1964, Geologic Map and Mineral Resources Summary of the Theta Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 56-SE, scale 1:24,000 (Theta Quadrangle). (*GRI Source Map ID 68521*).

Digital Geologic-GIS Map of the Three Churches Quadrangle, Tennessee (*GRI MapCode THCH*)

Wilson, C.W., Jr., and Marcher, M.V., 1972, Geologic Map and Mineral Resources Summary of the Three Churches Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 34-NE, scale 1:24,000 (Three Churches Quadrangle). (*GRI Source Map ID 68522*).

Digital Geologic-GIS Map of the Waynesboro East Quadrangle, Tennessee (*GRI MapCode WAYN*)

Marcher, M.V., Wilson, C.W., Jr., Colvin, J.M., Jr., and Barnes, R.H., 1963, Geologic Map and Mineral Resources Summary of the Waynesboro East Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 42-SW, scale 1:24,000 (Waynesboro East Quadrangle). (*GRI Source Map ID 68538*).

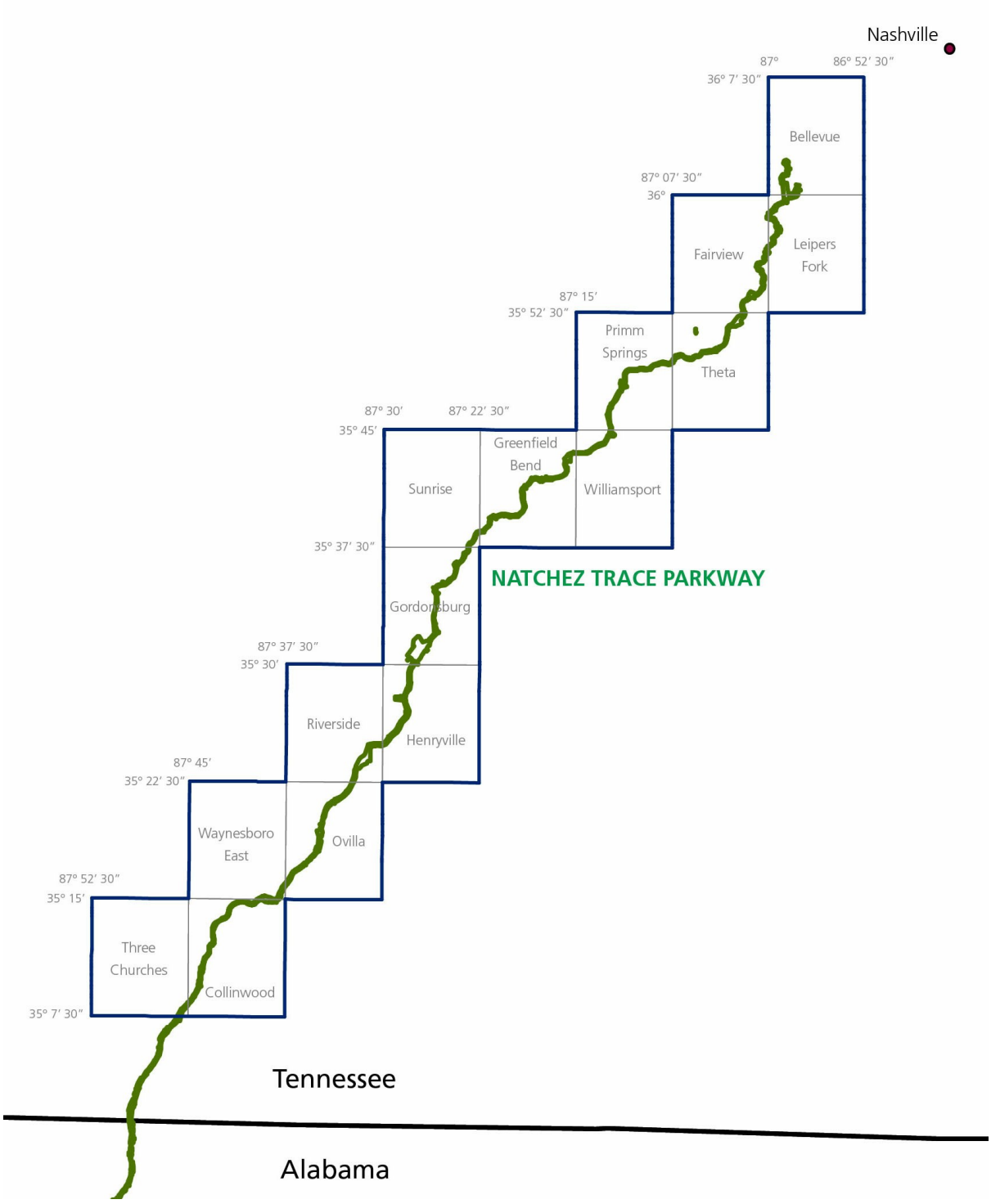
Digital Geologic-GIS Map of the Williamsport Quadrangle, Tennessee (*GRI MapCode WILL*)

Wilson, C.W., Jr., Barnes, R.H., Miller, R.A., and Jewell, J.W., 1964, Geologic Map and Mineral Resources Summary of the Williamsport Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 57-NW, scale 1:24,000 (Williamsport Quadrangle). (*GRI Source Map ID 68546*).

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

Index Map

The following index map displays the extents of the GRI digital geologic-GIS maps produced for the Tennessee portion of Natchez Trace Parkway (NATR). The compiled map of the Tennessee portion of the parkway is outlined in purple, with component 7.5' quadrangle maps and their names, as well as latitude and longitude coordinates, being displayed in gray. The boundary for Natchez Trace Parkway (as of May, 2022) is outlined in green.



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

Map Unit List

The geologic units present in the digital geologic-GIS data produced for Natchez Trace Parkway, Tennessee (NATR) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., Qal - Alluvial deposits). Units are listed from youngest to oldest. No description for water is provided. Information about each geologic unit is also presented in the GRI Geologic Unit Information (NATRUNIT) table included with the GRI digital geologic-GIS data. Some source unit symbols, names and/or ages 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. In this case a single unit symbol and name, and the unit's now recognized age, was adopted. Unit symbols, names and/or ages in a unit descriptions, or on a correlation of map units or other source map figure were not edited. If a unit symbol, name 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.

Cenozoic Era

Quaternary Period
Qal - Alluvial deposits
Qt - Terrace deposits

Mesozoic Era

Cretaceous Period
Ke - Eutaw Formation
Kt - Tuscaloosa Group, undivided

Mesozoic and Paleozoic Eras

Cretaceous and Mississippian Periods
KMtsw - Tuscaloosa Group, St. Louis Limestone and Warsaw Limestone, undivided

Mississippian Period
Msw - St. Louis Limestone and Warsaw Limestone, undivided
Mw - Warsaw Limestone
Mf - Fort Payne Formation

Mississippian and Devonian Periods
MDfc - Fort Payne Formation and Chattanooga Shale, undivided

Devonian Period
Dp - Pegram Limestone

Silurian Period
Sbp - Brownsport Formation
Sbd - Brownsport Formation and Dixon Formation, undivided
Sw - Wayne Group, undivided
Sdx - Dixon Formation
Sl - Lego Limestone
Swb - Wayne Group and Brassfield Limestone, undivided

Sla - Laurel Limestone
Slob - Laurel Limestone, Osgood Formation and Brassfield Limestone, undivided
Sbr - Brassfield Limestone

Ordovician Period
Os - Sequatchie Formation
Or - Richmond Group
Omfa - Mannie Shale, Fernvale Limestone and Arnheim Formation, undivided
Qmfl - Mannie Shale, Fernvale Limestone and Leipers Limestone, undivided
Ofl - Fernvale Limestone and Leipers Limestone, undivided
Olcy - Leipers Limestone and Catheys Formation, undivided
On - Maysville Group? and Nashville Group, undivided
Ob - Bigby Limestone
Oh - Hermitage Formation
Oc - Carters Limestone

Map Unit Descriptions

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

Qal - Alluvial deposits (Holocene and Pleistocene)

Qal - Alluvial Deposits (Pleistocene and Holocene)
Clay, silt, and sand with some gravel are found along Harpeth River, its abandoned meanders, and its tributaries. Sand and gravel, with some silt and clay, occur as scattered deposits as much as 75 feet (23 m.) above present flood plain. Description from source map: Bellevue Quadrangle

Qal - Alluvium (Quaternary)
Unsorted gravel, sand, silt, and clay possibly as much as 20 feet thick. Not mapped. Description from source map: Collinwood Quadrangle

Qal - Alluvial Deposits (Pleistocene and Recent)
Sand, silt, and clay with some gravel, poorly sorted, in the flood plains of South Harpeth River, East Fork, Bedford Creek, Leipers Fork, and their larger tributaries; deposits discontinuous and very irregular in thickness. Not mapped. Description from source map: Fairview Quadrangle

Qal - Alluvium (Quaternary)
Unsorted gravel, sand, silt, and clay, possibly as much as 20 feet thick along Swan Creek and its tributaries. Not mapped. Description from source map: Gordonsburg Quadrangle

Qal - Alluvial Deposits (Quaternary)
Unconsolidated and unsorted clay, silt, sand, and gravel along flood plain of Duck River. Alluvial deposits above the level of the flood plain, locally preserved as high as 720 feet in elevation, consist of chert sand and gravel with lesser amounts of silt and clay. Gravel ranges to cobble size, averages 1 inch to 2 inches in diameter. Some of these deposits are isolated, but most merge with flood plain alluvium. Maximum preserved thickness about 60 feet. Description from source map: Greenfield Bend Quadrangle

Qal - Alluvial Deposits (Quaternary)
Unsorted gravel, sand, silt, and clay possibly as much as 20 feet thick along the Buffalo River and its tributaries. Not mapped. Description from source map: Henryville Quadrangle

Qal - Alluvial Deposits (Quaternary)
Clay, silt, and sand with some gravel along the flood plains of the Harpeth and West Harpeth Rivers and their tributaries. Sand and gravel with some silt and clay as small scattered deposits above the level of the flood plains. Not mapped. Description from source map: Leipers Fork Quadrangle

Qal - Alluvium (Quaternary)
Alluvium Unsorted gravel, sand, silt, and clay possibly as much as 20 feet thick along some of the larger streams. Not mapped. Description from source map: Ovilla Quadrangle

Qal - Alluvium (Quaternary)
Unsorted gravel, sand, silt, and clay possibly as much as 30 feet maximum thickness along the Buffalo River and its tributaries. Not mapped. Description from source map: Riverside Quadrangle

Qal - Alluvium (Pleistocene and Recent)
Poorly sorted gravel, sand, silt, and clay, possibly as thick as 20 feet along Swan Creek and its larger tributaries. Not mapped. Description from source map: Sunrise Quadrangle

Qal - Alluvial Deposits (Pleistocene and Recent)
Chert gravel of local origin with sand, silt, and clay; poorly sorted. Description from source map: Three Churches Quadrangle

Qal - Alluvium (Quaternary)
Alluvium Unsorted gravel, sand, silt, and clay possibly as much as 20 feet thick along some of the larger streams. Not mapped. Description from source map: Waynesboro East Quadrangle

Qal - Alluvial Deposits (Quaternary)
Unconsolidated and unsorted clay, silt, and sand with some gravel, gray to brownish-orange, along flood plains of Duck River and its larger tributaries. Alluvial deposits above the levels of these flood plains, at elevations ranging from 600 to 750 feet, consist of unsorted, waterworn, very light gray to moderate brown chert cobbles, gravel, and sand, with some silt and clay; cobbles as much as 6 inches in diameter. Thickness highly variable, maximum about 40 feet. Description from source map: Williamsport Quadrangle

Qt - Terrace deposits (Quaternary)

Qt - Terrace Deposits (Quaternary)
Terrace Deposits Chert and quartz gravel, subangular to well-rounded, 14 inch to 3 inches in diameter, iron-stained, in a sand, silt, and clay matrix. Maximum thickness 5 to 10 feet. Present only along the Buffalo River. Not mapped. Description from source map: Henryville Quadrangle

Qt - Terrace Deposits (Quaternary)
Chert and quartz gravel, subangular to well-rounded, 14 inch to 3 inches in diameter, in a sand, silt, and clay matrix. Maximum thickness 5 to 10 feet. Present only along the Buffalo River, especially in the vicinity of Texas Bottoms. Not mapped. Description from source map: Riverside Quadrangle

Of note, as the unit (Qt) is not mapped on the source map, the unit is not present in the GRI digital geolgoic-GIS data. The unit is, as mentioned above, present in areas of the Henryville and Riverside quadrangles.

Ke - Eutaw Formation (Upper Cretaceous)

Ke - Eutaw (?) Sand (Cretaceous)
In the vicinity of McGlamerys Stand the Tuscaloosa Gravel is overlain by patches of reddish, very silty sand which probably are remnants of Eutaw Sand but are so deeply weathered that identification is questionable, and the outcrops are too thin and discontinuous to be mapped. Description from source map: Collinwood Quadrangle

Ke - Eutaw Formation (Upper Cretaceous)
Quartz sand, silty, light-gray to yellowish-gray (weathers red, reddish brown, and light-brown), fine- to very fine-grained, laminated to thin-bedded, mostly well-sorted, locally contains white clay-ball conglomerate, micaceous, finely glauconitic; locally at base contains scattered gravels or thin beds of gray chert gravel Description from source map: Three Churches Quadrangle

Kt - Tuscaloosa Group, undivided (Upper Cretaceous)

Kt - Tuscaloosa Gravel (Cretaceous)
Chert gravel, well rounded, 1 to 8 inches in diameter, in a tripolitic and sandy clay matrix. Bedding is not discernible and outcrops commonly have a bleached appearance. May be as much as 100 feet thick. Many of the ridges in the northeastern part of the quadrangle also are capped with patches of gravel too thin and discontinuous to be mapped. Description from source map: Collinwood Quadrangle

Kt - Tuscaloosa Gravel (Cretaceous)
Chert gravel, well-rounded, 1 to 3 inches in diameter, contains a few quartz and quartzite pebbles, in a tripolitic and sandy clay matrix. Occurs as small isolated pockets on ridges in the west-central and southeastern parts of the area but is too thin and discontinuous to be mapped. Description from source map: Gordonsburg Quadrangle

Kt - Tuscaloosa Gravel (Cretaceous)
Chert and quartz gravel, subrounded to well-rounded, 12 inch to 3 inches in diameter, in an iron-stained, sandy reddish clay matrix. Largely limited to the higher ridges in the southern part of the area, where the outcrops are too thin and discontinuous to be mapped. Description from source map: Henryville Quadrangle

Kt - Tuscaloosa Gravel (Cretaceous)
Chert gravel, well rounded, 1 to 3 inches in diameter, locally contains abundant quartz and quartzite pebbles especially in the southeastern part of the quadrangle, in a tripolitic and very sandy clay matrix. Maximum thickness 30 feet. Description from source map: Ovilla Quadrangle

Kt - Tuscaloosa Gravel (Cretaceous)
Chert gravel, well-rounded, 1 to 4 inches in diameter, contains some quartz and quartzite pebbles, in a tripolitic and sandy clay matrix. Commonly has a bleached appearance. Small isolated pockets of Tuscaloosa Gravel are present on most of the higher ridges in the area but are too thin and discontinuous to be mapped. Description from source map: Riverside Quadrangle

Kt - Tuscaloosa Formation (Upper Cretaceous)
Gravel, primarily chert with a few quartz and quartzite pebbles, well rounded, 1 to 3 inches in diameter, in a matrix of tripolitic and sandy clay. Occurs in small, isolated pockets on ridges in the northeastern and southeastern parts of the area; too thin and discontinuous to map. Description from source map: Sunrise Quadrangle

Kt - Tuscaloosa Gravel (Upper Cretaceous)
Chert gravel, white to medium-gray (stained reddish-brown, yellowish orange, and pale-red), well-rounded, 1 to 10 inches in diameter; with a few well-rounded, pitted quartz granules; in a tripolitic and sandy clay matrix. Description from source map: Three Churches Quadrangle

Kt - Tuscaloosa Gravel (Cretaceous)
Chert gravel, well-rounded, 1 to 6 inches in diameter, in a tripolitic and sandy clay matrix, locally contains a few quartz and quartzite pebbles. Maximum thickness 50 to 60 feet. Description from source map: Waynesboro East Quadrangle

Of note, the unit is referred to as the Tuscaloosa Group in the GRI digital geologic-GIS data.

KMtsw - Tuscaloosa Group, St. Louis Limestone and Warsaw Limestone, undivided (Upper Cretaceous and Middle Mississippian)

KMtsw - Tuscaloosa, St. Louis and Warsaw Formations, undifferentiated (Cretaceous and Mississippian)
Residual deposits of nodular to blocky, porous or quartzose fossiliferous chert, and well-rounded quartz and chert gravel, mixed in small slumped masses on the highest ridges in the northwest part of the quadrangle. Not mapped. Description from source map: Greenfield Bend Quadrangle

Of note, the Tuscaloosa Formation is referred to as the Tuscaloosa Group in the GRI digital geologic-GIS data. As this unit (KMtsw) is not mapped on the source map, the unit is not present in the GRI digital geolgoic-GIS data. The unit is, as mentioned above, present in an area of the Greenfield Bend quadrangle.

Msw - St. Louis Limestone and Warsaw Limestone, undivided (Middle Mississippian)

Mw - St. Louis and Warsaw Limestones (Mississippian)
St. Louis and Warsaw Limestones are represented only by blocks of chert in a yellowish or brownish sandy clay soil. Chert derived from the St. Louis is rounded nodules or angular blocks as much as 1 foot in diameter of dense light-colored chert locally containing “Lithostrotion” or Syringopora. Chert derived from the Warsaw is irregular blocks as much as 2 feet in diameter of gray porous or dense quartzose chert commonly containing abundant fossils, especially bryozoans and small horn corals. Maximum thickness 80 feet. Description from source map: Gordonsburg Quadrangle

Msw - St. Louis and Warsaw Limestones (Upper Mississippian)
Weathered chert residuum only; matrix is yellow or brown sandy clay soil. St. Louis chert consists of rounded nodules or angular blocks as much as 1 foot in diameter of dense, light-colored chert locally containing “Lithostrotion" or Syringopora. Warsaw chert consists of irregular blocks as much as 2 feet in diameter of gray, porous or dense, quartzose chert commonly containing abundant fossils, especially bryozoans and small horn corals. Description from source map: Sunrise Quadrangle

Mw - Warsaw Limestone (Middle Mississippian)

Mw - Warsaw Limestone (Upper Mississippian)
Formation entirely weathered to a rubble of angular blocks of porous, fossiliferous chert in a matrix of reddish- to yellowish-brown soil. The chert blocks are as much as 12 inches (31 cm.) thick and stained yellowish., reddish- and moderate brown to reddish-orange. Preserved only along Sullivan Ridge in the northwest corner of the quadrangle. Description from source map: Bellevue Quadrangle

Mw - Warsaw Limestone (Mississippian)
The Warsaw Limestone is represented by residuum consisting of blocks 6 inches to 1 foot in diameter of porous or quartzose fossiliferous chert. Maximum thickness 40 feet. Description from source map: Collinwood Quadrangle

Mw - Warsaw Limestone (Upper Mississippian)
In this quadrangle the Warsaw is entirely weathered to a rubble of angular blocks of porous, fossiliferous chert in a matrix of reddish- to yellowish-brown clayey soil. The chert occurs in blocks as much as 12 inches thick, stained various shades of brown and locally containing medium- to dark-gray streaks and concentric bands; some very coarse-grained. Description from source map: Fairview Quadrangle

Mw - Warsaw Limestone (Mississippian)
Warsaw Limestone is represented by residuum consisting of blocks 6 inches to 2 feet in diameter of porous or quartzose fossiliferous chert in reddish sandy clay soil. Maximum preserved thickness 70 feet. Description from source map: Henryville Quadrangle

Mw - Warsaw Limestone (Mississippian)
The Warsaw Limestone is represented by residuum consisting of blocks 6 inches to 2 feet in diameter of porous or quartzose fossiliferous chert in a yellowish sandy clay matrix. Maximum thickness 90 feet. Description from source map: Ovilla Quadrangle

Mw - Warsaw Limestone (Mississippian)
The Warsaw Limestone is represented by residuum consisting of blocks 6 inches to 1 foot in diameter of porous or quartzose fossiliferous chert in a yellowish sandy clay soil. Maximum thickness 60 feet. Description from source map: Riverside Quadrangle

Mw - Warsaw Limestone (Mississippian)
The Warsaw Limestone is represented by residuum consisting of blocks 6 inches to 2 feet in diameter of porous or quartzose fossiliferous chert in a yellowish to reddish sandy clay matrix. Preserved only on Beckett Hill, in northwest part of quadrangle. Maximum thickness 10 feet. Description from source map: Theta Quadrangle

Mw - Warsaw Limestone (Mississippian)
Warsaw Limestone is represented by residuum consisting of blocks 1 to 3 feet in diameter of light-colored, quartzose, very fossiliferous chert in a yellowish sandy clay soil. Maximum thickness 40 feet. Description from source map: Waynesboro East Quadrangle

Mf - Fort Payne Formation (Middle and Early Mississippian)

Mfp - Fort Payne Chert (Mississippian)
Upper cherty unit: Chert, dark yellowish-brown to olive gray, very rough irregular plates and granule-sized particles in a matrix of dark yellowish-brown, calcareous siltstone; contains siliceous geodes and quartz nodules 12 inch to 2 inches in diameter; weathers to yellowish granular tripolitic chert; locally contains beds 4 to 8 inches thick of dense dark brittle chert. Maximum thickness 200 feet.

Lower silty unit: Siltstone, olive-gray, calcareous, massive when fresh but weathers shaly; siliceous geodes are very abundant locally; along Double Branch and Shawnette Creek the silty unit contains much dense dark bedded chert. Along Shawnette Creek the lower part of this unit contains a single bed 1 foot to 18 inches thick of brownish-gray to olive-gray, highly glauconitic and silty crinoidal limestone which weathers to punky porous chert. May be as much as 140 feet maximum thickness.

The combined thickness of upper and lower units at any one locality averages about 280 feet. Where the upper unit is thin the lower unit is thick and vice versa, so that the composite maximum of both units is not present at any one locality. Description from source map: Collinwood Quadrangle

Mfp - Fort Payne Formation (Mississippian)
Cherty facies: Chert, olive-black to pale yellowish-brown, very rough irregular plates and granule-sized particles in a matrix of dark yellowish-brown calcareous siltstone; contains beds of dense or porous locally fossiliferous chert; in most of the area this facies is weathered to yellowish or brownish granular chert in a tripolitic matrix. Thickness 120 to 180 feet.

