

Index and Short Description to the Geologic terms used by the GSS

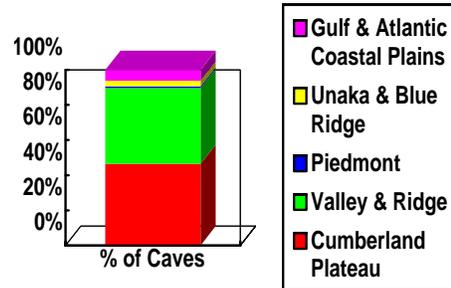
- compiled by Carl Anderson

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The following definitions apply to usages in the GSS cave list. Descriptions and definitions are provided to help standardize both usage and meaning. All material is compiled from numerous sources, rock unit descriptions are taken from the appropriate lexicon of geologic names and the descriptions are based on the original description where ever possible.

The GSS records the Physiographic Province of the entrance to caves. Currently the following provinces are defined by the GSS:

- C - Cumberland Plateau (undifferentiated)
- V - Vally & Ridge
- P - Piedmont
- U - Unaka & Blue Ridge
- G - Gulf & Atlantic Coastal Plains (undifferentiated)

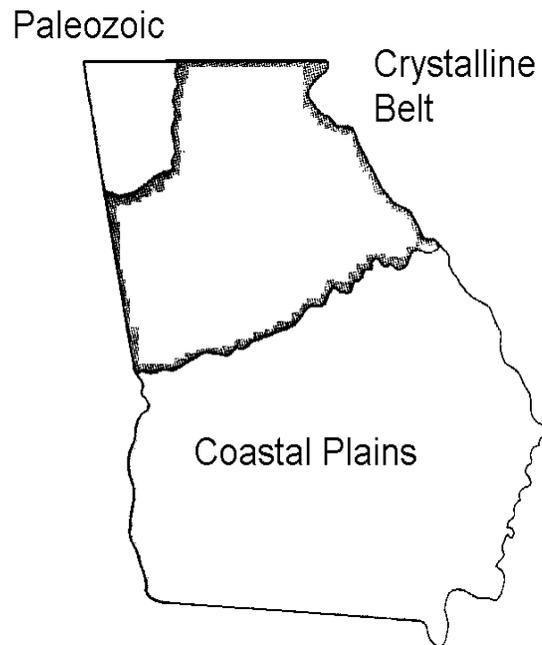


Physiographic provinces are used to describe the general physical form of the terrain and, in general terms, the composition of the rock.

Physiographic Provinces

The state of Georgia is easily divided into 3 distinct physiographic regions: a coastal plain, a crystalline belt, and a paleozoic region.

The **paleozoic** re-corner of the state that were laid down mentary rocks) dur-The rocks under-folding and faulting Paleozoic era. the the Cartersville fault fault can be easily from Cohutta County trace south then east southeast County. The paleo-subdivided in to two topography.



gion is the northwest and contains rocks as sediments (sedi- ing the Paleozoic Era. went considerable near the end of the region is bounded by to the south. *The be traced as follows: Springs in Murray to Cartersville, and to Epsom Hill in Polk zoic region can be more parts based on*

from *Georgia State Base Geologic Map, 1976*

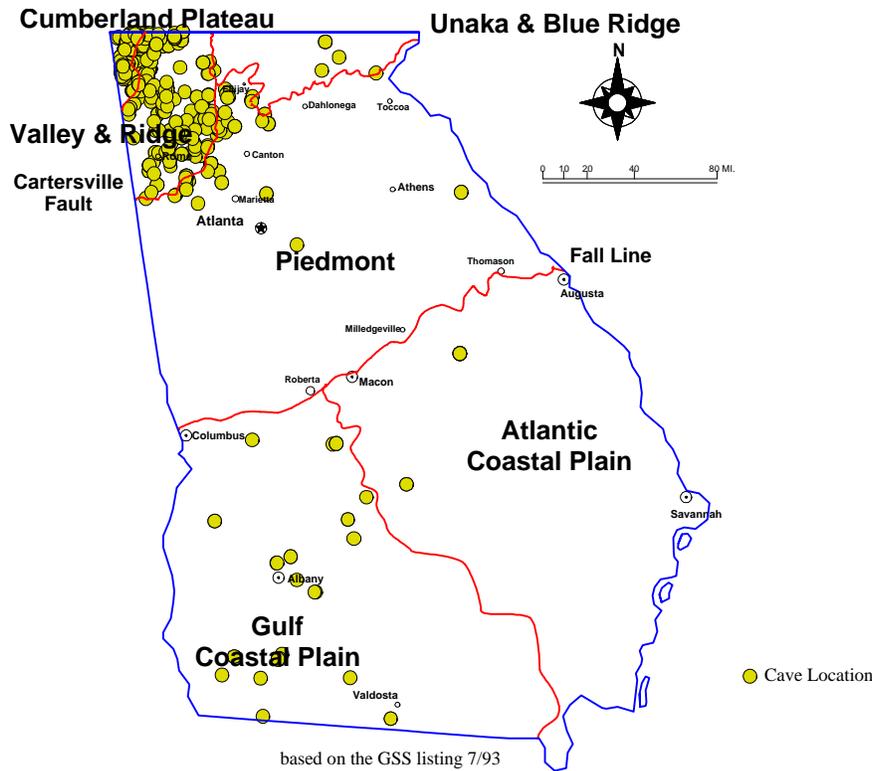
Cumberland Plateau - This province is made up of eroded and uneroded elements of the Cumberland Plateau extending southwest from Tennessee. The Cumberland Plateau consists of rolling hills and shallow valleys except where streams have formed canyons. The Kingston Fault forms a convenient boundary for this province as does Lookout and Pigeon mtns. Most features in northwest Georgia capped by Pennsylvanian rocks are a part of