Siltstone facies: Siltstone, calcareous, dark yellowish brown to olive-gray, shaly or massive; contains irregular beds and nodules of dense dark chert, especially in upper part. Thickness 40 to 100 feet.

The maximum exposed thickness of cherty and siltstone facies at any one locality averages about 220 feet. Where the cherty facies is thin the siltstone facies is thick, and vice versa, so that the composite maximum is not exposed at any one locality. Description from source map: Henryville Quadrangle

MDfc - Fort Payne Formation and Chattanooga Shale, undivided (Middle and Early Mississippian and Upper and Middle Devonian)

Mfp - Fort Payne and Chattanooga Formations (Lower Mississippian and Upper Devonian)
Fort Payne Formation
Where fresh, this formation consists of siltstone, with some shale, calcareous, dolomitic, brownish-black, brownish-gray to grayish-black and olive-gray (weathers yellowish-brown), commonly hard and platy, contains lenses and blebs of dense gray- to grayish-black and brownish-black chert and small quartz geodes. Locally, near base, are beds and lenses of crinoidal limestone, light olive-gray to light-gray, fine to coarse-grained, thin- to medium-bedded, interbedded with greenish-gray and light olive-gray shale, siltstone, and chert. At base is greenish-gray shale or claystone (Maury Shale) about 1 foot (3 m.) thick, containing dark-gray phosphatic nodules. Where weathered, formation consists of a rubble of chert and siliceous residue, yellowish-orange to yellowish gray and reddish brown to yellowish-brown.

Chattanooga Shale
Shale is carbonaceous, grayish-black, very thinly laminated, fissile.Locally, at base, are several inches of brownish-gray, very fine- to medium-grained sandstone. Description from source map: Bellevue Quadrangle

Mfp - Fort Payne and Chattanooga Formations (Lower Mississippian and Upper Devonian)
Fort Payne Formation
Where fresh this formation consists of siltstone, with some shale, limy, brownish-black and brownish-gray to grayish-black and olive-gray (weathers yellowish-brown), commonly hard and platy, contains lenses and blebs of dense, gray to grayish- and brownish-black chert; contains small quartz geodes. Formation weathers to a rubble of chert and siliceous residue, yellowish-orange to yellowish-gray and reddish- to yellowish-brown. At base is greenish-gray shale or mudstone (Maury Shale), about 1 foot thick, containing dark-gray phosphatic nodules.

Chattanooga Shale
Shale, carbonaceous, grayish-black, very thinly laminated, fissile. Locally, at base, is several inches of brownish-gray, very fine-grained sandstone. Description from source map: Fairview Quadrangle

Mfp - Fort Payne Chert and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Chert
Cherty facies is chert, dusky-brown to olive-gray, rough and irregular granule-sized particles and plates, in a matrix of dark yellowish-brown calcareous siltstone; locally contains beds as much as 1 foot thick of dense dark chert. Restricted to upper part of formation. Thickness 150 to 250 feet.

Silty facies is siltstone, calcareous, brownish-gray to olive-gray, upper part is fairly massive but weathers shaly to platy and locally contains beds of dense dark chert; lower part is shaly to fissile; siliceous geodes common. The lower 1 foot to 2 feet consists of dark greenish-gray glauconitic clayey shale containing a zone of flattened phosphatic nodules at the base. Restricted to lower part of formation. Thick ness 50 to 150 feet. The combined thickness of the cherty and silty facies may be as much as 300 feet. Where the cherty facies is thin, the silty facies is thick, and vice versa, so that neither the

composite maximum nor the composite minimum is present at any one locality.

Chattanooga Shale
Shale, brownish-black, fissile, commonly pyritic, contains a few scattered sand grains in lower part; maximum known thickness 2 feet. Underlain by basal sandstone member, which is greenish-black to moderate yellowish-brown, glauconitic, iron-stained, phosphatic, very silty, fine-grained sandstone; grades laterally into “blue phosphate” rock; maxmium known thickness about 3 feet. Description from source map: Gordonsburg Quadrangle

Mfp - Fort Payne Formation and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Formation
The Fort Payne Formation in the Greenfield Bend quadrangle consists of an upper cherty facies and a lower silicastone[1] facies, which are gradational laterally and vertically.

Cherty facies is chert, dense to porous, commonly quartzose, nodular to fragmental, in a siliceous, tripolitic, and clayey matrix, all dark yellowishorange to dark yellowish brown, with some residual bedding. Thickness about 60 feet.

Silicastone facies is silicastone, siltstone, and some shale with variable calcareous and dolomitic content; silicastone is flaky and nodular, light-gray to light bluish-gray (weathers to pale yellowish-brown), thin-bedded; contains stringers, beds, and nodules of light olive-gray to dark yellowish-brown chert, from 1 inch to several inches in thickness. Thickness a bout 140 feet.

At base of formation is greenish-gray shale or mudstone (Maury Shale), 1 foot to 2 feet thick, with mediumgray to brownish-black phosphatic nodules as much as 6 inches in diameter. Fresh exposures are rare, and in most places the formation weathers to a rubble of chert, shaly flakes, and siliceous residue. Maximum preserved thickness of formation 200 feet.

[1] A sedimentary rock consisting of fragmental (silt-size) and/or precipitated silica.

Chattanooga Shale
Shale, carbonaceous, grayish-black, thinly laminated, fissile, locally contains marcasite nodules, commonly sulfur-stained, thickness 1 to 5 feet. Sandstone at base is moderate to dusky yellowish-brown, fine- to medium-grained, locally glauconitic; grades into “blue phosphate” rock, medium- to dark-gray, phosphatic and sandy, very fine- to medium-grained, locally conglomeratic and fossiliferous; thickness less than 1 foot to 3 feet. Description from source map: Greenfield Bend Quadrangle

Mfp - Fort Payne Chert and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Formation
The Fort Payne Formation in the Leipers Fork quadrangle consists of three facies-an upper cherty facies, a lower shaly facies, and locally in the northwestern corner of the quadrangle) a limestone facies. The limestone facies is 80 to 130 feet above the base of the formation and grades laterally and vertically into the cherty facies.

Cherty facies is limestone and dolomite, very siliceous, fine- to medium-grained, grading into silicastone[1] with varying degrees of calcareous and dolomitic content; facies is dusky yellowish-brown to brownish-gray, very thin- to medium-bedded, with many blebs, lenses, and thin beds of greenish-gray to grayish-black dense chert, small quartz geodes locally present, in part slightly fossiliferous, contains interbedded thin calcareous shale partings. Thickness about 200 feet.

Limestone facies is light olive-gray, medium- to very coarse-grained, fossiliferous, in part crinoidal. Thickness 0 to 50 feet.

Shaly facies is shale and siltstone, slightly calcareous, olive-gray to brownish-gray, fissile to thin-bedded, commonly hard and platy; at base is greenish-gray shale or mudstone (Maury Shale), 1 to 4 feet thick, containing phosphatic nodules. Thickness about 50 feet.
Maximum preserved thickness of formation 250 feet.

In most places the Fort Payne weathers to residuum consisting of blocks and thin slabs of yellowish-orange quartzose, porous chert, partly fossiliferous or crinoidal; blocks of greenish-gray to grayish-black dense chert as much as 6 inches thick; shaly flakes; and smaller particles of siliceous residue.

[1] A sedimentary rock consisting of fragmental (silt-size) and/or precipitated silica.

Chattanooga Shale
Shale, carbonaceous, grayish-black, thinly laminated, fissile. Sandstone at base is moderate to dusky yellowish-brown, fine- to medium-grained, less than 1 foot thick. Formation thickness about 10 feet. Description from source map: Leipers Fork Quadrangle

Mfp - Fort Payne Chert and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Chert
Upper cherty unit: Chert, dark yellowish-brown to brownish-gray, very rough irregular plates and granule-sized particles in a matrix of olive-gray, calcareous siltstone; siliceous geodes locally abundant; nodules and beds 6 inches to 1 foot thick of dense dark chert are common locally, especially in the lower part. Thickness 140-240 feet.

Lower silty unit: Siltstone, grayish-brown, shaly or platy, calcareous; contains dense nodules and irregular beds of dense dark chert; siliceous geodes common especially in upper part; lower part is more shaly and lower 2 or 3 feet becomes progressively more glauconitic downward. Maximum thickness 60-160 feet.

The combined thickness of upper and lower units at any one locality averages about 300 feet. Where the upper unit is thin, the lower unit is thick, and vice versa, so that neither the composite maximum nor the composite minimum is present at any one locality.

Chattanooga Shale
Chattanooga Shale interval in this quadrangle is represented by the Hardin Sandstone Member, which is pale yellowish-brown to olive-gray, fine-grained, well-cemented, somewhat phosphatic, iron-stained. Maximum thickness 5 feet. (Although black fissile shale may be present locally above this sandstone, it was not observed.) Description from source map: Ovilla Quadrangle

Mfp - Fort Payne Formation and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Formation
Upper part is a rubble of chert, clay and siliceous residue, yellowish-orange to yellowish-gray with some reddish-brown. Chert beds 1 to 2 feet thick are common. Maximum thickness about 200 feet.

Lower part is silicastone[1] with variable calcareous and dolomitic content, olive-gray to dark olive-gray and olive-black, very fine- to fine-grained, thick-bedded to laminated, quartz geodes prominent, weathers shaly. Thickness 20 to 80 feet.

[1] A sedimentary rock composed of fragmental (silt-size) and/or precipitated silica.

Chattanooga Shale
Shale, grayish-black to brownish-black, carbonaceous, locally pyritic and arenaceous; locally (in middle) contains large flattened phosphatic nodules as much as 1 foot in size; overlain by thin green shale with phosphatic nodules (Maury Shale). “Blue phosphate” rock at base is medium- to dark-gray, phosphatic

and sandy, fine- to medium-grained, locally conglomeratic and fossiliferous, thickness less than 1 foot to 3 feet. Maximum thickness of formation 10 feet. Description from source map: Primm Springs Quadrangle

Mfp - Fort Payne Chert and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Chert
Upper cherty unit: Chert, dusky yellowish-brown to olive gray, very rough and irregular plates and granulesized particles, in a matrix of dark yellowish-brown, calcareous siltstone; contains siliceous geodes and quartz nodules 12 inch to 1 inch in diameter; weathers to yellowish and reddish, granular, tripolitic chert; locally contains beds 6 to 10 inches thick of dense, dark brittle chert. Thickness 120 to 240 feet.

Lower silty unit: Siltstone, dark yellowish-brown to olive gray, shaly but locally massive with shaly partings; contains some dense rounded nodules and irregular beds of chert 6 to 12 inches thick, especially in upper part; locally contains a few small siliceous geodes. The lower 2 to 3 feet consists of dark greenish-gray clay shale, which contains progressively more glauconite downward and grades into sandy, greenishgray, glauconitic, limy shale containing scattered phosphatic nodules. Thickness 40 to 160 feet.

The combined thickness of upper and lower units at any one locality averages about 260 feet. Where the upper unit is thin, the lower unit is thick, and vice versa, so that neither the composite maximum nor the composite minimum is present at any one locality.

Chattanooga Shale
Chattanooga Shale interval in this quadrangle is represented by the Hardin Sandstone Member, which is fine- to medium-grained sandstone, iron-stained, well-cemented, locally glauconitic and/or phosphatic, 2 to 20 feet thick, locally may be interbedded with gray, silty shale. (Although black, fissile shale may be present locally above this sandstone, it was not observed.) Description from source map: Riverside Quadrangle

Mfp - Fort Payne and Chattanooga Formations (Lower Mississippian and Upper Devonian)
Fort Payne Formation
The Fort Payne Formation in the Sunrise quadrangle consists of an upper cherty facies and a lower siltstone facies, which grade into each other laterally and vertically.

Upper cherty facies is dusky-brown to olive-gray, rough and irregular granule-sized particles and plates of chert in a matrix of dark yellowish-brown calcareous siltstone; locally contains beds as much as 6 inches thick of dense, dark chert.

Lower silty facies is siltstone, calcareous, brownish-gray to olive-gray, shaly, in part fissile; at base is thin greenish-gray, glauconitic, clayey shale (Maury Shale), with medium-gray to brownish-black flattened phosphatic concretions as much as 20 inches in diameter.

In most areas the formation is weathered to a rubble of chert, shaly flakes and siliceous residue.

Chattanooga Shale
Shale, carbonaceous, grayish-black, thinly laminated, fissile, locally contains marcasite nodules, commonly sulfur-stained, thickness less than 1 foot to 7 feet. Sandstone at base is medium- to dark-gray and moderate to dusky yellowish-brown, fine- to medium-grained, locally conglomeratic, commonly pyritic; grades laterally into medium- to dark-gray, phosphatic, silty, very fine- to medium-grained, fossiliferous sandstone (“blue phosphate") member; thickness less than 1 foot to 3 feet. Description from source map: Sunrise Quadrangle

Mfp - Fort Payne Formation and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Formation
The Fort Payne Formation in the Theta quadrangle consists of three facies-an upper cherty facies, a middle silicastone[1] facies, and a lower shaly facies—which are gradational vertically and laterally.

[1] A sedimentary rock consisting of fragmental (silt-size) and/or precipitated silica.

Cherty facies is chert, dense to porous, thin- to medium bedded, interbedded with weathered siltstone, siliceous residue, and shaly flakes, all yellowish-brown. Thickness 0 to 75 feet; absent or thin in north.

Silicastone facies is silicastone with variable calcareous and dolomitic content, locally shaly, medium- to dark- gray and brownish-gray, thin- to mediumbedded; contains a few thin beds, scattered nodules, and blebs of dense chert, and abundant small quartz geodes. Thickness 15 to 100 feet. Grades laterally, near base, into lower shaly facies.

Shaly facies is shale with some thin-bedded silicastone and scattered thin beds of dense chert, all brownishgray and hard. Thickness 0 to 20 feet; absent in southwest. Grades laterally into silicastone facies.

At base of formation is greenish-gray shale or mudstone (Maury Shale), 1 to 4 feet thick, containing phosphatic nodules. Thickness of formation about 225 feet.

Chattanooga Shale
Shale, carbonaceous, grayish-black to brownish-black, fissile to laminated, petroliferous odor, locally pyritic, locally very slightly phosphatic. “Blue phosphate” rock at base is phosphatic and sandy, medium- to dark-gray, very fine-to medium-grained, locally conglomeratic and fossiliferous; thickness 6 inches to 2 feet. Formation thickness 4 to 15 feet. Description from source map: Theta Quadrangle

Mfp - Fort Payne and Chattanooga Formations (Lower Mississippian and Upper Devonian)
Fort Payne Formation
In this quadrangle the Fort Payne Formation consists of an upper cherty facies and a lower siltstone and shale facies.

Upper cherty facies has been weathered to yellowish-brown, granular, locally rough and irregular but in part slabby siliceous residue with pods of light-gray tripolitic residue and clay; contains various proportions of beds of dark-gray dense chert as much as 10 inches thick.

Lower siltstone and shale facies where fresh is slightly calcareous, olive gray to brownish-gray and brownish-black (weathers light-gray), commonly hard and platy; contains thin beds of brownish-black, dense chert. Thin beds of siltstone in lower part of this facies contain very fine-grained sand. Locally present in this facies are lenses of argillaceous limestone similar in color to the siltstone and shale.

At base of formation is thin greenish-gray shale, mudstone, or siltstone (Maury Shale) containing glauconite and phosphate nodules.

Chattanooga Shale
Shale, carbonaceous, grayish-black, with some medium- to dark-gray shale and siltstone. Hardin Sandstone Member at base is brown, very fine- to medium-grained, thick-bedded, commonly well-cemented. Description from source map: Three Churches Quadrangle

Mfp - Fort Payne Chert, Chattanooga Shale and Hardin Sandstone (Mississippian and Devonian)
Fort Payne Chert
Upper cherty unit: Chert, dusky yellowish-brown to olive gray, very rough irregular plates and granule-sized particles, in a matrix of dark yellowish-brown, calcareous, locally shaly siltstone; weathers to yellowish, granular, tripolitic chert; the lower and upper parts locally contain beds 4 inches to 1 foot thick of dense dark chert; a few of these chert beds contain scattered fossils, mainly crinoid fragments and bryozoans. Thickness 80-220 feet.

Lower silty unit: Siltstone, dark yellowish-brown to olive gray, shaly or platy, irregular nodules and beds of dense dark chert in upper part. Along Simmons Branch this unit contains beds of very dense, brownish-black, silty and cherty limestone containing scattered fossil fragments. The lower 2 or 3 feet consists of dark greenish-gray shale which becomes progressively more glauconitic downward into greenish clay shale containing flattened phosphatic nodules as much as 1 foot in diameter. Just north of the confluence of Fortyeight and Little Fortyeight Creeks the beds overlying the phosphatic nodules zone consist of 1 to 10 feet of fine-grained, glauconitic silty sandstone which grades laterally into dense, greenish-gray chert containing large scattered grains of glauconite. Thickness 60 to 200 feet.

The combined thickness of the upper and lower units at any one locality averages about 280 feet. Where the upper unit is thick, the lower unit is thin, and vice versa, so that neither the composite maximum nor the composite minimum is present at any one locality.

Chattanooga Shale
Shale, olive-black to brownish-black, platy to fissile, car bonaceous, pyritic; upper part becomes lighter colored and glauconitic and grades into overlying Fort Payne. Known to be present at only one locality, about 0.25 mile north of the confluence of Fortyeight and Little Forty eight Creeks. Maximum thickness 2 feet.

Hardin Sandstone Member at base is very fine- to medium-grained, dark yellowish-brown to dark yellowish-orange, iron-stained, well cemented to semifriable, somewhat phosphatic, very silty; upper 2 to 4 feet very glauconitic, locally contains thin beds and partings of sandy shale and dense dark chert. Maximum thickness 10 feet. Description from source map: Waynesboro East Quadrangle

Mfp - Fort Payne Formation and Chattanooga Shale (Mississippian and Devonian)
Fort Payne Formation
The Fort Payne Formation in the Williamsport quadrangle consists of an upper cherty facies and a lower silty facies, which are gradational vertically and laterally.

Upper cherty facies is chert, dense to porous, thin- to medium-bedded, interbedded with weathered siltstone, shale partings, and siliceous residue, all yellowishbrown; some chert in lower part of facies is light-gray speckled with medium-gray, fine-to medium-grained, fossiliferous. Maximum thickness 50 feet.

Lower silty facies is siltstone interbedded with shale partings, siliceous residue, and some tripolitic zones, with scattered thin beds, nodules, and blebs of chert, dense to granular and porous, all yellowish-brown; some chert in this facies is light-gray speckled with medium-gray, fine- to medium-grained, fossiliferous. Locally present near base of facies is shale, gray (weathers light yellowish-brown), 5 to 10 feet thick, which grades laterally and vertically into silty facies. Thickness of lower silty facies 0 to 60 feet; thickest in the southeast.

At base of formation is greenish-gray shale or mudstone (Maury Shale), 1 to 4 feet thick, containing phosphatic nodules. Fresh exposures are rare, and in most places the Fort Payne weathers to a rubble

of chert, shaly flakes, and siliceous residue, yellowish-orange to yellowish gray with some reddish-brown. Maximum preserved thickness of formation 180 feet.

Chattanooga Shale
Shale, carbonaceous, grayish-black, fissile to laminated, petroliferous odor, locally pyritic. “Blue phosphate" rock at base is phosphatic and sandy, medium- to dark-gray, very fine- to medium-grained, locally conglomeratic and fossiliferous; thickness 1 to 3 feet. Formation thickness 1 to 8 feet. Description from source map: Williamsport Quadrangle

Sbp - Brownsport Formation (Upper Silurian)

Sbp - Brownsport Formation (Middle Silurian)
Lobelville (?) Member above is limestone, fine- to medium-grained, thin- to medium-bedded, interbedded with calcareous shale, silty, light olive-gray to yellowish-gray and dusky yellow-brown, fossiliferous. Unit is not typical Lobelville lithology, but is at stratigraphic position of this member. Bob Limestone Member is medium light-gray to light brownish gray to light olive-gray, consists largely of medium-grained oolite with a matrix of fine-grained limestone; medium- to thick-bedded.

Beech River Member below is limestone, fine. to medium-grained, thin-bedded, and calcareous shale; both light olive-gray, olive-gray, medium- to medium dark-gray, brownish-gray, and dark yellowish-brown, with mottlings of grayish-olive and dusky yellow-green; basal four feet (1.2 m.) are limestone, fine- to medium-grained, thin-bedded, with thin partings of calcareous shale, slightly glauconitic.

Formation preserved only in a narrow down-faulted zone along the bluff near where U.S. Highway 70 crosses the western edge of the quadrangle. Description from source map: Bellevue Quadrangle

Sbp - Brownsport Group (Silurian)
The Brownsport Group consists of the Lobelville, Bob, and Beech River formations. Only the Beech River Formation is present in the Riverside quadrangle.

Beech River Formation
Limestone and calcareous shale, light olive-gray to greenish-gray, fine- to medium-grained, thin-bedded, with basal limestone; fossiliferous. Present only in center of quadrangle. Thickness 0 to 25 feet. Description from source map: Riverside Quadrangle

Sbp - Brownsport Group (Silurian)
Bob Limestone is pale yellowish-brown to light olive-gray, medium to very coarsely crystalline, medium-bedded, glassy in appearance. Thickness 0 to 10 feet. Beech River Formation is limestone, light olive-gray to greenish-gray, fine- to medium-grained, very thin- to thin-bedded, and calcareous shale, with basal thin- bedded limestone, fossiliferous. Thickness 0 to 30 feet. Description from source map: Waynesboro East Quadrangle

Sbd - Brownsport Formation and Dixon Formation, undivided (Silurian)

Sbd - Brownsport and Dixon Formations (Middle Silurian)
Brownsport Formation
Limestone,fine- to medium-grained, thin-bedded, and calcareous shale, both light olive-gray with some grayish red-purple.

Dixon Formation
Limestone, argillaceous, fine- to medium-grained, thin- to medium- bedded, with some shale and mudstone, all grayish-olive to greenish-gray and grayish-red. Description from source map: Three Churches Quadrangle

Sw - Wayne Group, undivided (Silurian)

Sw - Wayne Group (Middle Silurian)
Dixon Formation is mudstone, argillaceous limestone, and calcareous shale, medium-gray with light olive-gray and greenish-gray to dark greenish-gray; fine. to medium-grained, thin to thick-bedded (mudstone is only thick-bedded lithology). Formation preserved only in vicinity of fault zone on U.S. Highway 70 near west edge of quadrangle and along Buffalo Road just to the northeast.

Lego Limestone is light olive gray to medium-gray (weathers to yellowish-brown surface), fine-grained with medium-to coarse calcite crystals, medium- and evenly bedded; a few silty and dolomitic beds weather dark yellowish orange to moderate yellowish-brown.
Waldron Shale is gray or greenish-gray to olive-gray calcareous shale with thin beds of limestone; fossiliferous.

Laurel Limestone is light olive-gray to medium light-gray; fine. grained with medium-to-coarse reddish-brown calcite crystals,medium- and evenly bedded; a few silty and dolomitic beds weather dark yellowish-orange to moderate yellowish brown.
Osgood Formation is limestone, argillaceous, with calcareous shale and siltstone, light olive-gray to grayish-olive; basal part locally grayish-red to reddish-brown. Description from source map: Bellevue Quadrangle

Sw - Wayne Group (Silurian)
Wayne Group Laurel Limestone is light brownish-gray with moderate red to pale reddish brown grains, mostly fine- to medium-grained, medium and uniformly bedded. Thickness 0 to 15 feet. Osgood Formation is calcareous shale and argillaceous limestone, light olive-gray to greenish-gray, thinly bedded. Thickness 0 to 10 feet. Description from source map: Greenfield Bend Quadrangle

Sw - Wayne Group (Silurian)
Laurel Limestone at top is medium-gray to light brownish-gray with pale reddish-brown grains, fine-grained with medium to coarse calcite crystals, medium and evenly bedded. Thickness 0 to 30 feet.

Osgood Formation is calcareous shale and argillaceous limestone, greenish-gray to dark greenish-gray, basal part locally grayish-red to dark reddish-brown. Thickness 0 to 12 feet. Description from source map: Leipers Fork Quadrangle

Sw - Wayne Group (Silurian)
Laurel Limestone is light brownish-gray with moderate red to pale reddish-brown grains , fine-grained with medium to coarse calcite crystals, medium and evenly bedded. Thickness about 20 feet.

Osgood Formation is calcareous shale and argillaceous limestone, light olive-gray to greenish-gray, basal part locally grayish-red to dark reddish-brown. Thickness about 15 feet. Description from source map: Ovilla Quadrangle

Sw - Wayne Group (Silurian)
Laurel Limestone is light olive-gray with moderate to dark reddish-brown calcite crystals, very fine- to fine-grained with some coarse-grained beds, uniformly thin- to medium-bedded. Thickness 0 to 25 feet.

Osgood Formation is argillaceous limestone and siltstone interbedded with thin shale laminae, light olive-gray with some moderate reddish brown calcite crystals, very fine-to coarse-grained, thin- to medium-bedded. Small cube-shaped crystals of pyrite are common. Thickness 0 to 15 feet. Description from source map: Primm Springs Quadrangle

Sw - Wayne Group (Silurian)
Laurel Limestone is medium-gray to light brownish gray with pale reddish specks, fine-grained with medium to coarse calcite crystals, medium- and even-bedded. Thickness 0 to 30 feet.

Osgood Formation is calcareous shale and argillaceous limestone, greenish-gray to dark greenish-gray, basal part locally grayish-red to dark reddish-brown. Thickness 0 to 15 feet. Thickness of group 0 to 45 feet; present only in Penny winkle Hollow. Description from source map: Theta Quadrangle

Dp - Pegram Limestone (Middle Devonian)

Dp - Pegram Formation (Middle Devonian)
Formation commonly consists of an upper sandstone and an underlying limestone unit, each of which is locally absent. Sandstone is calcareous, various shades of gray, yellow, and brown, mostly medium-grained and saccharoidal, but ranging from fine- to coarse-grained; locally contains a variety of very coarse grains and small quartz pebbles at base; medium to thick-bedded. Limestone is very light-gray to medium light-gray, brownish-gray, and light olive-gray, locally containing pale-red, moderate orange-pink, and pale reddish brown grains; some beds are medium dark gray (weather to dark yellowish - brown); very fine-grained to coarsely crystalline, typically crinoidal; medium- to thick-bedded; some beds contain numerous small black grains; locally contains lenses or thin beds of fine. to medium-grained sandstone, and zones of pale to moderate yellowish-brown to light olive-gray calcareous shale, siltstone, and clayey-to-silty patches. Description from source map: Bellevue Quadrangle

Of note, the Pegram Formation is referred to as the Pegram Limestone in the GRI digital geologic-GIS data.

Sdx - Dixon Formation (Silurian)

Sdx - Dixon Formation (Silurian)
Limestone, argillaceous, fine- to medium-grained, thin bedded, with some shale and massive mudstone, all grayish-olive to dark greenish-gray. Shale zone is at top. Thickness 0 to 40 feet. Description from source map: Riverside Quadrangle

Sdx - Dixon Formation (Silurian)
Limestone, argillaceous, fine- to medium-grained, generally thin-bedded, with some shale and thick-bedded mudstone, all grayish-olive to dark greenish-gray; shale zone at top. Thickness 0 to 40 feet. Description from source map: Waynesboro East Quadrangle

Sl - Lego Limestone (Silurian)

Sl - Lego Limestone (Middle Silurian)
Limestone, light olive-gray and greenish-gray to pale yellowish-brown, with various concentrations of reddish-brown grains, fine-grained with medium to coarse calcite crystals, medium-bedded and evenly bedded. Description from source map: Three Churches Quadrangle

Swb - Wayne Group and Brassfield Limestone, undivided (Silurian)

Sw - Wayne Group without Dixon Formation (Silurian)
Lego Limestone is olive-gray to yellowish-brown with reddish-brown specks, mostly fine- to medium-grained, medium and uniformly bedded, with thin shale breaks near the top. Thickness 0 to 30 feet.

Waldron Shale is calcareous shale with thin layers of limestone, light olive-gray to dark greenish-gray. Thickness 0 to 5 feet.

Laurel Limestone is light brownish-gray with moderate red to pale reddish-brown specks, mostly fine- to medium-grained, medium and uniformly bedded. Thickness 0 to 30 feet.

Osgood Formation is calcareous shale and argillaceous limestone, light olive-gray, basal part locally grayish red to dark reddish-brown. Thickness 0 to 15 feet.

Brassfield Limestone is light olive-gray, fine- to medium grained, thinly bedded, with lenses of chert and green grains of glauconite. Thickness 0 to 15 feet. Description from source map: Riverside Quadrangle

Sw - Wayne Group and Brassfield Limestone (Silurian)
Lego Limestone is olive-gray to yellowish-brown with reddish brown grains , fine-grained with medium to coarse calcite crystals, medium and evenly bedded, with thin shale breaks near top. Thickness 0 to 30 feet.

Waldron Shale is calcareous shale with thin layers of limestone, light olive-gray to dark greenish-gray. Thickness 0 to 2 feet.

Laurel Limestone is light brownish-gray with moderate red to pale reddish-brown grains, fine-grained with medium to coarse calcite crystals, medium and evenly bedded. Thickness about 30 feet.

Osgood Formation is calcareous shale and argillaceous limestone, light olive-gray, basal part locally red dish. Thickness about 15 feet.

Brassfield Limestone is light olive-gray, fine- to medium grained, thin-bedded, with lenses of chert and green grains of glauconite. Thickness about 15 feet. Description from source map: Waynesboro East Quadrangle

Sla - Laurel Limestone (Silurian)

Sl - Laurel Limestone (Middle Silurian)
Limestone, crystalline, light olive-gray with coarse grains of dark reddish brown calcite, fine- to coarse-grained, thin- to medium-bedded, evenly bedded. Crops out only along Bear Creek, in extreme northwestern part of quadrangle. Description from source map: Sunrise Quadrangle

Slob - Laurel Limestone, Osgood Formation and Brassfield Limestone, undivided (Silurian)

Su - Laurel, Osgood and Brassfield Formations (Middle and Lower Silurian)
Laurel Limestone
Limestone, light olive-gray to medium-light-gray and light brownish-gray with scattered pale reddish-brown grains, fine-grained with medium to coarse calcite crystals, medium-bedded and evenly bedded.

Osgood Formation
Limestone, argillaceous, with calcareous shale and mudstone, greenish gray to light olive-gray.

Brassfield Limestone
Limestone, light olive-gray to brownish- and yellowish-gray, very fine- to medium-grained, thin-bedded, with lenses of chert and green grains of glauconite. Description from source map: Fairview Quadrangle

Sbr - Brassfield Limestone (Lower Silurian)

Sbr - Brassfield Limestone (Lower Silurian)
Brassfield Limestone is light olive-gray to light- and medium gray, brownish-gray and pale to moderate and dark yellowishbrown; very fine. to coarse-grained; some beds are granular and contain brown and black grains; some coarse-grained beds contain pale-red, moderate orange-pink, and pale reddish-brown grains; silty and dolomitic beds weather dark yellowish-orange and moderate yellowish-brown; some beds contain patches of grayish-green silt; thin- to medium-bedded, basal bed is locally crossbedded; contains nodules and layers of dense, light-gray to black and yellowish-brown chert; glauconitic. Description from source map: Bellevue Quadrangle

Sbr - Brassfield Limestone (Silurian)
Limestone, light olive-gray, fine- to medium-grained, thin- to medium-bedded, contains chert lenses and nodules, and green grains of glauconite. Thickness 0 to 30 feet. Description from source map: Gordonsburg Quadrangle

Sbr - Brassfield Limestone (Silurian)
Limestone, light olive-gray to moderate yellowish-brown, fine- to medium-grained, thin- to medium-bedded, commonly contains green glauconite grains and scattered lenses and nodules of chert. Weathers to “sugary” appearance, with glauconite grains more prominent. Thickness 0 to 60 feet. Description from source map: Greenfield Bend Quadrangle

Sbr - Brassfield Limestone (Silurian)
Limestone, light olive-gray, very fine-to medium-grained, thin-bedded, with lenses of chert and green grains of glauconite. Thickness 0 to 30 feet. Description from source map: Leipers Fork Quadrangle

Sbr - Brassfield Limestone (Silurian)
Limestone, light olive-gray, fine- to medium-grained, thin- to medium-bedded, contains green glauconite grains and lenses of chert. Thickness 0 to 30 feet. Description from source map: Primm Springs Quadrangle

Sbr - Brassfield Limestone (Lower Silurian)
Limestone, glauconitic, light olive-gray, fine- to medium-grained, thin- to medium-bedded, evenly bedded, with lenses and nodules of chert. Description from source map: Sunrise Quadrangle

Sbr - Brassfield Limestone (Silurian)
Limestone, light olive-gray, very fine- to medium grained, thin-bedded, with thin beds and lenses of chert, and green grains of glauconite. Thickness 0 to 60 feet; present in southwest and west-center. Description from source map: Theta Quadrangle

Os - Sequatchie Formation (Upper Ordovician)

Os - Sequatchie Formation (Upper Ordovician)
Shale is medium dark-gray, olive-gray, dark yellowish-brown and brownish-gray; limestone (Fernvale limestone facies), is pale. to dark yellowish-brown, brownish-gray, olive-gray, and medium-gray, with various concentrations of grayish reddish-brown, yellow-green, pale-red, moderate orange-pink, and pale red-brown grains; medium- to coarse-grained; medium-bedded, irregularly bedded. Lenses within this facies are grayish-red to reddish brown, hematitic; siltstone, calcareous shale, and mudstone with argillaceous limestone, light olive-gray to greenish-gray, thin- to medium-bedded; and limestone, medium-gray and brownish-gray, argillaceous, nodular and shaly, thin-bedded with thin shale partings. Description from source map: Bellevue Quadrangle

Or - Richmond Group (Upper Ordovician)

Or - Richmond Group (Ordovician)
Mannie Shale at top, calcareous, olive-gray to dark greenish-gray (weathers dusky-yellow to light olivebrown), with argillaceous limestone. Thickness 0 to 15 feet.

Fernvale Limestone is medium-gray to light olive-gray with reddish-brown and yellow-green grains, coarsely crystalline, medium and irregularly bedded. Thickness 0 to 30 feet.

Arnheim Formation at base is limestone, nodular and shaly, medium-gray to dark-gray with some brownish-gray, thin-bedded, fossiliferous. Thickness 0 to 5 feet.

Thickness of group 0 to 30 feet. Description from source map: Leipers Fork Quadrangle

Or - Richmond Group (Ordovician)
Mannie Shale is calcareous and clayey, light olive-gray to olive-gray, with lenses and nodules of fossiliferous, fine- to coarse-grained limestone 2 to 6 inches thick. Thickness 0 to 8 feet.

Fernvale Limestone is light olive-gray with pale reddish brown calcite crystals, coarse- to very coarse-grained, thin- to medium-bedded, irregularly bedded, crossbedded. Thickness 0 to 25 feet. Description from source map: Primm Springs Quadrangle

Or - Richmond Group (Ordovician)
Mannie Shale is calcareous, light-olive to grayish-green (weathers dusky-yellow to light olive-brown), with argillaceous limestone. Thickness 12 to 15 feet. Fernvale Limestone is light olive-gray to pale-olive with dark yellowish-orange to dusky-yellow specks, coarsely crystalline, massively and irregularly bedded, locally phosphatic. Thickness 15 to 25 feet. Description from source map: Riverside Quadrangle

Or - Richmond Group (Ordovician)
Mannie Shale is slightly calcareous, olive-gray to dark greenish-gray (weathers dusky yellow to light olivebrown). Thickness 0 to 10 feet; locally present in west-center and southwest. (Formation locally present in northeast, ranging to 5 feet thick, and is mapped with Leipers Formation in that area.)

Fernvale Limestone is medium-gray to light olive-gray with reddish-brown and yellow-green grains, coarsely crystalline, medium-bedded, irregularly bedded. Thickness 0 to 25 feet; present in west-center and southwest.

Thickness of group 0 to 30 feet. Description from source map: Theta Quadrangle

Or - Richmond Group (Ordovician)
Mannie Shale is calcareous, light-olive to grayish-green (weathers dusky-yellow to light olive-brown), with shaly limestone. Thickness about 15 feet. Fernvale Limestone is pale yellowish-brown to light olive gray to medium-gray, with moderate yellow-green and pale reddish brown grains, coarsely to very coarsely crystalline, medium and irregularly bedded. Thickness about 15 feet. Description from source map: Waynesboro East Quadrangle

Omfa - Mannie Shale, Fernvale Limestone and Arnheim Formation, undivided (Upper Ordovician)

Omfa - Mannie, Fernvale and Arnheim Formations (Upper Ordovician)
Mannie Shale
Shale, calcareous, olive- to greenish-gray (weathers dusky-yellow to light olive-brown), with thin beds of argillaceous limestone.

Fernvale Limestone
Limestone, light olive-gray and medium-light-gray to brownish-gray and dark-gray, pale to moderate brown, and pale to dark yellowish-brown with grains and pellets of moderate-brown and dark yellowishorange, medium- to coarse-grained, medium-bedded, and irregularly bedded.

Arnheim Formation
Limestone, nodular and shaly, medium- to dark-gray with some brownish gray, thin-bedded. Exposures are rare. Description from source map: Fairview Quadrangle

Qmfl - Mannie Shale, Fernvale Limestone and Leipers Limestone, undivided (Upper Ordovician)

Omfl - Mannie, Fernvale and Leipers Formations (Upper Ordovician)
Because the Mannie and Fernvale are very thin and only preserved locally, they are mapped with the Leipers.

Mannie Shale is calcareous, clayey, yellowish-gray to grayish yellow green, thinly laminated, commonly fossiliferous.

Fernvale Limestone is bioclastic, light olive-gray, coarse- to very coarse grained, thin- to medium-bedded, irregularly bedded, crossbedded, fossiliferous. Along Horse Branch in the south-central part of the quadrangle the Fernvale is ferruginous.

Leipers Limestone is crystalline to silty, olive-gray to dark yellowish brown, fine- to coarse-grained, thin- to thick-bedded, crossbedded, phosphatic, commonly fossiliferous in lower part; weathers to brown phosphatic residuum. Description from source map: Sunrise Quadrangle

Ofl - Fernvale Limestone and Leipers Limestone, undivided (Upper Ordovician)

Ol - Fernvale Limestone and Leipers Formation (Ordovician)
Fernvale Limestone is calcarenite, light olive-gray, coarse- to very coarse-grained, unevenly bedded, thin- to medium-bedded, crossbedded, fossiliferous. Thickness 0 to 10 feet.

Leipers Formation is mostly crystalline limestone with a few silty, nodular shaly beds, olive-gray to dark yellowish-brown, very fine- to very coarse-grained, thin- to thick-bedded, crossbedded and phosphatic, fossiliferous, weathers to brown phosphatic residuum. Maximum exposed thickness about 40 feet. Description from source map: Gordonsburg Quadrangle

Olcy - Leipers Limestone and Catheys Formation, undivided (Upper Ordovician)

Olcy - Leipers and Catheys Formations (Upper and Middle Ordovician)
Limestone is dark-gray (weathers to pale yellowish-brown), fine grained, thin- to medium-bedded; limestone, argillaceous, dular and shaly, fossiliferous, medium dark-gray to brown ish-gray, thin-bedded; limestone, bioclastic, medium lightgray to brownish-gray, coarse-grained, medium-bedded, crossbedded, containing small yellowish-brown to reddishbrown phosphatic pellets (weathers to brown phosphatic residuum). Bioclastic limestone occurs as lenses in the upper part of this map unit, and also locally in a thin zone near the base. Basal beds are shaly limestone and calcareous shale that contain abundant Constellaria.Description from source map: Bellevue Quadrangle

Olcy - Leipers and Catheys Formations (Upper and Middle Ordovician)
Limestone, medium-dark-gray to brownish-gray, argillaceous, nodular and shaly, thin-bedded; limestone, dark-gray (weathers pale yellowish-brown), fine-grained; near base (and also in lenses above) is calcarenite, medium-light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum; basal few feet is calcareous shale containing abundant bryozoans (Constellaria). Description from source map: Fairview Quadrangle

Olcy - Leipers and Catheys Formations (Ordovician)
Leipers to the west is principally calcarenite, medium light-gray to brownish-gray (weathers grayish-orange to pale yellowish-brown), medium- to coarsegrained, medium-bedded but with very thick bed at base and near middle, crossbedded, fossiliferous, contains very pale-orange to pale yellowish-brown phosphate pellets, weathers to brown phosphatic residuum. To the east Leipers is mostly limestone, nodular, shaly, and fossiliferous, medium light-gray to medium dark-gray, fine-grained, thin- to mediumbedded. Calcarenite and nodular limestone facies are interbedded, principally in central part of quadrangle; very thick phosphatic calcarenite bed at base is persistent throughout quadrangle. Near base is mudstone, slightly fossiliferous, interbedded with very thin lenses of fine-grained limestone; 2 to 8 feet thick, persistent throughout quadrangle. Formation thickness 20 to 160 feet.

Catheys to the west is principally calcarenite, very similar to Leipers calcarenite except contains more thin beds. To the east Catheys is mostly limestone, slabby, nodular, argillaceous, fossiliferous, light- to medium-gray, fine- to medium-grained, thin- to medium-bedded, with some zones of highly fossiliferous calcareous shale, basal zone contains abundant Constellaria bryozoans. Calcarenite and nodular limestone facies are interbedded, principally in central part of quadrangle; phosphatic calcarenite zone near base is persistent throughout quadrangle. For mation thickness 40 to 120 feet, Combined thickness of Leipers and Catheys 60 to 220 feet. Description from source map: Greenfield Bend Quadrangle

Olcy - Leipers and Catheys Formations (Ordovician)
Limestone, medium dark-gray to brownish-gray, argillaceous, nodular and shaly, thin-bedded, fossiliferous; limestone, dark-gray (weathers pale yellowishbrown), fine-grained, thin- to medium-bedded; calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum; and thin zones of limestone, clayey, medium-gray (weathers to light-gray surface), cryptocrystalline, dense, medium-bedded, breaks with conchoidal fracture, present only in the north. Basal beds contain abundant Constellaria. Thickness 100 to 175 feet.

Description from source map: Leipers Fork Quadrangle

Olcy - Leipers and Catheys Formations (Ordovician)
Limestone, argillaceous, nodular and shaly, and crystal line, olive-gray and medium dark-gray to brownish gray, very fine- to very coarse-grained, thick- to thin-bedded, fossiliferous, with phosphatic matrix; top of formation contains an abundance of large brachiopods (Platystrophia ponderosa zone); limestone, medium dark-gray to dark-gray (weathers pale yellowish-brown), fine-grained, thin- to mediumbedded; calcarenite, dark yellowish-brown to light olive-gray, medium- to very coarse-grained, thin- to medium-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum. Commonly present in lower part of formation is shaly limestone which typically contains large numbers of bryozoans (Constellaria zone). Maximum thickness of formation about 200 feet. Description from source map: Primm Springs Quadrangle

Olcy - Leipers and Catheys Formations (Ordovician)
Leipers Formation in upper part is limestone, argillaceous, nodular and shaly, medium dark-gray to brownish-gray, very fine- to medium-grained, thin-bedded, fossiliferous; lower part is limestone, medium light-gray to brownish-gray, medium- to coarse-grained, thin- to medium-bedded, crossbedded, locally phosphatic (weathers to brown phosphatic residuum). Near base of formation is mudstone, slightly calcareous, partly shaly, light- to dark-gray, slightly fossiliferous, with interbedded very thin lenses of fine-grained limestone; thickness 2 to 8 feet. Locally near base in northeast is limestone, siliceous, dusky yellowish-brown, very fine- to fine-grained, thin- to medium-bedded. Formation thickness 30 to 100 feet.

Catheys Formation is limestone, argillaceous, slabby and nodular, gray to brownish-gray, fine- to mediumgrained, thin- and even-bedded, fossiliferous; and calcarenite, medium light-gray to brownish-gray, fine- to coarse-grained, thin- to medium-bedded, crossbedded, composed largely of fossil fragments, contains small pellets of brown phosphate. Commonly present at base of formation is shaly limestone and calcareous shale, gray to brownish-gray, fine-grained, which typically contains large numbers of bryozoans (Constellaria zone). Thickness 50 to 100 feet.

Thickness of combined formations 100 to 200 feet. Description from source map: Theta Quadrangle

Olcy - Leipers and Catheys Formations (Ordovician)
Leipers Formation in upper part is limestone, argillaceous, nodular and shaly, medium dark-gray to brownish-gray, very fine- to coarse-grained, thinbedded, fossiliferous; lower part is calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum. Near base of formation is mudstone, slightly calcareous, partly shaly, light- to dark-gray, slightly fossiliferous, with interbedded very thin lenses of fine-grained limestone; thickness 2 to 8 feet. Formation thickness 20 to 140 feet.

Catheys Formation is limestone, argillaceous, slabby and nodular, gray to brownish-gray, fine- to mediumgrained, thin- and even-bedded, fossiliferous; calcarenite, medium light-gray to brownish-gray, fine-to coarse-grained, thin- to medium-bedded, crossbedded, composed largely of fossil fragments, contains small pellets of brown phosphate, weathers to brown phosphatic residuum. Commonly present at base of formation is shaly limestone and calcareous shale, gray to brownish-gray, fine-grained, which typically contains large numbers of bryozoans (Constellaria zone). Formation thickness 40 to 50 feet. Description from source map: Williamsport Quadrangle

On - Maysville Group? and Nashville Group, undivided (Upper Ordovician)

Omn - Maysville and Nashville Groups (Ordovician)
Limestone, medium dark-gray, sandy and argillaceous, weathers brown or buff, fine-grained, thin-bedded or laminated with shale partings; and medium- to coarse-grained, nodular to massive and crossbedded, fossiliferous, phosphatic limestone that weathers to brown phosphatic residuum. Only upper few feet exposed. Description from source map: Riverside Quadrangle

Ob - Bigby Limestone (Upper Ordovician)

Obc - Bigby-Cannon Limestone (Middle Ordovician)
The Bigby-Cannon Limestone in this quadrangle consists of the Bigby limestone, Dove-colored limestone, and the Cannon limestone facies, which are laterally and vertically intertongued. The Bigby facies comprises the entire formation except in the southeast corner of the quadrangle, where the middle part of the formation includes all three facies.

Bigby limestone facies is bioclastic, medium light-gray to brownish gray,coarse-grained, medium-bedded, crossbedded, contains small brown to reddish brown pellets of phosphate; weathers to brown phosphatic residuum.

Dove-colored limestone facies is medium light-gray to medium gray (weathers to a characteristic light-gray surface), cryptocrystalline, medium and evenly bedded, brittle, breaks with pronounced conchoidal fracture, contains specks and stringers of clear calcite.

Cannon limestone facies is medium dark-gray to brownish-black, microcrystalline to medium-grained, thin- to medium-bedded. Description from source map: Bellevue Quadrangle

Obc - Bigby-Cannon Limestone (Middle Ordovician)
Only the Bigby limestone facies of the Bigby-Cannon occurs in this quadrangle. It is calcarenite, medium-light-gray to brownish-gray, coarsegrained, medium-bedded, crossbedded, contains brown phosphate pellets. Description from source map: Fairview Quadrangle

Obc - Bigby-Cannon Limestone (Ordovician)
The Bigby-Cannon Limestone in the Greenfield Bend quadrangle consists only of the Bigby limestone facies. Bigby limestone facies is calcarenite, medium-gray to light brownish-gray (weathers grayish-orange to pale yellowish-brown), medium- to coarse-grained, medium-bedded, crossbedded, contains very paleorange to pale yellowish-brown phosphate pellets, weathers to brown phosphatic residuum. Interbedded with laminated argillaceous limestone facies of Hermitage in vicinity of Shady Grove. Upper part of formation characterized by abundance of Rafinesquina. Thickness 50 to 80 feet. Description from source map: Greenfield Bend Quadrangle

Obc - Bigby-Cannon Limestone (Ordovician)
The Bigby-Cannon Limestone in the Leipers Fork quadrangle consists of three facies—the Cannon limestone, Dove-colored limestone, and Bigby limestone which replace each other laterally and vertically. In most places the Bigby limestone facies comprises the upper and lower parts of the formation; the Dovecolored limestone and Cannon limestone facies comprise most of the middle part of the formation, except in the northern and western portions of the quadrangle, where the Bigby also is present in the middle part. The formation ranges in thickness from 50 to 90 feet, thickens eastward.

Cannon limestone facies is medium dark-gray to brownish-black, microcrystalline to medium-grained, thin- to medium-bedded, evenly bedded. Composite thickness 0 to 15 feet; absent in the west.

Dove-colored limestone facies is medium light-gray to medium-gray (weathers to light-gray surface), cryptocrystalline, medium and evenly bedded, brittle, breaks with pronounced conchoidal fracture, contains specks and stringers of clear calcite. Composite thickness 0 to 50 feet; absent in the west.

Bigby limestone facies is calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, contains brown phosphate pellets, intercalations of sandy beds near the base to the west, weathers to brown phosphatic residuum. Composite thickness 25 to 50 feet; thickens eastward. Description from source map: Leipers Fork Quadrangle

Obc - Bigby-Cannon Limestone (Ordovician)
The Bigby-Cannon Limestone in the Primm Springs quadrangle consists only of the Bigby limestone facies. Bigby limestone facies is calcarenite, olive-gray to dark yellowish-brown, medium- to coarse-grained, medium- to thick-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum. Thickness 20 to 50 feet. Description from source map: Primm Springs Quadrangle

Obc - Bigby-Cannon Limestone (Ordovician)
The Bigby-Cannon Limestone in the Theta quadrangle consists of three facies the Cannon limestone, Dovecolored limestone, and Bigby limestone which replace each other laterally and vertically. Formation thickness 40 to 60 feet; crops out only in southeast and southwest.

Cannon limestone facies is medium dark-gray to brownish-black, microcrystalline to medium-grained, thin- to medium-bedded, evenly bedded. Composite thickness 0 to 5 feet.

Dove-colored limestone facies is medium light-gray to medium-gray (weathers to light-gray surface), cryptocrystalline, medium-bedded, evenly bedded, brittle, breaks with pronounced conchoidal fracture, contains specks and stringers of clear calcite. Composite thickness 0 to 5 feet.

Bigby limestone facies is calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, contains brown phosphate pellets, weathers to brown phosphatic residuum. Composite thickness 40 to 60 feet. Description from source map: Theta Quadrangle

Obc - Bigby-Cannon Limestone (Ordovician)
The Bigby-Cannon Limestone in the Williamsport quadrangle consists only of the Bigby limestone facies. Bigby limestone facies is calcarenite, medium light-gray to brownish-gray, medium- to coarse-grained, medium-bedded, crossbedded, contains brown phosphate pellets, weathers to brown phosphatic residuum. Gradational with underlying Hermitage. Thickness 40 to 80 feet. Description from source map: Williamsport Quadrangle

Of note, the Bigby-Canon Limestone is simply referred to as the Bigby Limestone, as per National Geologic Map Database Lexicon and other sources.

Oh - Hermitage Formation (Upper Ordovician)

Oh - Hermitage Formation (Middle Ordovician)
Limestone contains silt and shale partings, medium-gray to brownish gray, thin' to medium-bedded, and shells of the brachiopod Resserella (formerly Dalmanella) fertilis. Description from source map: Bellevue Quadrangle

Oh - Hermitage Formation (Ordovician)
Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, fine- to coarse-grained, medium- to thick-bedded, characterized by numerous shells of the

brachiopod Resserella fertilis (formerly Dalmanella fertilis), locally contains thin lenses and nodules of dense chert. Thickness 0 to 10 feet. Laminated argillaceous limestone facies is sandy, medium-gray to dark-gray (weathers to pale and dark yellowish-brown), very fine- to medium- grained, laminated to thin-bedded with thin shale partings. Thickness 60 to 80 feet. Formation thickness 60 to 80 feet. Description from source map: Greenfield Bend Quadrangle

Oh - Hermitage Formation (Ordovician)
Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, medium-bedded, characterized by numerous shells of the brachiopod Resserella fertilis (formerly Dalmanella fertilis). Thickness 10 to 20 feet; grades into underlying member to the west.Laminated argillaceous limestone facies is silty to sandy, medium-gray to dark-gray (weathers pale to dark yellowish-brown), very fine- to medium-grained, thin-bedded to laminated with thin shale partings. About 60 feet exposed. Description from source map: Leipers Fork Quadrangle

Oh - Hermitage Formation (Ordovician)
Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, fine- to coarse-grained, thin- to medium-bedded, characterized by numerous shells of the brachiopod Resserella fertilis (formerly Dalmanella fertilis). Thickness 10 to 15 feet. Laminated argillaceous limestone facies is sandy, olive gray and medium-gray to dark-gray (weathers to pale and dark yellowish-brown), very fine- to mediumgrained, laminated to thin-bedded with thin shale partings, prominent flow structures (rolled-up zones). Maximum exposed thickness 10 feet. Description from source map: Primm Springs Quadrangle

Oh - Hermitage Formation (Ordovician)
Hermitage Formation Coquina facies is limestone with disseminated silt and thin shale partings, medium-gray to brownish-gray, medium-bedded, characterized by numerous shells of the brachiopod Resserella fertilis (formerly Dalmanella fertilis). Maximum exposed thickness 15 feet; outcrops only in southeast, in valley of Carters Creek. Description from source map: Theta Quadrangle

Oh - Hermitage Formation (Ordovician)
Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, medium-bedded, characterized by numerous shells of the brachiopod Resserella fertilis (formerly Dalmanella fertilis). Thickness 0 to 20 feet. Laminated argillaceous limestone facies is sandy, medium-gray to dark-gray (weathers to pale and dark yellowish-brown), very fine- to medium-grained, laminated to thin-bedded with thin shale partings. Thickness about 40 to 60 feet. Formation thickness 40 to 70 feet. Description from source map: Williamsport Quadrangle

Oc - Carters Limestone (Upper Ordovician)

Oc - Carters Limestone (Ordovician)
Limestone, medium light-gray to brownish-gray and yellowish-brown, cryptocrystalline to medium-grained, medium- to thick-bedded, evenly bedded, with minor amounts of magnesian limestone as small irregular mottlings and thin bands, and thin lenses of chert locally. Maximum exposed thickness 40 feet. Description from source map: Greenfield Bend Quadrangle

Oc - Carters Limestone (Ordovician)
Limestone, medium light-gray to brownish-gray and yellowish-brown, cryptocrystalline to very finegrained with some beds ranging up to coarse-grained, medium- to thick-bedded, even-bedded, with minor amounts of saccharoidal magnesian limestone as small irregular mottlings, and thin bands (commonly etched into relief upon weathering), and thin lenses of chert locally; some beds show conchoidal fracture. Maximum exposed thickness 50 feet. Description from source map: Williamsport Quadrangle

Ancillary Source Map Information

The following sections present ancillary source map information associated with sources used for this project. Graphics were extracted from scanned digital images of the source paper maps, and in some cases, despite efforts to improve image quality, have discolorations present.

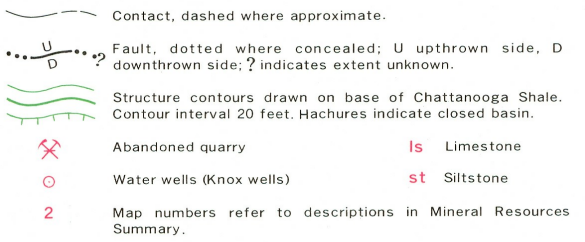
Bellevue Quadrangle

The formal citation for this source.

> Wilson, C.W., Jr., and Miller, R.A., 1980, Geologic Map and Mineral Resources Summary of the Bellevue Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 308-SW, scale 1:24,000 (*GRI Source Map ID 68220*).

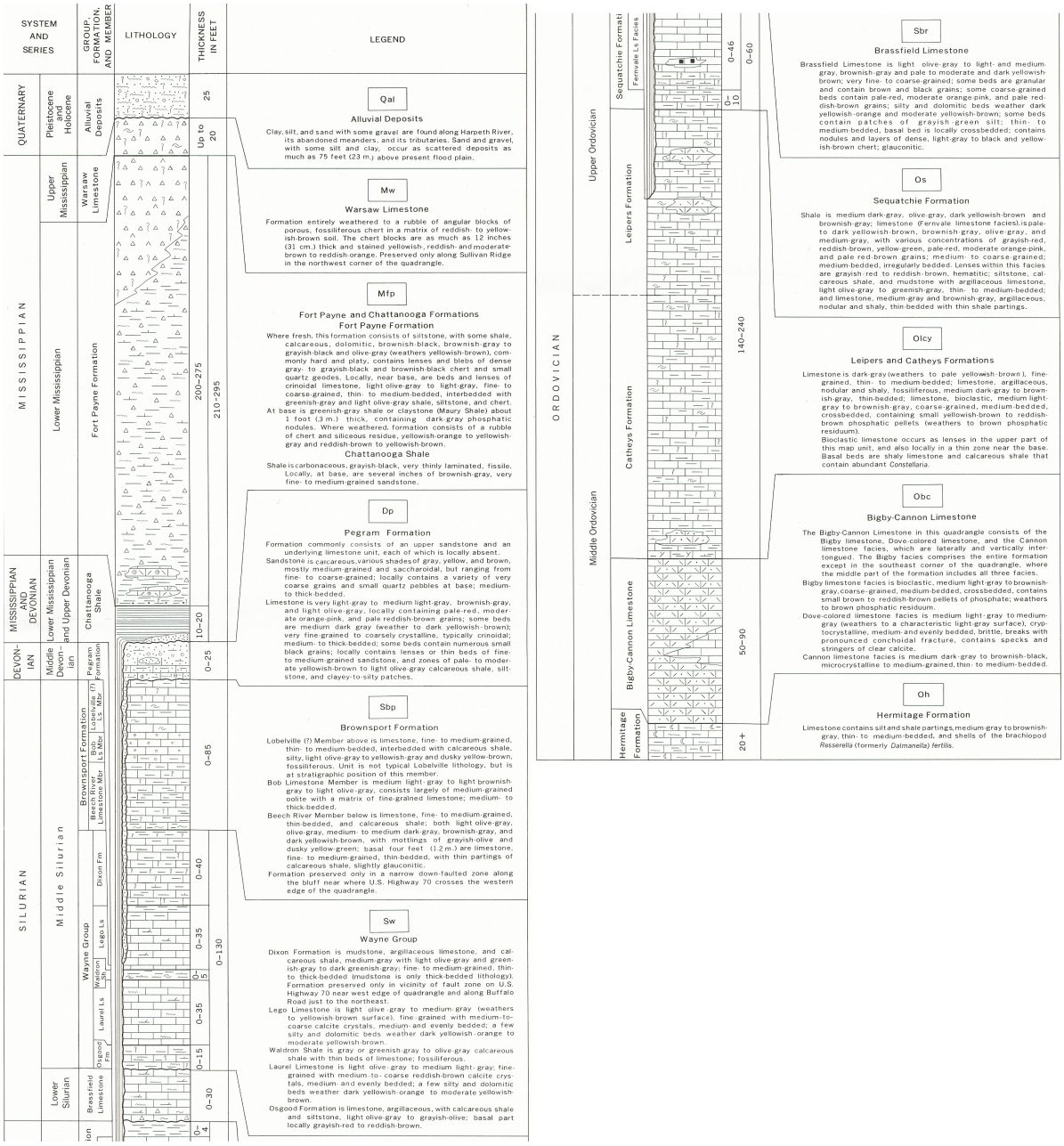
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Bellevue Quadrangle

Stratigraphic Column



Graphic from source map: Bellevue Quadrangle

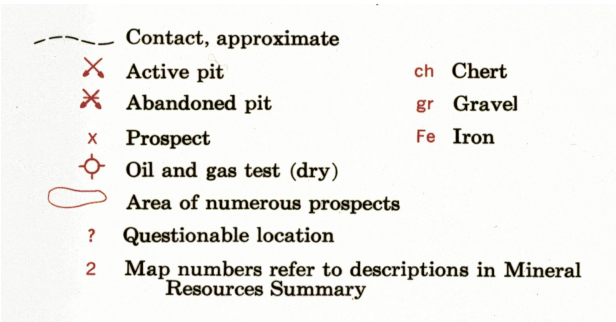
Collinwood Quadrangle

The formal citation for this source.

> Marcher, M.V., Barnes, R.H., and Colvin, J.M., Jr., 1963, Geologic Map and Mineral Resources Summary of the Collinwood Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 43-NW, scale 1:24,000 (*GRI Source Map ID 68267*).

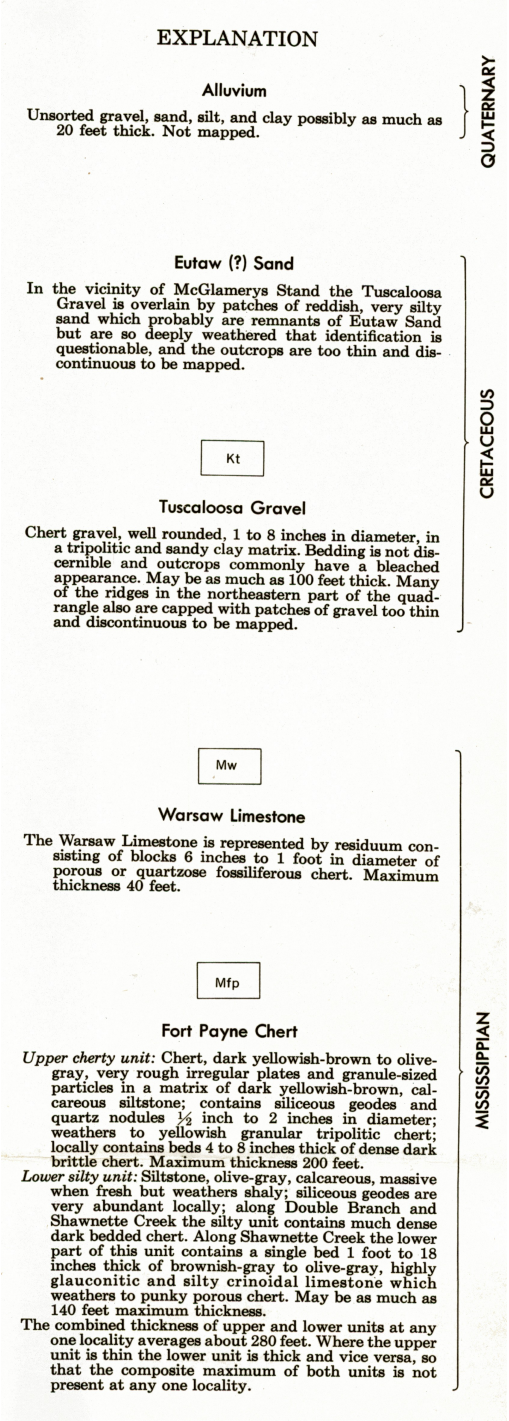
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Collinwood Quadrangle

Explanation



Graphic from source map: Collinwood Quadrangle

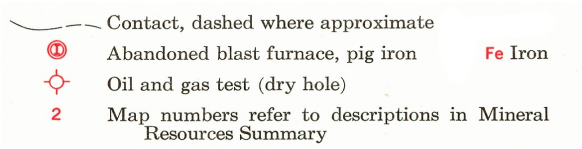
Fairview Quadrangle

The formal citation for this source.

> Wilson, C.W., Jr., 1972, Geologic Map and Mineral Resources Summary of the Fairview Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 56-NE, scale 1:24,000 (*GRI Source Map ID 68304*).

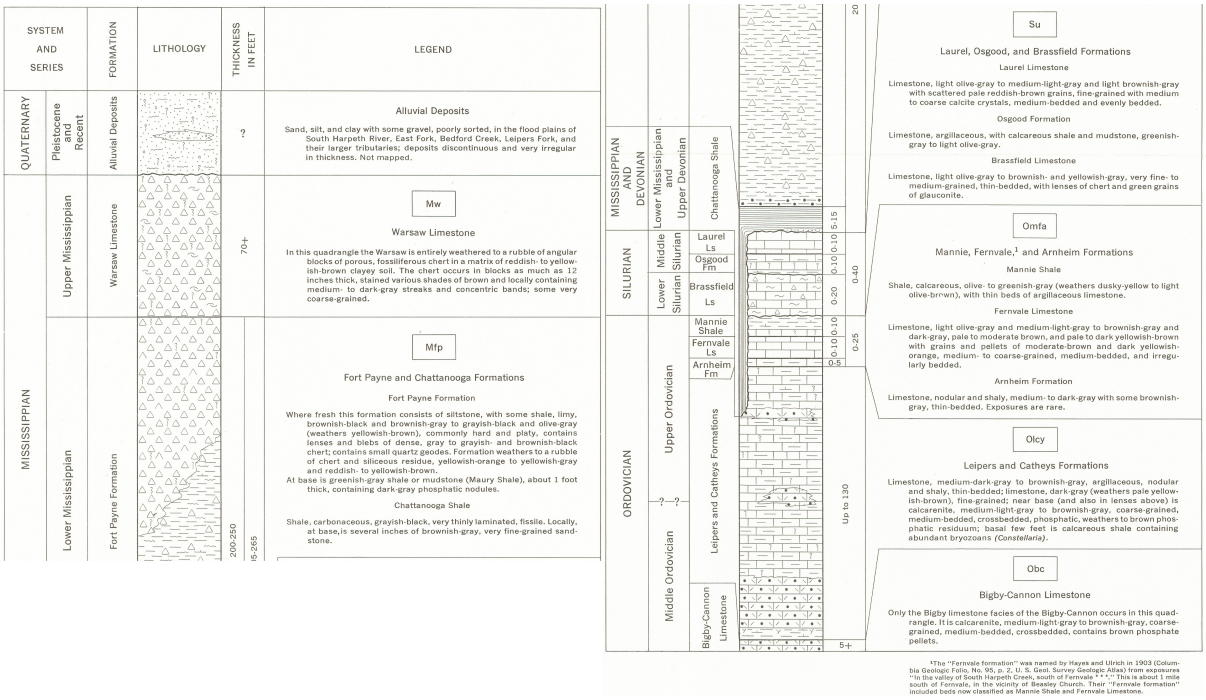
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Fairview Quadrangle

Stratigraphic Column



Graphic from source map: Fairview Quadrangle

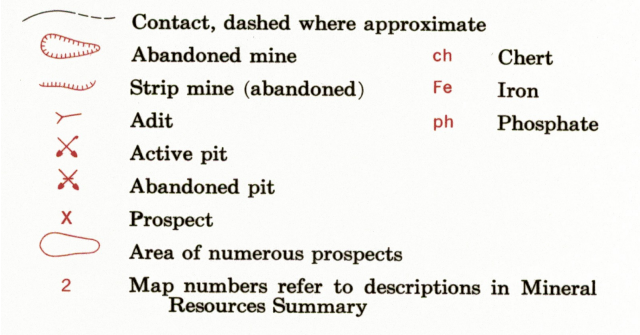
Gordonsburg Quadrangle

The formal citation for this source.

> Colvin, J.M., Jr., and Marcher, M.V., 1964, Geologic Map and Mineral Resources Summary of the Gordonsburg Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 50-SW, scale 1:24,000 (*GRI Source Map ID 68324*).

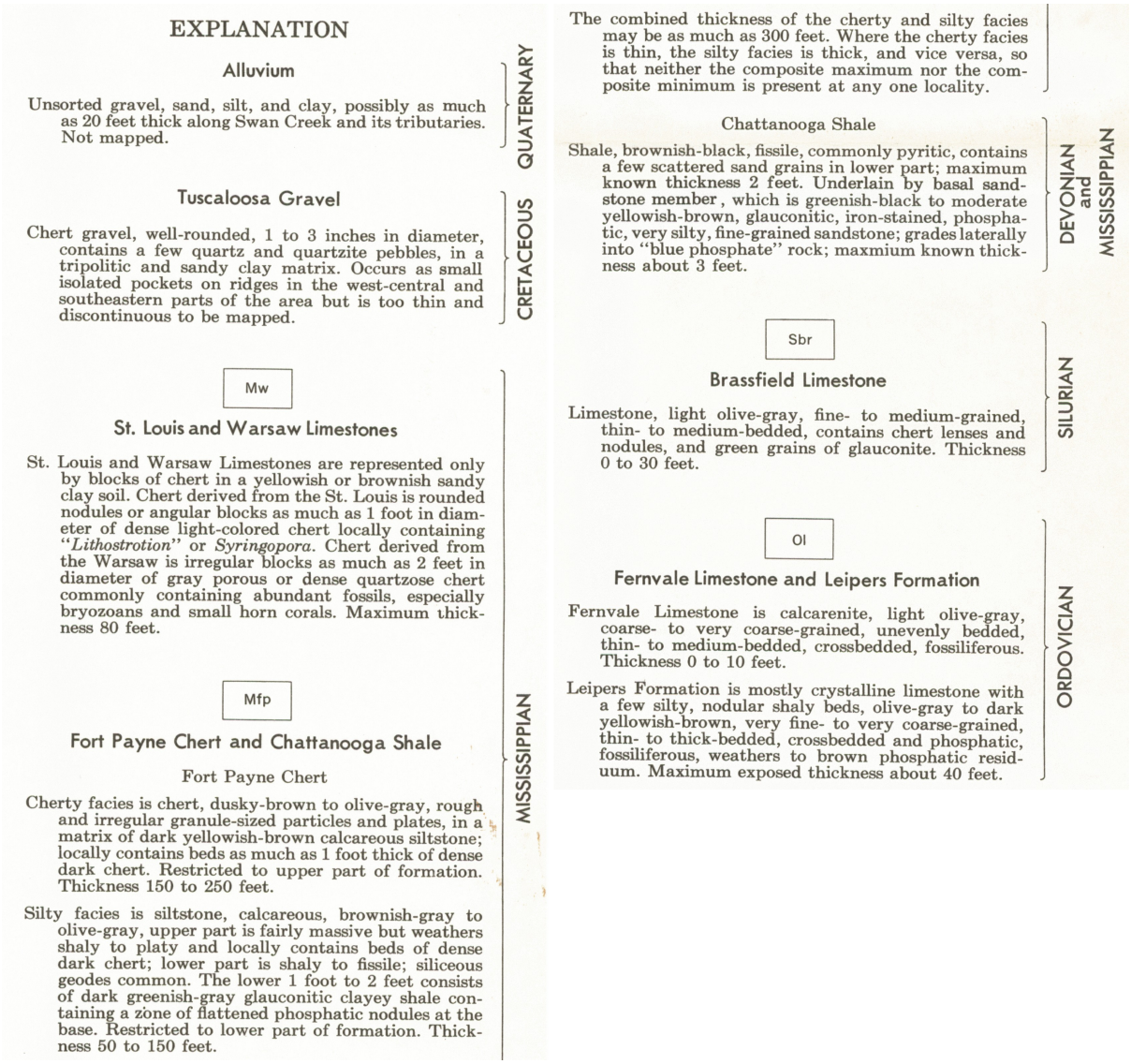
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Gordonsburg Quadrangle

Explanation



EXPLANATION

Alluvium — QUATERNARY

Unsorted gravel, sand, silt, and clay, possibly as much as 20 feet thick along Swan Creek and its tributaries. Not mapped.

Tuscaloosa Gravel — CRETACEOUS

Chert gravel, well-rounded, 1 to 3 inches in diameter, contains a few quartz and quartzite pebbles, in a tripolitic and sandy clay matrix. Occurs as small isolated pockets on ridges in the west-central and southeastern parts of the area but is too thin and discontinuous to be mapped.

Mw

St. Louis and Warsaw Limestones — MISSISSIPPIAN

St. Louis and Warsaw Limestones are represented only by blocks of chert in a yellowish or brownish sandy clay soil. Chert derived from the St. Louis is rounded nodules or angular blocks as much as 1 foot in diameter of dense light-colored chert locally containing "*Lithostrotion*" or *Syringopora*. Chert derived from the Warsaw is irregular blocks as much as 2 feet in diameter of gray porous or dense quartzose chert commonly containing abundant fossils, especially bryozoans and small horn corals. Maximum thickness 80 feet.

Mfp

Fort Payne Chert and Chattanooga Shale — MISSISSIPPIAN

Fort Payne Chert

Cherty facies is chert, dusky-brown to olive-gray, rough and irregular granule-sized particles and plates, in a matrix of dark yellowish-brown calcareous siltstone; locally contains beds as much as 1 foot thick of dense dark chert. Restricted to upper part of formation. Thickness 150 to 250 feet.

Silty facies is siltstone, calcareous, brownish-gray to olive-gray, upper part is fairly massive but weathers shaly to platy and locally contains beds of dense dark chert; lower part is shaly to fissile; siliceous geodes common. The lower 1 foot to 2 feet consists of dark greenish-gray glauconitic clayey shale containing a zone of flattened phosphatic nodules at the base. Restricted to lower part of formation. Thickness 50 to 150 feet.

The combined thickness of the cherty and silty facies may be as much as 300 feet. Where the cherty facies is thin, the silty facies is thick, and vice versa, so that neither the composite maximum nor the composite minimum is present at any one locality.

Chattanooga Shale — DEVONIAN and MISSISSIPPIAN

Shale, brownish-black, fissile, commonly pyritic, contains a few scattered sand grains in lower part; maximum known thickness 2 feet. Underlain by basal sandstone member, which is greenish-black to moderate yellowish-brown, glauconitic, iron-stained, phosphatic, very silty, fine-grained sandstone; grades laterally into "blue phosphate" rock; maxmium known thickness about 3 feet.

Sbr

Brassfield Limestone — SILURIAN

Limestone, light olive-gray, fine- to medium-grained, thin- to medium-bedded, contains chert lenses and nodules, and green grains of glauconite. Thickness 0 to 30 feet.

Ol

Fernvale Limestone and Leipers Formation — ORDOVICIAN

Fernvale Limestone is calcarenite, light olive-gray, coarse- to very coarse-grained, unevenly bedded, thin- to medium-bedded, crossbedded, fossiliferous. Thickness 0 to 10 feet.

Leipers Formation is mostly crystalline limestone with a few silty, nodular shaly beds, olive-gray to dark yellowish-brown, very fine- to very coarse-grained, thin- to thick-bedded, crossbedded and phosphatic, fossiliferous, weathers to brown phosphatic residuum. Maximum exposed thickness about 40 feet.

Graphic from source map: Gordonsburg Quadrangle

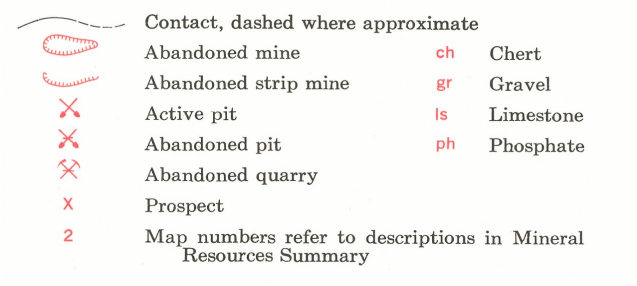
Greenfield Bend Quadrangle

The formal citation for this source.

> Wilson, C.W., Jr., and Miller, R.A., 1965, Geologic Map and Mineral Resources Summary of the Greenfield Bend Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 50-NE, scale 1:24,000 (*GRI Source Map ID 68333*).

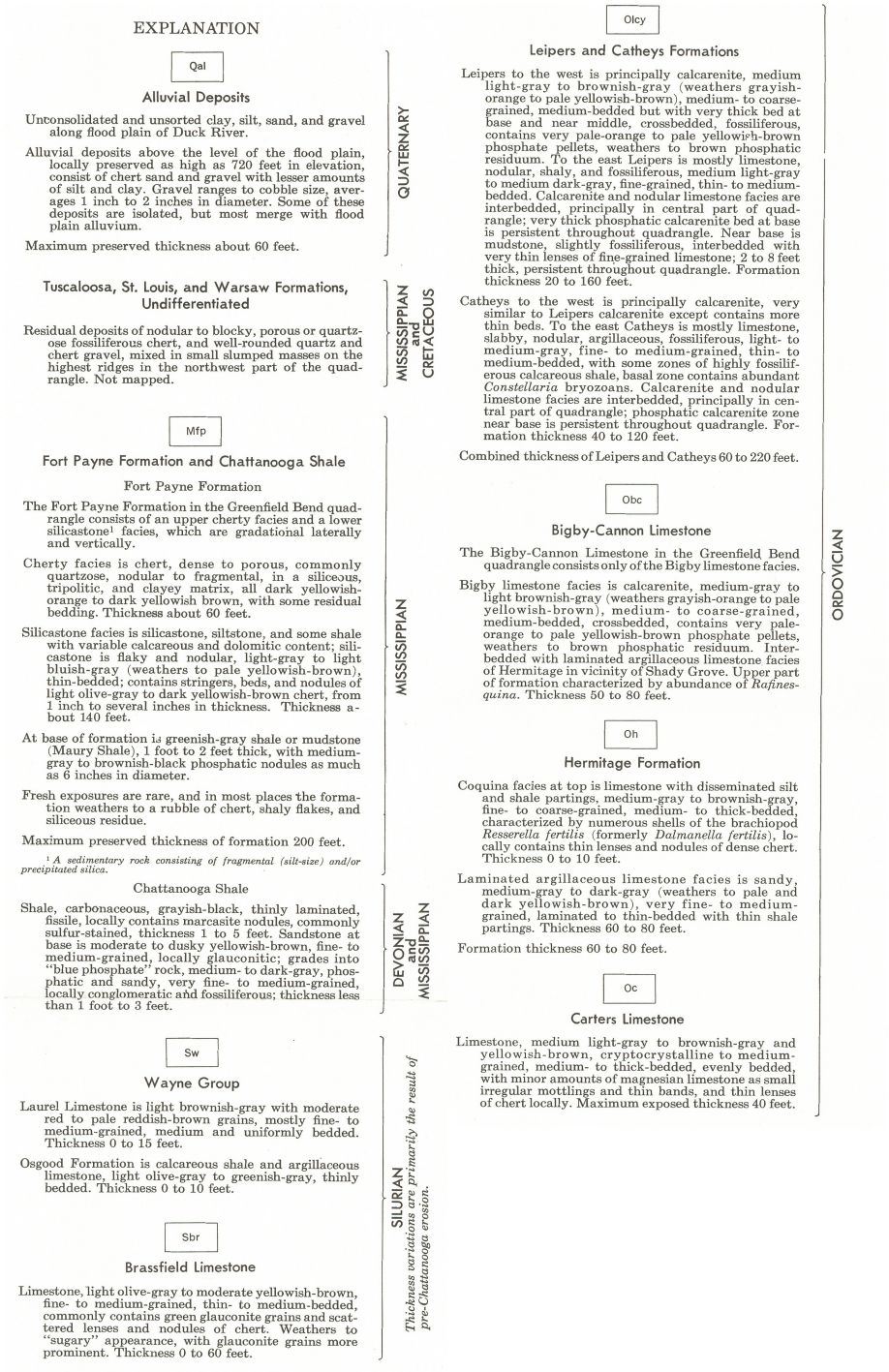
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Greenfield Bend Quadrangle

Explanation



EXPLANATION

Qal

Alluvial Deposits

Unconsolidated and unsorted clay, silt, sand, and gravel along flood plain of Duck River.

Alluvial deposits above the level of the flood plain, locally preserved as high as 720 feet in elevation, consist of chert sand and gravel with lesser amounts of silt and clay. Gravel ranges to cobble size, averages 1 inch to 2 inches in diameter. Some of these deposits are isolated, but most merge with flood plain alluvium.

Maximum preserved thickness about 60 feet.

QUATERNARY

Tuscaloosa, St. Louis, and Warsaw Formations, Undifferentiated

Residual deposits of nodular to blocky, porous or quartzose fossiliferous chert, and well-rounded quartz and chert gravel, mixed in small slumped masses on the highest ridges in the northwest part of the quadrangle. Not mapped.

MISSISSIPPIAN and CRETACEOUS

Mfp

Fort Payne Formation and Chattanooga Shale

Fort Payne Formation

The Fort Payne Formation in the Greenfield Bend quadrangle consists of an upper cherty facies and a lower silicastone[1] facies, which are gradational laterally and vertically.

Cherty facies is chert, dense to porous, commonly quartzose, nodular to fragmental, in a siliceous, tripolitic, and clayey matrix, all dark yellowish-orange to dark yellowish brown, with some residual bedding. Thickness about 60 feet.

Silicastone facies is silicastone, siltstone, and some shale with variable calcareous and dolomitic content; silicastone is flaky and nodular, light-gray to light bluish-gray (weathers to pale yellowish-brown), thin-bedded; contains stringers, beds, and nodules of light olive-gray to dark yellowish-brown chert, from 1 inch to several inches in thickness. Thickness about 140 feet.

At base of formation is greenish-gray shale or mudstone (Maury Shale), 1 foot to 2 feet thick, with medium-gray to brownish-black phosphatic nodules as much as 6 inches in diameter.

Fresh exposures are rare, and in most places the formation weathers to a rubble of chert, shaly flakes, and siliceous residue.

Maximum preserved thickness of formation 200 feet.

[1] *A sedimentary rock consisting of fragmental (silt-size) and/or precipitated silica.*

MISSISSIPPIAN

Chattanooga Shale

Shale, carbonaceous, grayish-black, thinly laminated, fissile, locally contains marcasite nodules, commonly sulfur-stained, thickness 1 to 5 feet. Sandstone at base is moderate to dusky yellowish-brown, fine- to medium-grained, locally glauconitic; grades into "blue phosphate" rock, medium- to dark-gray, phosphatic and sandy, very fine- to medium-grained, locally conglomeratic and fossiliferous; thickness less than 1 foot to 3 feet.

DEVONIAN and MISSISSIPPIAN

Sw

Wayne Group

Laurel Limestone is light brownish-gray with moderate red to pale reddish-brown grains, mostly fine- to medium-grained, medium and uniformly bedded. Thickness 0 to 15 feet.

Osgood Formation is calcareous shale and argillaceous limestone, light olive-gray to greenish-gray, thinly bedded. Thickness 0 to 10 feet.

Sbr

Brassfield Limestone

Limestone, light olive-gray to moderate yellowish-brown, fine- to medium-grained, thin- to medium-bedded, commonly contains green glauconite grains and scattered lenses and nodules of chert. Weathers to "sugary" appearance, with glauconite grains more prominent. Thickness 0 to 60 feet.

SILURIAN

Thickness variations are primarily the result of pre-Chattanooga erosion.

Olcy

Leipers and Catheys Formations

Leipers to the west is principally calcarenite, medium light-gray to brownish-gray (weathers grayish-orange to pale yellowish-brown), medium- to coarse-grained, medium-bedded but with very thick bed at base and near middle, crossbedded, fossiliferous, contains very pale-orange to pale yellowish-brown phosphate pellets, weathers to brown phosphatic residuum. To the east Leipers is mostly limestone, nodular, shaly, and fossiliferous, medium light-gray to medium dark-gray, fine-grained, thin- to medium-bedded. Calcarenite and nodular limestone facies are interbedded, principally in central part of quadrangle; very thick phosphatic calcarenite bed at base is persistent throughout quadrangle. Near base is mudstone, slightly fossiliferous, interbedded with very thin lenses of fine-grained limestone; 2 to 8 feet thick, persistent throughout quadrangle. Formation thickness 20 to 160 feet.

Catheys to the west is principally calcarenite, very similar to Leipers calcarenite except contains more thin beds. To the east Catheys is mostly limestone, slabby, nodular, argillaceous, fossiliferous, light- to medium-gray, fine- to medium-grained, thin- to medium-bedded, with some zones of highly fossiliferous calcareous shale, basal zone contains abundant *Constellaria* bryozoans. Calcarenite and nodular limestone facies are interbedded, principally in central part of quadrangle; phosphatic calcarenite zone near base is persistent throughout quadrangle. Formation thickness 40 to 120 feet.

Combined thickness of Leipers and Catheys 60 to 220 feet.

Obc

Bigby-Cannon Limestone

The Bigby-Cannon Limestone in the Greenfield Bend quadrangle consists only of the Bigby limestone facies.

Bigby limestone facies is calcarenite, medium-gray to light brownish-gray (weathers grayish-orange to pale yellowish-brown), medium- to coarse-grained, medium-bedded, crossbedded, contains very pale-orange to pale yellowish-brown phosphate pellets, weathers to brown phosphatic residuum. Interbedded with laminated argillaceous limestone facies of Hermitage in vicinity of Shady Grove. Upper part of formation characterized by abundance of *Rafinesquina*. Thickness 50 to 80 feet.

Oh

Hermitage Formation

Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, fine- to coarse-grained, medium- to thick-bedded, characterized by numerous shells of the brachiopod *Resserella fertilis* (formerly *Dalmanella fertilis*), locally contains thin lenses and nodules of dense chert. Thickness 0 to 10 feet.

Laminated argillaceous limestone facies is sandy, medium-gray to dark-gray (weathers to pale and dark yellowish-brown), very fine- to medium-grained, laminated to thin-bedded with thin shale partings. Thickness 60 to 80 feet.

Formation thickness 60 to 80 feet.

Oc

Carters Limestone

Limestone, medium light-gray to brownish-gray and yellowish-brown, cryptocrystalline to medium-grained, medium- to thick-bedded, evenly bedded, with minor amounts of magnesian limestone as small irregular mottlings and thin bands, and thin lenses of chert locally. Maximum exposed thickness 40 feet.

ORDOVICIAN

Graphic from source map: Greenfield Bend Quadrangle

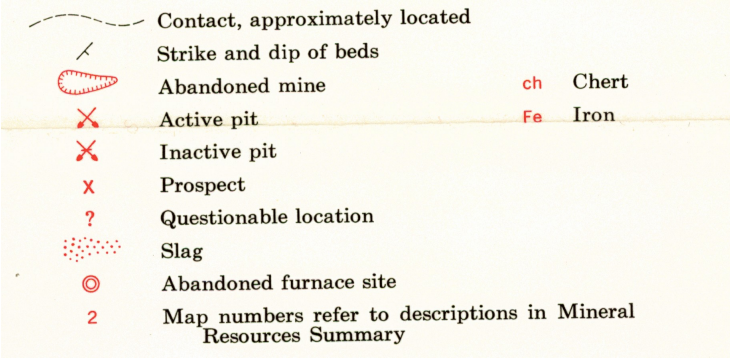
Henryville Quadrangle

The formal citation for this source.

> Marcher, M.V., Lounsbury, R.E., and Larson, L.T., 1965, Geologic Map and Mineral Resources Summary of the Henryville Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 51-NW, scale 1:24,000 (*GRI Source Map ID 68342*).

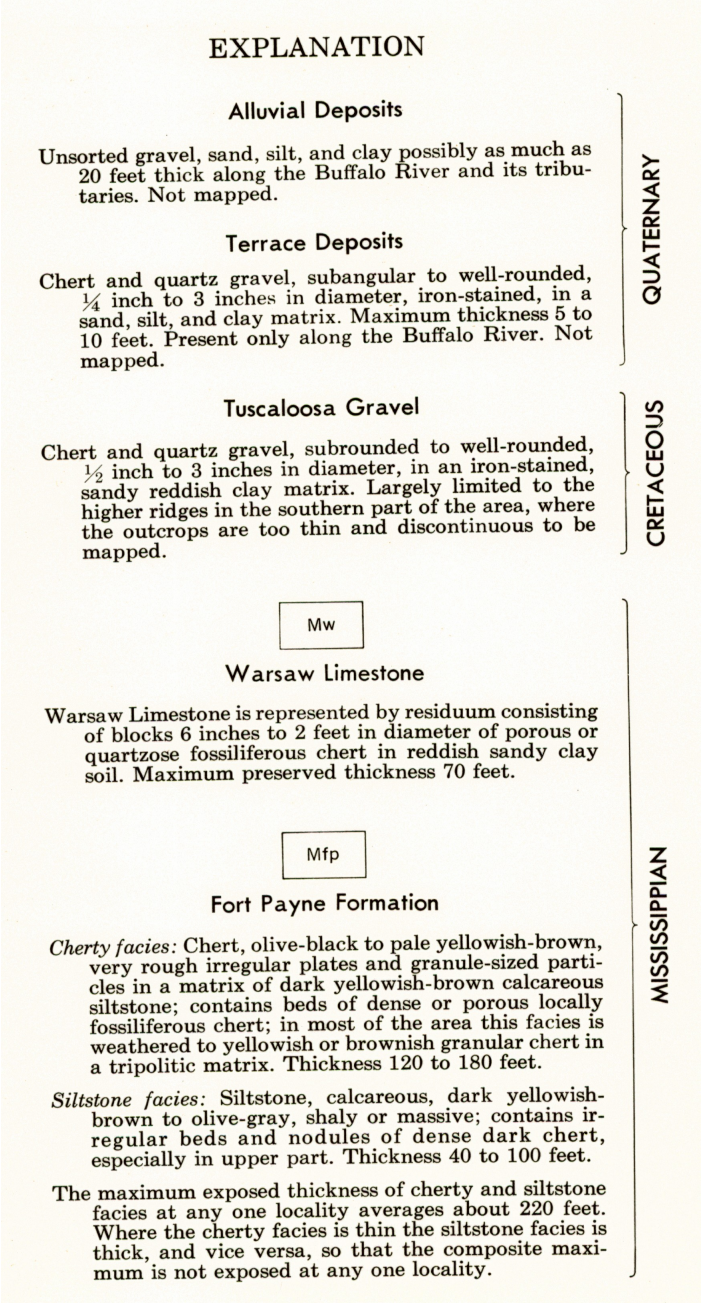
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Henryville Quadrangle

Explanation



EXPLANATION

Alluvial Deposits

Unsorted gravel, sand, silt, and clay possibly as much as 20 feet thick along the Buffalo River and its tributaries. Not mapped.

Terrace Deposits

Chert and quartz gravel, subangular to well-rounded, ¼ inch to 3 inches in diameter, iron-stained, in a sand, silt, and clay matrix. Maximum thickness 5 to 10 feet. Present only along the Buffalo River. Not mapped.

QUATERNARY

Tuscaloosa Gravel

Chert and quartz gravel, subrounded to well-rounded, ½ inch to 3 inches in diameter, in an iron-stained, sandy reddish clay matrix. Largely limited to the higher ridges in the southern part of the area, where the outcrops are too thin and discontinuous to be mapped.

CRETACEOUS

Mw

Warsaw Limestone

Warsaw Limestone is represented by residuum consisting of blocks 6 inches to 2 feet in diameter of porous or quartzose fossiliferous chert in reddish sandy clay soil. Maximum preserved thickness 70 feet.

Mfp

Fort Payne Formation

Cherty facies: Chert, olive-black to pale yellowish-brown, very rough irregular plates and granule-sized particles in a matrix of dark yellowish-brown calcareous siltstone; contains beds of dense or porous locally fossiliferous chert; in most of the area this facies is weathered to yellowish or brownish granular chert in a tripolitic matrix. Thickness 120 to 180 feet.

Siltstone facies: Siltstone, calcareous, dark yellowish-brown to olive-gray, shaly or massive; contains irregular beds and nodules of dense dark chert, especially in upper part. Thickness 40 to 100 feet.

The maximum exposed thickness of cherty and siltstone facies at any one locality averages about 220 feet. Where the cherty facies is thin the siltstone facies is thick, and vice versa, so that the composite maximum is not exposed at any one locality.

MISSISSIPPIAN

Graphic from source map: Henryville Quadrangle

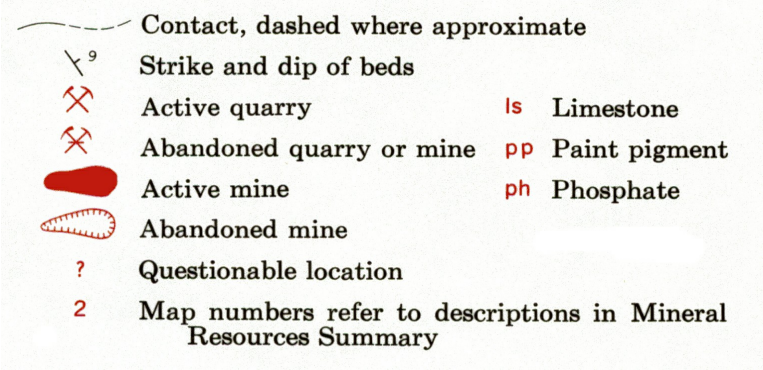
Leipers Fork Quadrangle

The formal citation for this source.

> Morrow, W.E., Wilson, C.W., Jr., and Hershey, R.E., 1693, Geologic Map and Mineral Resources Summary of the Leipers Fork Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 63-NW, scale 1:24,000 (*GRI Source Map ID 68371*).

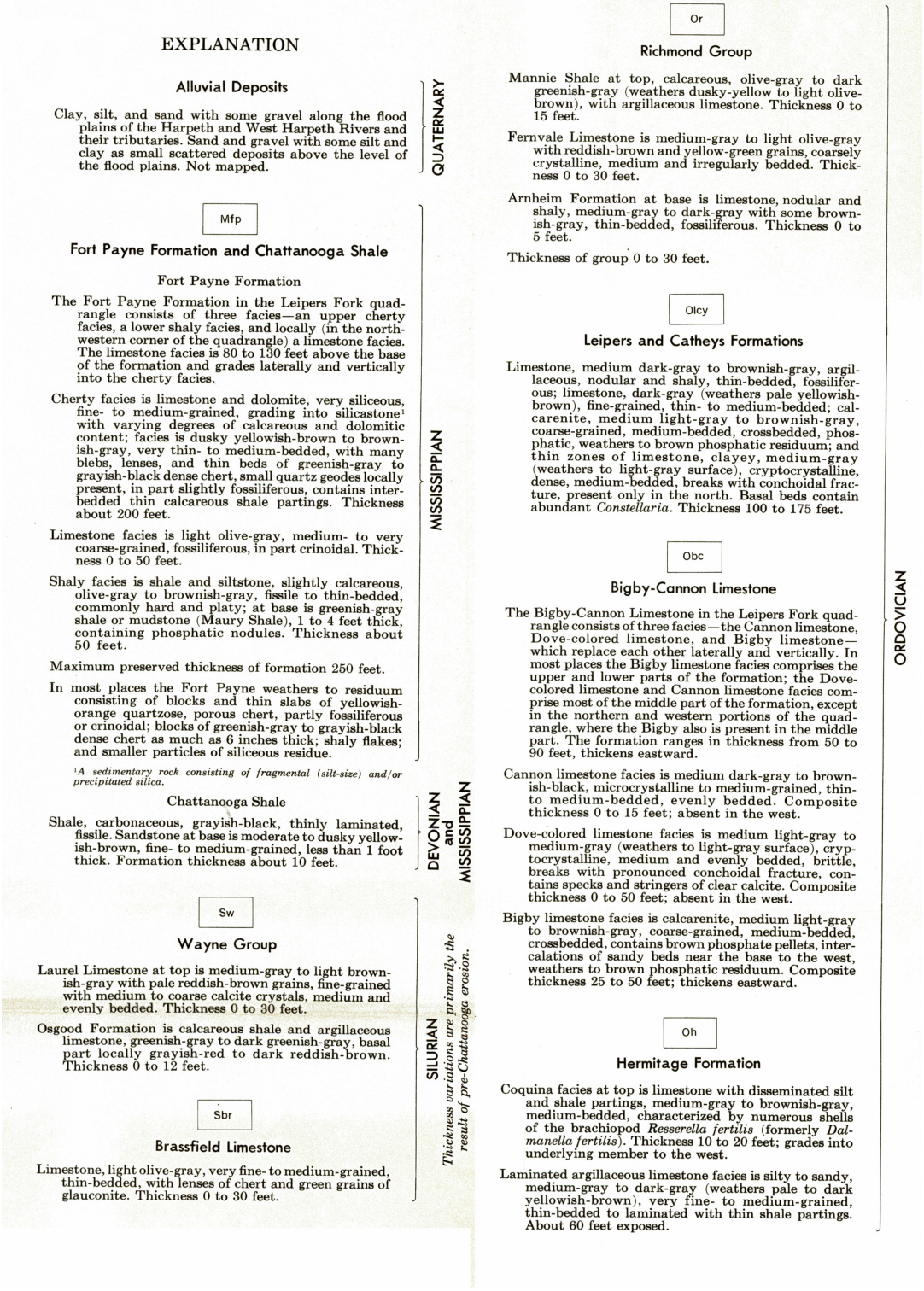
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Leipers Fork Quadrangle

Explanation



EXPLANATION

Alluvial Deposits — QUATERNARY

Clay, silt, and sand with some gravel along the flood plains of the Harpeth and West Harpeth Rivers and their tributaries. Sand and gravel with some silt and clay as small scattered deposits above the level of the flood plains. Not mapped.

Mfp

Fort Payne Formation and Chattanooga Shale — MISSISSIPPIAN

Fort Payne Formation

The Fort Payne Formation in the Leipers Fork quadrangle consists of three facies—an upper cherty facies, a lower shaly facies, and locally (in the northwestern corner of the quadrangle) a limestone facies. The limestone facies is 80 to 130 feet above the base of the formation and grades laterally and vertically into the cherty facies.

Cherty facies is limestone and dolomite, very siliceous, fine- to medium-grained, grading into silicastone[1] with varying degrees of calcareous and dolomitic content; facies is dusky yellowish-brown to brownish-gray, very thin- to medium-bedded, with many blebs, lenses, and thin beds of greenish-gray to grayish-black dense chert, small quartz geodes locally present, in part slightly fossiliferous, contains interbedded thin calcareous shale partings. Thickness about 200 feet.

Limestone facies is light olive-gray, medium- to very coarse-grained, fossiliferous, in part crinoidal. Thickness 0 to 50 feet.

Shaly facies is shale and siltstone, slightly calcareous, olive-gray to brownish-gray, fissile to thin-bedded, commonly hard and platy; at base is greenish-gray shale or mudstone (Maury Shale), 1 to 4 feet thick, containing phosphatic nodules. Thickness about 50 feet.

Maximum preserved thickness of formation 250 feet.

In most places the Fort Payne weathers to residuum consisting of blocks and thin slabs of yellowish-orange quartzose, porous chert, partly fossiliferous or crinoidal; blocks of greenish-gray to grayish-black dense chert as much as 6 inches thick; shaly flakes; and smaller particles of siliceous residue.

[1]*A sedimentary rock consisting of fragmental (silt-size) and/or precipitated silica.*

Chattanooga Shale — DEVONIAN and MISSISSIPPIAN

Shale, carbonaceous, grayish-black, thinly laminated, fissile. Sandstone at base is moderate to dusky yellowish-brown, fine- to medium-grained, less than 1 foot thick. Formation thickness about 10 feet.

Sw

Wayne Group — SILURIAN

Laurel Limestone at top is medium-gray to light brownish-gray with pale reddish-brown grains, fine-grained with medium to coarse calcite crystals, medium and evenly bedded. Thickness 0 to 30 feet.

Osgood Formation is calcareous shale and argillaceous limestone, greenish-gray to dark greenish-gray, basal part locally grayish-red to dark reddish-brown. Thickness 0 to 12 feet.

Thickness variations are primarily the result of pre-Chattanooga erosion.

Sbr

Brassfield Limestone

Limestone, light olive-gray, very fine- to medium-grained, thin-bedded, with lenses of chert and green grains of glauconite. Thickness 0 to 30 feet.

Or

Richmond Group — ORDOVICIAN

Mannie Shale at top, calcareous, olive-gray to dark greenish-gray (weathers dusky-yellow to light olive-brown), with argillaceous limestone. Thickness 0 to 15 feet.

Fernvale Limestone is medium-gray to light olive-gray with reddish-brown and yellow-green grains, coarsely crystalline, medium and irregularly bedded. Thickness 0 to 30 feet.

Arnheim Formation at base is limestone, nodular and shaly, medium-gray to dark-gray with some brownish-gray, thin-bedded, fossiliferous. Thickness 0 to 5 feet.

Thickness of group 0 to 30 feet.

Olcy

Leipers and Catheys Formations

Limestone, medium dark-gray to brownish-gray, argillaceous, nodular and shaly, thin-bedded, fossiliferous; limestone, dark-gray (weathers pale yellowish-brown), fine-grained, thin- to medium-bedded; calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum; and thin zones of limestone, clayey, medium-gray (weathers to light-gray surface), cryptocrystalline, dense, medium-bedded, breaks with conchoidal fracture, present only in the north. Basal beds contain abundant *Constellaria*. Thickness 100 to 175 feet.

Obc

Bigby-Cannon Limestone

The Bigby-Cannon Limestone in the Leipers Fork quadrangle consists of three facies—the Cannon limestone, Dove-colored limestone, and Bigby limestone—which replace each other laterally and vertically. In most places the Bigby limestone facies comprises the upper and lower parts of the formation; the Dove-colored limestone and Cannon limestone facies comprise most of the middle part of the formation, except in the northern and western portions of the quadrangle, where the Bigby also is present in the middle part. The formation ranges in thickness from 50 to 90 feet, thickens eastward.

Cannon limestone facies is medium dark-gray to brownish-black, microcrystalline to medium-grained, thin- to medium-bedded, evenly bedded. Composite thickness 0 to 15 feet; absent in the west.

Dove-colored limestone facies is medium light-gray to medium-gray (weathers to light-gray surface), cryptocrystalline, medium and evenly bedded, brittle, breaks with pronounced conchoidal fracture, contains specks and stringers of clear calcite. Composite thickness 0 to 50 feet; absent in the west.

Bigby limestone facies is calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, contains brown phosphate pellets, intercalations of sandy beds near the base to the west, weathers to brown phosphatic residuum. Composite thickness 25 to 50 feet; thickens eastward.

Oh

Hermitage Formation

Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, medium-bedded, characterized by numerous shells of the brachiopod *Resserella fertilis* (formerly *Dalmanella fertilis*). Thickness 10 to 20 feet; grades into underlying member to the west.

Laminated argillaceous limestone facies is silty to sandy, medium-gray to dark-gray (weathers pale to dark yellowish-brown), very fine- to medium-grained, thin-bedded to laminated with thin shale partings. About 60 feet exposed.

Graphic from source map: Leipers Fork Quadrangle

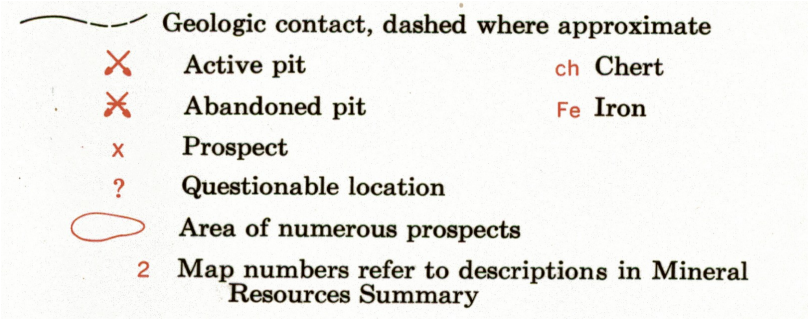
Ovilla Quadrangle

The formal citation for this source.

> Marcher, M.V., Colvin, J.M., Jr., and Barnes, R.H., 1963, Geologic Map and Mineral Resources Summary of the Ovilla Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 42-SE, scale 1:24,000 (*GRI Source Map ID 68436*).

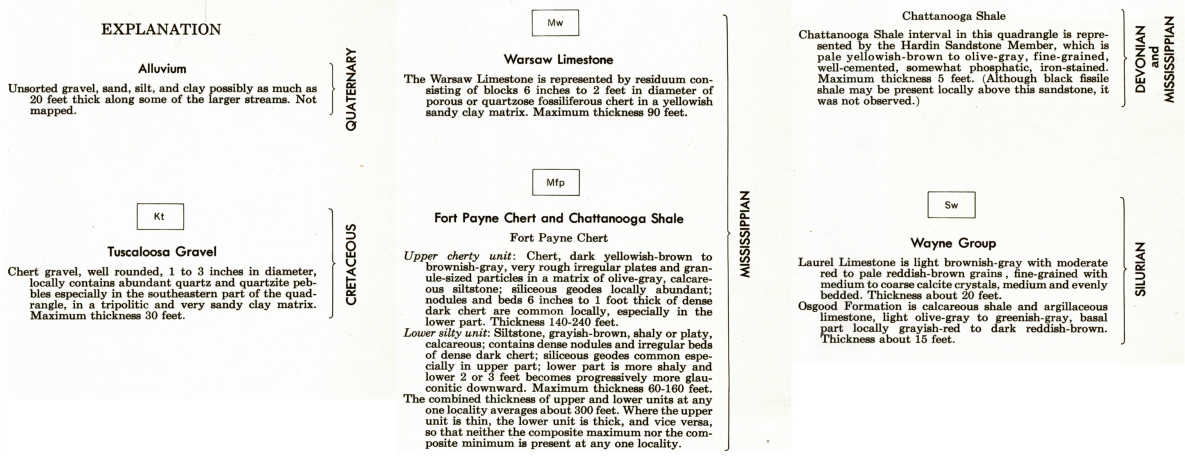
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Ovilla Quadrangle

Explanation



Graphic from source map: Ovilla Quadrangle

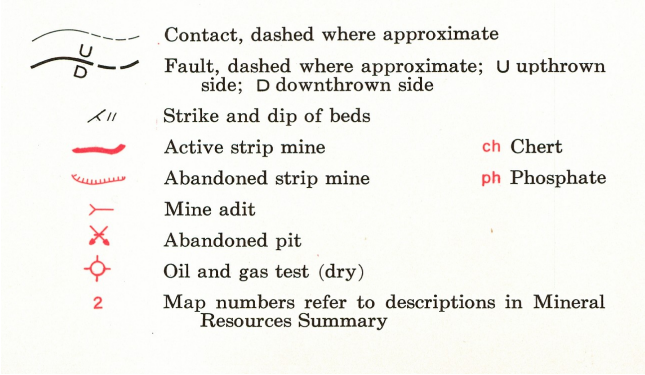
Primm Springs Quadrangle

The formal citation for this source.

> Colvin, J.M., Jr., Wilson, C.W., Jr., and Hershey, R.E., 1965, Geologic Map and Mineral Resources Summary of the Primm Springs Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 56-SW, scale 1:24,000 (*GRI Source Map ID 68459*).

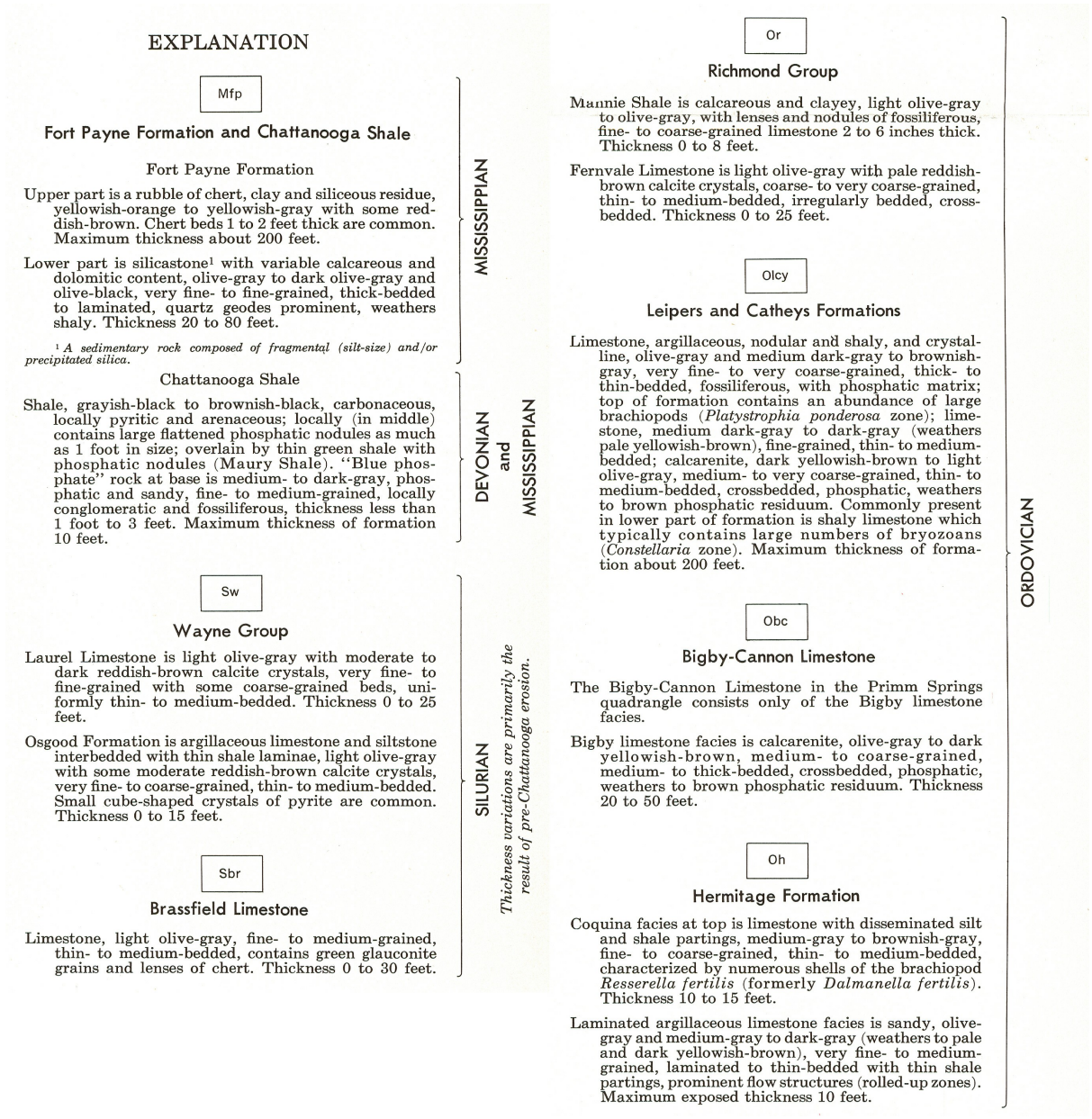
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Primm Springs Quadrangle

Explanation



EXPLANATION

Mfp

Fort Payne Formation and Chattanooga Shale

Fort Payne Formation

Upper part is a rubble of chert, clay and siliceous residue, yellowish-orange to yellowish-gray with some reddish-brown. Chert beds 1 to 2 feet thick are common. Maximum thickness about 200 feet.

Lower part is silicastone[1] with variable calcareous and dolomitic content, olive-gray to dark olive-gray and olive-black, very fine- to fine-grained, thick-bedded to laminated, quartz geodes prominent, weathers shaly. Thickness 20 to 80 feet.

[1] *A sedimentary rock composed of fragmental (silt-size) and/or precipitated silica.*

MISSISSIPPIAN

Chattanooga Shale

Shale, grayish-black to brownish-black, carbonaceous, locally pyritic and arenaceous; locally (in middle) contains large flattened phosphatic nodules as much as 1 foot in size; overlain by thin green shale with phosphatic nodules (Maury Shale). "Blue phosphate" rock at base is medium- to dark-gray, phosphatic and sandy, fine- to medium-grained, locally conglomeratic and fossiliferous, thickness less than 1 foot to 3 feet. Maximum thickness of formation 10 feet.

DEVONIAN and MISSISSIPPIAN

Sw

Wayne Group

Laurel Limestone is light olive-gray with moderate to dark reddish-brown calcite crystals, very fine- to fine-grained with some coarse-grained beds, uniformly thin- to medium-bedded. Thickness 0 to 25 feet.

Osgood Formation is argillaceous limestone and siltstone interbedded with thin shale laminae, light olive-gray with some moderate reddish-brown calcite crystals, very fine- to coarse-grained, thin- to medium-bedded. Small cube-shaped crystals of pyrite are common. Thickness 0 to 15 feet.

Sbr

Brassfield Limestone

Limestone, light olive-gray, fine- to medium-grained, thin- to medium-bedded, contains green glauconite grains and lenses of chert. Thickness 0 to 30 feet.

SILURIAN

Thickness variations are primarily the result of pre-Chattanooga erosion.

Or

Richmond Group

Mannie Shale is calcareous and clayey, light olive-gray to olive-gray, with lenses and nodules of fossiliferous, fine- to coarse-grained limestone 2 to 6 inches thick. Thickness 0 to 8 feet.

Fernvale Limestone is light olive-gray with pale reddish-brown calcite crystals, coarse- to very coarse-grained, thin- to medium-bedded, irregularly bedded, crossbedded. Thickness 0 to 25 feet.

Olcy

Leipers and Catheys Formations

Limestone, argillaceous, nodular and shaly, and crystalline, olive-gray and medium dark-gray to brownish-gray, very fine- to very coarse-grained, thick- to thin-bedded, fossiliferous, with phosphatic matrix; top of formation contains an abundance of large brachiopods (*Platystrophia ponderosa* zone); limestone, medium dark-gray to dark-gray (weathers pale yellowish-brown), fine-grained, thin- to medium-bedded; calcarenite, dark yellowish-brown to light olive-gray, medium- to very coarse-grained, thin- to medium-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum. Commonly present in lower part of formation is shaly limestone which typically contains large numbers of bryozoans (*Constellaria* zone). Maximum thickness of formation about 200 feet.

Obc

Bigby-Cannon Limestone

The Bigby-Cannon Limestone in the Primm Springs quadrangle consists only of the Bigby limestone facies.

Bigby limestone facies is calcarenite, olive-gray to dark yellowish-brown, medium- to coarse-grained, medium- to thick-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum. Thickness 20 to 50 feet.

Oh

Hermitage Formation

Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, fine- to coarse-grained, thin- to medium-bedded, characterized by numerous shells of the brachiopod *Resserella fertilis* (formerly *Dalmanella fertilis*). Thickness 10 to 15 feet.

Laminated argillaceous limestone facies is sandy, olive-gray and medium-gray to dark-gray (weathers to pale and dark yellowish-brown), very fine- to medium-grained, laminated to thin-bedded with thin shale partings, prominent flow structures (rolled-up zones). Maximum exposed thickness 10 feet.

ORDOVICIAN

Graphic from source map: Primm Springs Quadrangle

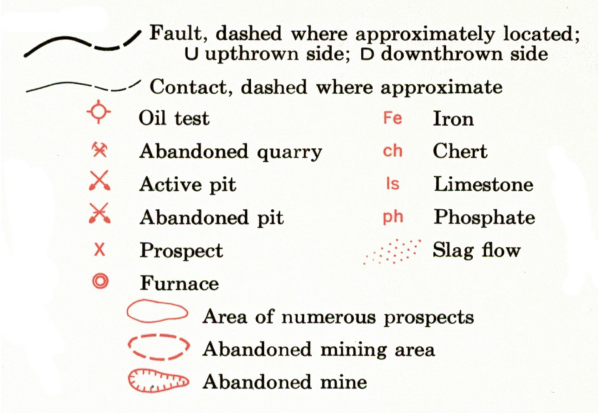
Riverside Quadrangle

The formal citation for this source.

> Wilson, C.W., Jr., Marcher, M.V., Colvin, J.M., Jr., and Barnes, R.H., 1962, Geologic Map and Mineral Resources Summary of the Riverside Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 42-NE, scale 1:24,000 (*GRI Source Map ID 68467*).

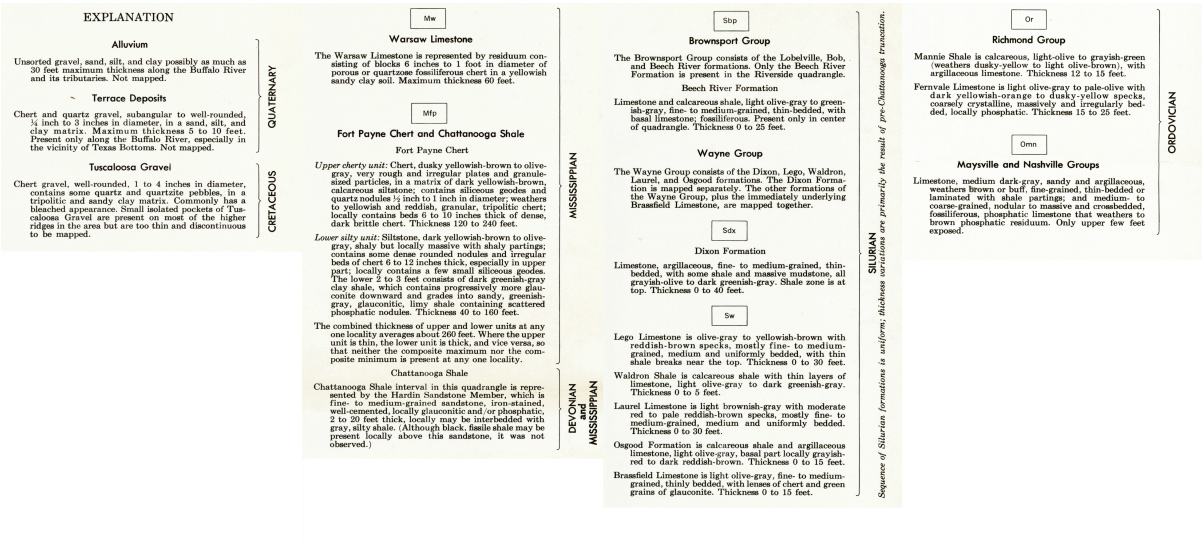
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Riverside Quadrangle

Explanation



Graphic from source map: Riverside Quadrangle

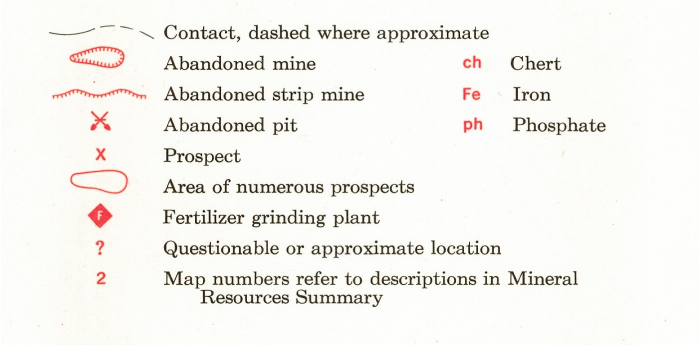
Sunrise Quadrangle

The formal citation for this source.

> Colvin, J.M., Jr., 1970, Geologic Map and Mineral Resources Summary of the Sunrise Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 50-NW, scale 1:24,000 (*GRI Source Map ID 68512*).

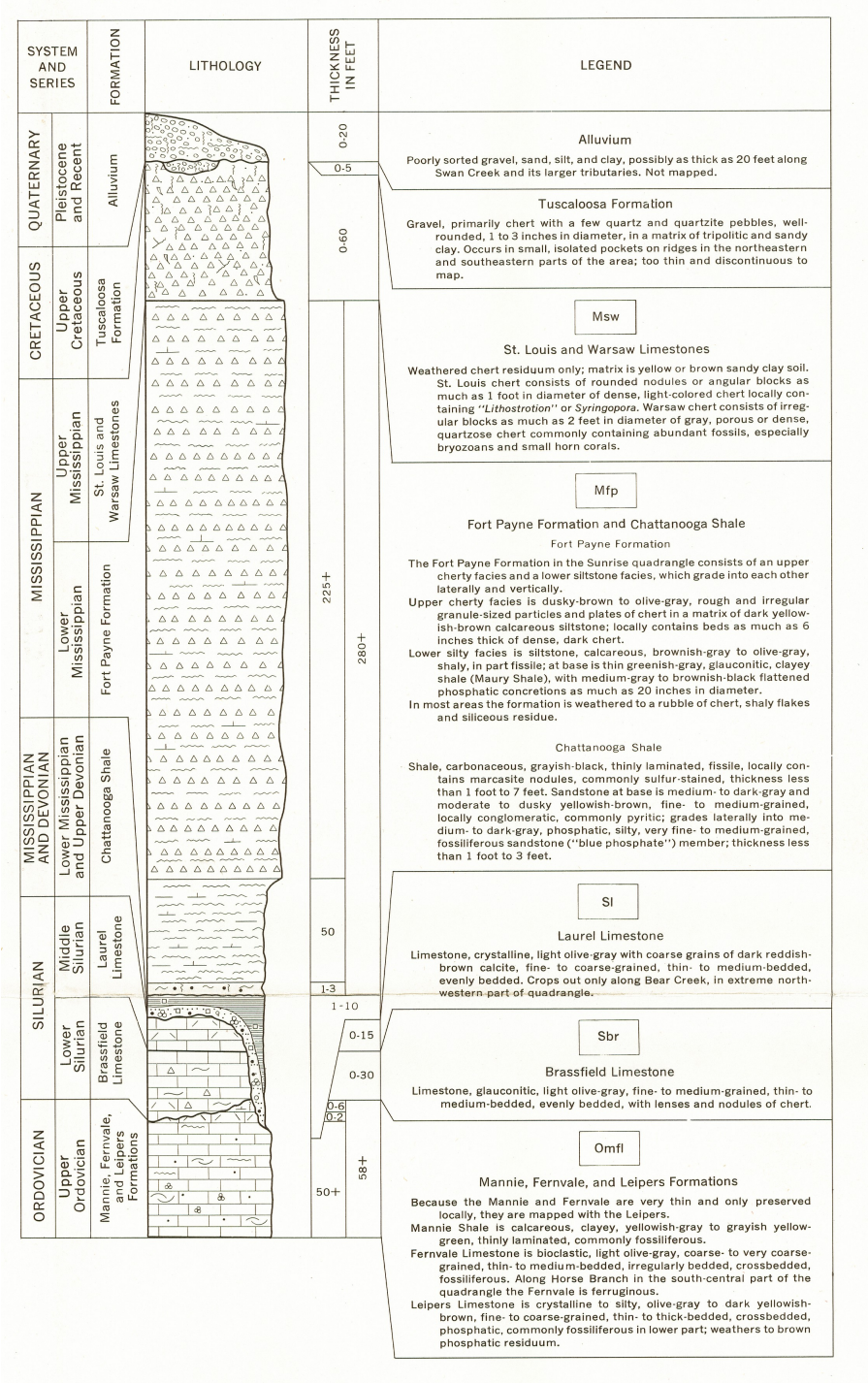
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Sunrise Quadrangle

Stratigraphic Column



Graphic from source map: Sunrise Quadrangle

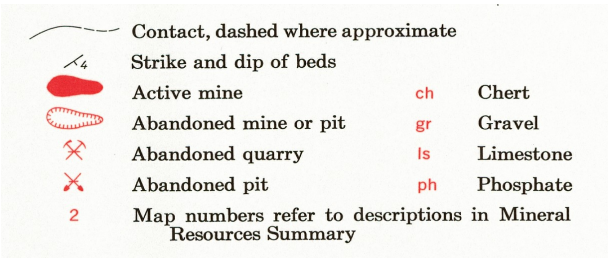
Theta Quadrangle

The formal citation for this source.

> Wilson, C.W., Jr., Colvin, J.M., Jr., and Fullerton, D.S., 1964, Geologic Map and Mineral Resources Summary of the Theta Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 56-SE, scale 1:24,000 (*GRI Source Map ID 68521*).

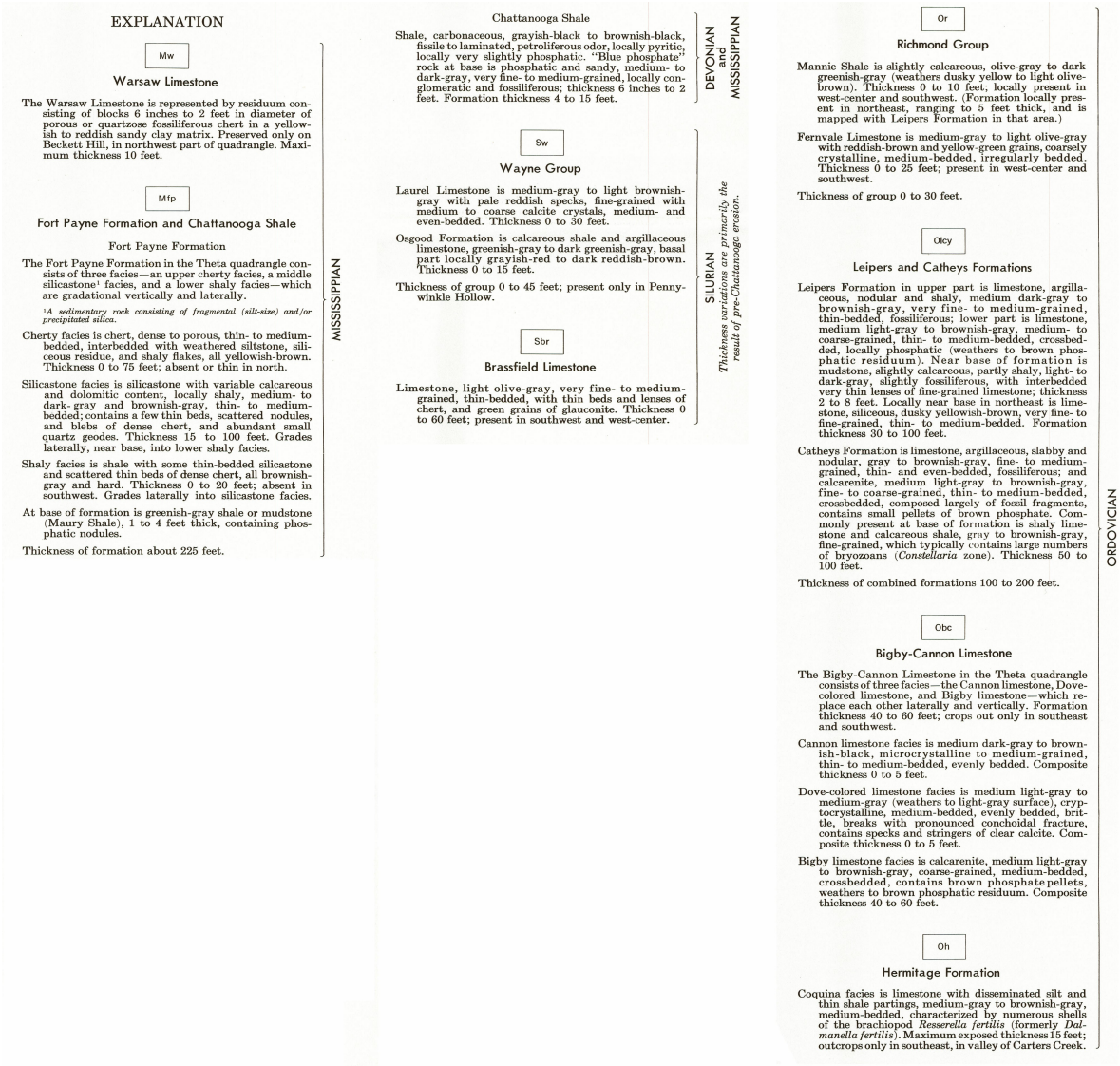
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Theta Quadrangle

Explanation



EXPLANATION

Mw

Warsaw Limestone

The Warsaw Limestone is represented by residuum consisting of blocks 6 inches to 2 feet in diameter of porous or quartzose fossiliferous chert in a yellowish to reddish sandy clay matrix. Preserved only on Beckett Hill, in northwest part of quadrangle. Maximum thickness 10 feet.

Mfp

Fort Payne Formation and Chattanooga Shale

Fort Payne Formation

The Fort Payne Formation in the Theta quadrangle consists of three facies—an upper cherty facies, a middle silicastone[1] facies, and a lower shaly facies—which are gradational vertically and laterally.

[1]*A sedimentary rock consisting of fragmental (silt-size) and/or precipitated silica.*

Cherty facies is chert, dense to porous, thin- to medium-bedded, interbedded with weathered siltstone, siliceous residue, and shaly flakes, all yellowish-brown. Thickness 0 to 75 feet; absent or thin in north.

Silicastone facies is silicastone with variable calcareous and dolomitic content, locally shaly, medium- to dark-gray and brownish-gray, thin- to medium-bedded; contains a few thin beds, scattered nodules, and blebs of dense chert, and abundant small quartz geodes. Thickness 15 to 100 feet. Grades laterally, near base, into lower shaly facies.

Shaly facies is shale with some thin-bedded silicastone and scattered thin beds of dense chert, all brownish-gray and hard. Thickness 0 to 20 feet; absent in southwest. Grades laterally into silicastone facies.

At base of formation is greenish-gray shale or mudstone (Maury Shale), 1 to 4 feet thick, containing phosphatic nodules.

Thickness of formation about 225 feet.

MISSISSIPPIAN

Chattanooga Shale

Shale, carbonaceous, grayish-black to brownish-black, fissile to laminated, petroliferous odor, locally pyritic, locally very slightly phosphatic. "Blue phosphate" rock at base is phosphatic and sandy, medium- to dark-gray, very fine- to medium-grained, locally conglomeratic and fossiliferous; thickness 6 inches to 2 feet. Formation thickness 4 to 15 feet.

DEVONIAN and MISSISSIPPIAN

Sw

Wayne Group

Laurel Limestone is medium-gray to light brownish-gray with pale reddish specks, fine-grained with medium to coarse calcite crystals, medium- and even-bedded. Thickness 0 to 30 feet.

Osgood Formation is calcareous shale and argillaceous limestone, greenish-gray to dark greenish-gray, basal part locally grayish-red to dark reddish-brown. Thickness 0 to 15 feet.

Thickness of group 0 to 45 feet; present only in Pennywinkle Hollow.

Sbr

Brassfield Limestone

Limestone, light olive-gray, very fine- to medium-grained, thin-bedded, with thin beds and lenses of chert, and green grains of glauconite. Thickness 0 to 60 feet; present in southwest and west-center.

SILURIAN

Thickness variations are primarily the result of pre-Chattanooga erosion.

Or

Richmond Group

Mannie Shale is slightly calcareous, olive-gray to dark greenish-gray (weathers dusky yellow to light olive-brown). Thickness 0 to 10 feet; locally present in west-center and southwest. (Formation locally present in northeast, ranging to 5 feet thick, and is mapped with Leipers Formation in that area.)

Fernvale Limestone is medium-gray to light olive-gray with reddish-brown and yellow-green grains, coarsely crystalline, medium-bedded, irregularly bedded. Thickness 0 to 25 feet; present in west-center and southwest.

Thickness of group 0 to 30 feet.

Olcy

Leipers and Catheys Formations

Leipers Formation in upper part is limestone, argillaceous, nodular and shaly, medium dark-gray to brownish-gray, very fine- to medium-grained, thin-bedded, fossiliferous; lower part is limestone, medium light-gray to brownish-gray, medium- to coarse-grained, thin- to medium-bedded, crossbedded, locally phosphatic (weathers to brown phosphatic residuum). Near base of formation is mudstone, slightly calcareous, partly shaly, light- to dark-gray, slightly fossiliferous, with interbedded very thin lenses of fine-grained limestone; thickness 2 to 8 feet. Locally near base in northeast is limestone, siliceous, dusky yellowish-brown, very fine- to fine-grained, thin- to medium-bedded. Formation thickness 30 to 100 feet.

Catheys Formation is limestone, argillaceous, slabby and nodular, gray to brownish-gray, fine- to medium-grained, thin- and even-bedded, fossiliferous; and calcarenite, medium light-gray to brownish-gray, fine- to coarse-grained, thin- to medium-bedded, crossbedded, composed largely of fossil fragments, contains small pellets of brown phosphate. Commonly present at base of formation is shaly limestone and calcareous shale, gray to brownish-gray, fine-grained, which typically contains large numbers of bryozoans (*Constellaria* zone). Thickness 50 to 100 feet.

Thickness of combined formations 100 to 200 feet.

Obc

Bigby-Cannon Limestone

The Bigby-Cannon Limestone in the Theta quadrangle consists of three facies—the Cannon limestone, Dove-colored limestone, and Bigby limestone—which replace each other laterally and vertically. Formation thickness 40 to 60 feet; crops out only in southeast and southwest.

Cannon limestone facies is medium dark-gray to brownish-black, microcrystalline to medium-grained, thin- to medium-bedded, evenly bedded. Composite thickness 0 to 5 feet.

Dove-colored limestone facies is medium light-gray to medium-gray (weathers to light-gray surface), cryptocrystalline, medium-bedded, evenly bedded, brittle, breaks with pronounced conchoidal fracture, contains specks and stringers of clear calcite. Composite thickness 0 to 5 feet.

Bigby limestone facies is calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, contains brown phosphate pellets, weathers to brown phosphatic residuum. Composite thickness 40 to 60 feet.

Oh

Hermitage Formation

Coquina facies is limestone with disseminated silt and thin shale partings, medium-gray to brownish-gray, medium-bedded, characterized by numerous shells of the brachiopod *Resserella fertilis* (formerly *Dalmanella fertilis*). Maximum exposed thickness 15 feet; outcrops only in southeast, in valley of Carters Creek.

ORDOVICIAN

Graphic from source map: Theta Quadrangle

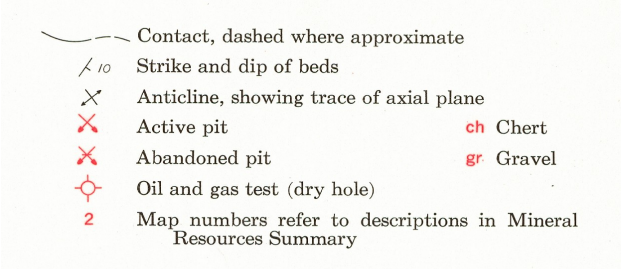
Three Churches Quadrangle

The formal citation for this source.

> Wilson, C.W., Jr., and Marcher, M.V., 1972, Geologic Map and Mineral Resources Summary of the Three Churches Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 34-NE, scale 1:24,000 (*GRI Source Map ID 68522*).

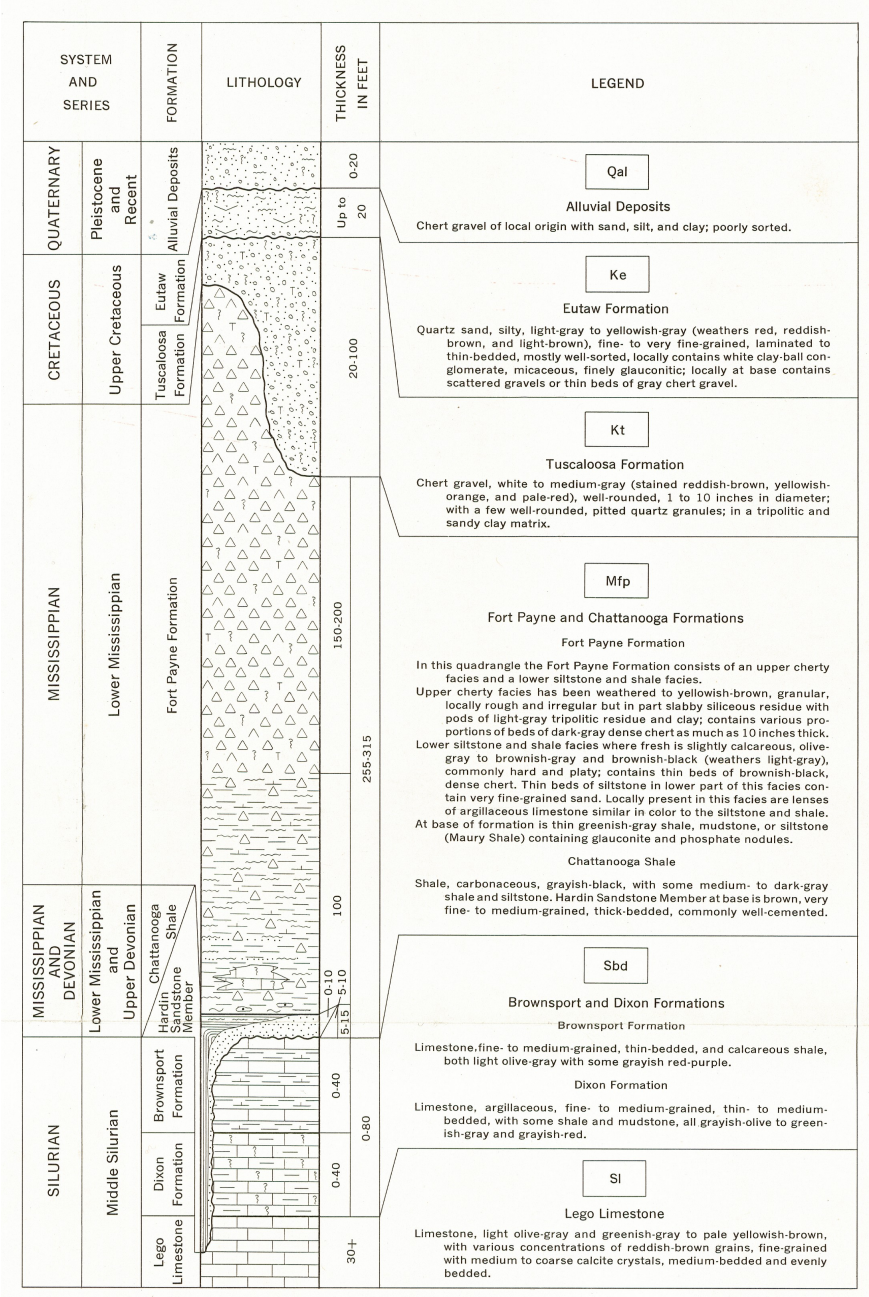
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Three Churches Quadrangle

Stratigraphic Column



Graphic from source map: Three Churches Quadrangle

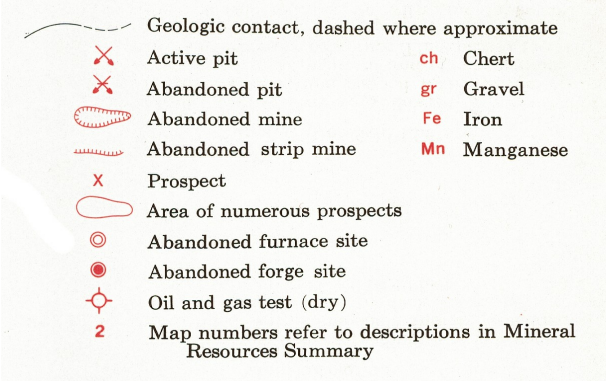
Waynesboro East Quadrangle

The formal citation for this source.

> Marcher, M.V., Wilson, C.W., Jr., Colvin, J.M., Jr., and Barnes, R.H., 1963, Geologic Map and Mineral Resources Summary of the Waynesboro East Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 42-SW, scale 1:24,000 (*GRI Source Map ID 68538*).

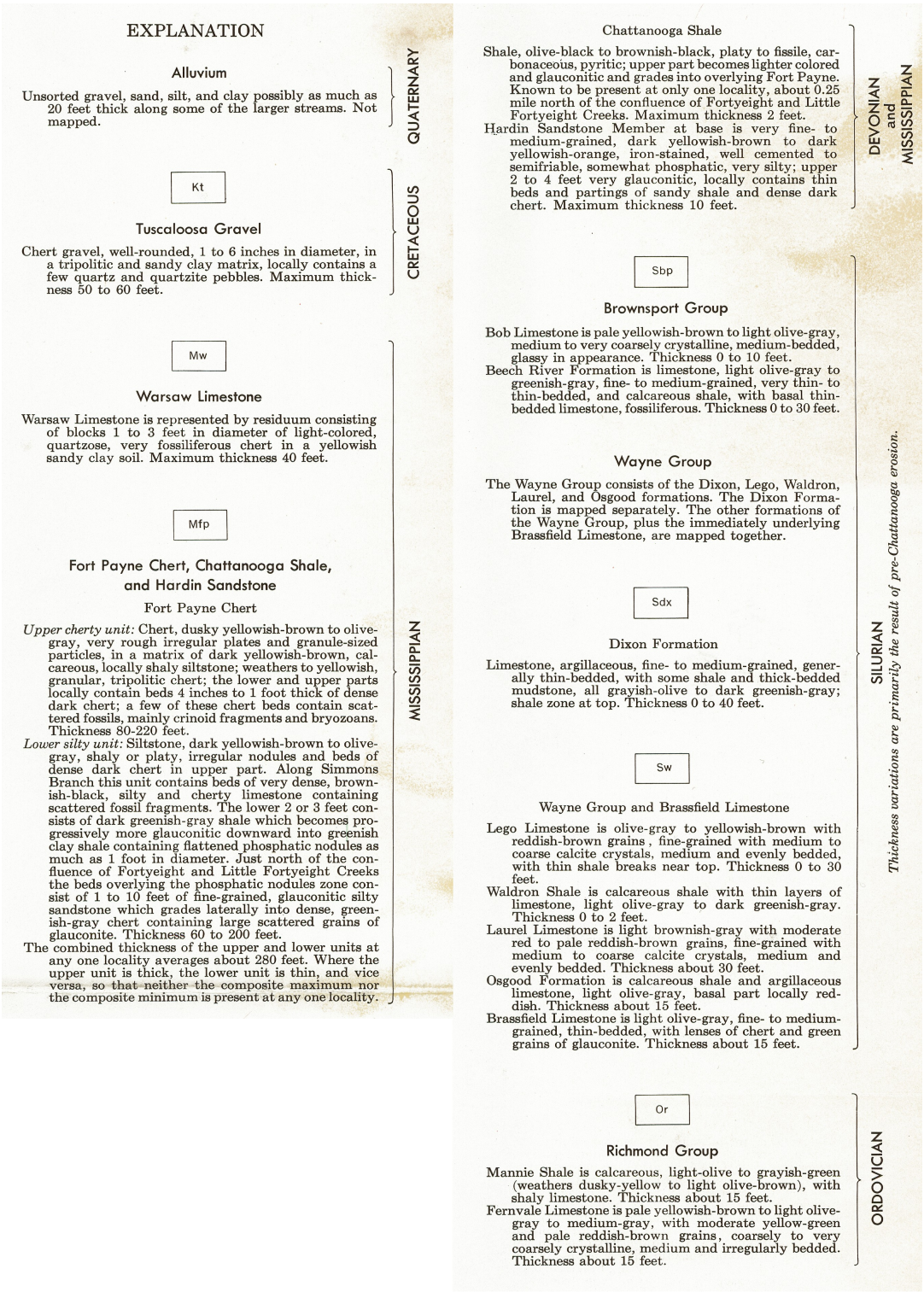
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Waynesboro East Quadrangle

Expalantion



EXPLANATION

Alluvium

Unsorted gravel, sand, silt, and clay possibly as much as 20 feet thick along some of the larger streams. Not mapped.

QUATERNARY

Kt

Tuscaloosa Gravel

Chert gravel, well-rounded, 1 to 6 inches in diameter, in a tripolitic and sandy clay matrix, locally contains a few quartz and quartzite pebbles. Maximum thickness 50 to 60 feet.

CRETACEOUS

Mw

Warsaw Limestone

Warsaw Limestone is represented by residuum consisting of blocks 1 to 3 feet in diameter of light-colored, quartzose, very fossiliferous chert in a yellowish sandy clay soil. Maximum thickness 40 feet.

Mfp

Fort Payne Chert, Chattanooga Shale, and Hardin Sandstone

Fort Payne Chert

Upper cherty unit: Chert, dusky yellowish-brown to olive-gray, very rough irregular plates and granule-sized particles, in a matrix of dark yellowish-brown, calcareous, locally shaly siltstone; weathers to yellowish, granular, tripolitic chert; the lower and upper parts locally contain beds 4 inches to 1 foot thick of dense dark chert; a few of these chert beds contain scattered fossils, mainly crinoid fragments and bryozoans. Thickness 80-220 feet.

Lower silty unit: Siltstone, dark yellowish-brown to olive-gray, shaly or platy, irregular nodules and beds of dense dark chert in upper part. Along Simmons Branch this unit contains beds of very dense, brownish-black, silty and cherty limestone containing scattered fossil fragments. The lower 2 or 3 feet consists of dark greenish-gray shale which becomes progressively more glauconitic downward into greenish clay shale containing flattened phosphatic nodules as much as 1 foot in diameter. Just north of the confluence of Fortyeight and Little Fortyeight Creeks the beds overlying the phosphatic nodules zone consist of 1 to 10 feet of fine-grained, glauconitic silty sandstone which grades laterally into dense, greenish-gray chert containing large scattered grains of glauconite. Thickness 60 to 200 feet.

The combined thickness of the upper and lower units at any one locality averages about 280 feet. Where the upper unit is thick, the lower unit is thin, and vice versa, so that neither the composite maximum nor the composite minimum is present at any one locality.

MISSISSIPPIAN

Chattanooga Shale

Shale, olive-black to brownish-black, platy to fissile, carbonaceous, pyritic; upper part becomes lighter colored and glauconitic and grades into overlying Fort Payne. Known to be present at only one locality, about 0.25 mile north of the confluence of Fortyeight and Little Fortyeight Creeks. Maximum thickness 2 feet.

Hardin Sandstone Member at base is very fine- to medium-grained, dark yellowish-brown to dark yellowish-orange, iron-stained, well cemented to semifriable, somewhat phosphatic, very silty; upper 2 to 4 feet very glauconitic, locally contains thin beds and partings of sandy shale and dense dark chert. Maximum thickness 10 feet.

DEVONIAN and MISSISSIPPIAN

Sbp

Brownsport Group

Bob Limestone is pale yellowish-brown to light olive-gray, medium to very coarsely crystalline, medium-bedded, glassy in appearance. Thickness 0 to 10 feet.

Beech River Formation is limestone, light olive-gray to greenish-gray, fine- to medium-grained, very thin- to thin-bedded, and calcareous shale, with basal thin-bedded limestone, fossiliferous. Thickness 0 to 30 feet.

Wayne Group

The Wayne Group consists of the Dixon, Lego, Waldron, Laurel, and Osgood formations. The Dixon Formation is mapped separately. The other formations of the Wayne Group, plus the immediately underlying Brassfield Limestone, are mapped together.

Sdx

Dixon Formation

Limestone, argillaceous, fine- to medium-grained, generally thin-bedded, with some shale and thick-bedded mudstone, all grayish-olive to dark greenish-gray; shale zone at top. Thickness 0 to 40 feet.

Sw

Wayne Group and Brassfield Limestone

Lego Limestone is olive-gray to yellowish-brown with reddish-brown grains, fine-grained with medium to coarse calcite crystals, medium and evenly bedded, with thin shale breaks near top. Thickness 0 to 30 feet.

Waldron Shale is calcareous shale with thin layers of limestone, light olive-gray to dark greenish-gray. Thickness 0 to 2 feet.

Laurel Limestone is light brownish-gray with moderate red to pale reddish-brown grains, fine-grained with medium to coarse calcite crystals, medium and evenly bedded. Thickness about 30 feet.

Osgood Formation is calcareous shale and argillaceous limestone, light olive-gray, basal part locally reddish. Thickness about 15 feet.

Brassfield Limestone is light olive-gray, fine- to medium-grained, thin-bedded, with lenses of chert and green grains of glauconite. Thickness about 15 feet.

SILURIAN

Thickness variations are primarily the result of pre-Chattanooga erosion.

Or

Richmond Group

Mannie Shale is calcareous, light-olive to grayish-green (weathers dusky-yellow to light olive-brown), with shaly limestone. Thickness about 15 feet.

Fernvale Limestone is pale yellowish-brown to light olive-gray to medium-gray, with moderate yellow-green and pale reddish-brown grains, coarsely to very coarsely crystalline, medium and irregularly bedded. Thickness about 15 feet.

ORDOVICIAN

Graphic from source map: Waynesboro East Quadrangle

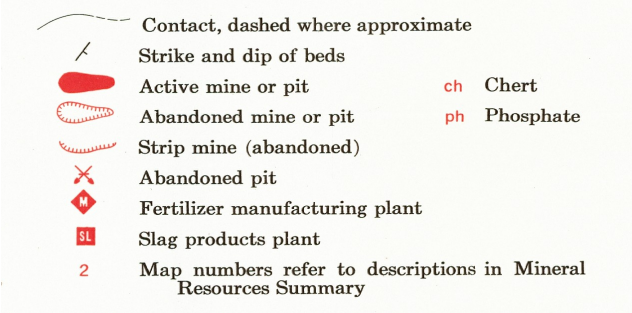
Williamsport Quadrangle

The formal citation for this source.

> Wilson, C.W., Jr., Barnes, R.H., Miller, R.A., and Jewell, J.W., 1964, Geologic Map and Mineral Resources Summary of the Williamsport Quadrangle: Tennessee Division of Geology, Geologic Quadrangle Map GM 57-NW, scale 1:24,000 (*GRI Source Map ID 68546*).

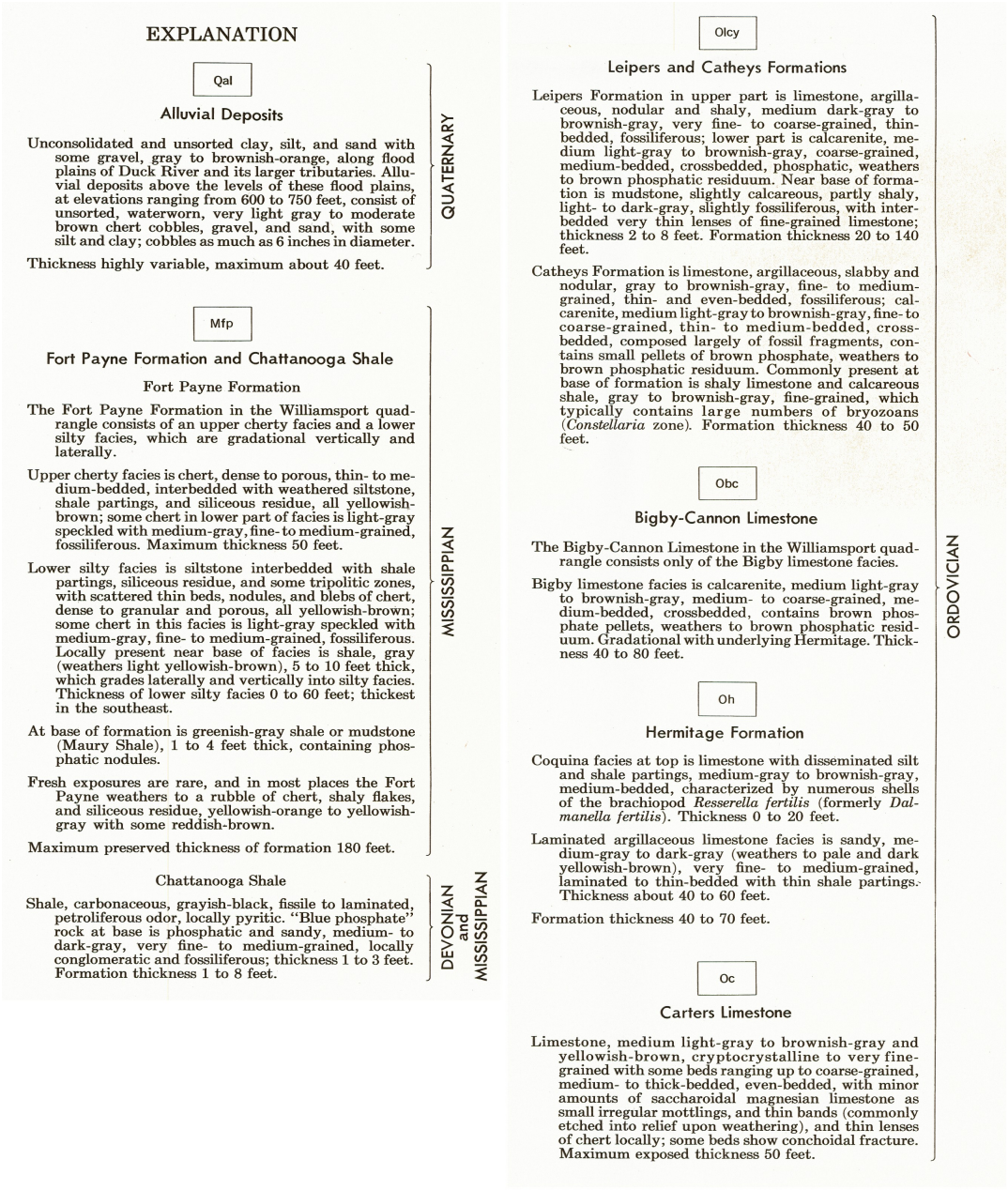
Prominent graphics associated with this source.

Map Legend



Graphic from source map: Williamsport Quadrangle

Explanation



EXPLANATION

Qal

Alluvial Deposits

Unconsolidated and unsorted clay, silt, and sand with some gravel, gray to brownish-orange, along flood plains of Duck River and its larger tributaries. Alluvial deposits above the levels of these flood plains, at elevations ranging from 600 to 750 feet, consist of unsorted, waterworn, very light gray to moderate brown chert cobbles, gravel, and sand, with some silt and clay; cobbles as much as 6 inches in diameter.

Thickness highly variable, maximum about 40 feet.

QUATERNARY

Mfp

Fort Payne Formation and Chattanooga Shale

Fort Payne Formation

The Fort Payne Formation in the Williamsport quadrangle consists of an upper cherty facies and a lower silty facies, which are gradational vertically and laterally.

Upper cherty facies is chert, dense to porous, thin- to medium-bedded, interbedded with weathered siltstone, shale partings, and siliceous residue, all yellowish-brown; some chert in lower part of facies is light-gray speckled with medium-gray, fine- to medium-grained, fossiliferous. Maximum thickness 50 feet.

Lower silty facies is siltstone interbedded with shale partings, siliceous residue, and some tripolitic zones, with scattered thin beds, nodules, and blebs of chert, dense to granular and porous, all yellowish-brown; some chert in this facies is light-gray speckled with medium-gray, fine- to medium-grained, fossiliferous. Locally present near base of facies is shale, gray (weathers light yellowish-brown), 5 to 10 feet thick, which grades laterally and vertically into silty facies. Thickness of lower silty facies 0 to 60 feet; thickest in the southeast.

At base of formation is greenish-gray shale or mudstone (Maury Shale), 1 to 4 feet thick, containing phosphatic nodules.

Fresh exposures are rare, and in most places the Fort Payne weathers to a rubble of chert, shaly flakes, and siliceous residue, yellowish-orange to yellowish-gray with some reddish-brown.

Maximum preserved thickness of formation 180 feet.

MISSISSIPPIAN

Chattanooga Shale

Shale, carbonaceous, grayish-black, fissile to laminated, petroliferous odor, locally pyritic. "Blue phosphate" rock at base is phosphatic and sandy, medium- to dark-gray, very fine- to medium-grained, locally conglomeratic and fossiliferous; thickness 1 to 3 feet. Formation thickness 1 to 8 feet.

DEVONIAN and MISSISSIPPIAN

Olcy

Leipers and Catheys Formations

Leipers Formation in upper part is limestone, argillaceous, nodular and shaly, medium dark-gray to brownish-gray, very fine- to coarse-grained, thin-bedded, fossiliferous; lower part is calcarenite, medium light-gray to brownish-gray, coarse-grained, medium-bedded, crossbedded, phosphatic, weathers to brown phosphatic residuum. Near base of formation is mudstone, slightly calcareous, partly shaly, light- to dark-gray, slightly fossiliferous, with interbedded very thin lenses of fine-grained limestone; thickness 2 to 8 feet. Formation thickness 20 to 140 feet.

Catheys Formation is limestone, argillaceous, slabby and nodular, gray to brownish-gray, fine- to medium-grained, thin- and even-bedded, fossiliferous; calcarenite, medium light-gray to brownish-gray, fine- to coarse-grained, thin- to medium-bedded, crossbedded, composed largely of fossil fragments, contains small pellets of brown phosphate, weathers to brown phosphatic residuum. Commonly present at base of formation is shaly limestone and calcareous shale, gray to brownish-gray, fine-grained, which typically contains large numbers of bryozoans (*Constellaria* zone). Formation thickness 40 to 50 feet.

Obc

Bigby-Cannon Limestone

The Bigby-Cannon Limestone in the Williamsport quadrangle consists only of the Bigby limestone facies.

Bigby limestone facies is calcarenite, medium light-gray to brownish-gray, medium- to coarse-grained, medium-bedded, crossbedded, contains brown phosphate pellets, weathers to brown phosphatic residuum. Gradational with underlying Hermitage. Thickness 40 to 80 feet.

Oh

Hermitage Formation

Coquina facies at top is limestone with disseminated silt and shale partings, medium-gray to brownish-gray, medium-bedded, characterized by numerous shells of the brachiopod *Resserella fertilis* (formerly *Dalmanella fertilis*). Thickness 0 to 20 feet.

Laminated argillaceous limestone facies is sandy, medium-gray to dark-gray (weathers to pale and dark yellowish-brown), very fine- to medium-grained, laminated to thin-bedded with thin shale partings. Thickness about 40 to 60 feet.

Formation thickness 40 to 70 feet.

Oc

Carters Limestone

Limestone, medium light-gray to brownish-gray and yellowish-brown, cryptocrystalline to very fine-grained with some beds ranging up to coarse-grained, medium- to thick-bedded, even-bedded, with minor amounts of saccharoidal magnesian limestone as small irregular mottlings, and thin bands (commonly etched into relief upon weathering), and thin lenses of chert locally; some beds show conchoidal fracture. Maximum exposed thickness 50 feet.

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Graphic from source map: Williamsport Quadrangle

GRI Digital Data Credits

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

The information in this document was compiled from GRI source maps, and is intended to accompany the digital geologic-GIS maps and other digital data for Natchez Trace Parkway, Tennessee (NATR) developed by Stephanie O'Meara, Derek Witt, James Winter, Kari Lanphier, Rachel Yoder, Ian Hageman and Max Jackl (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).

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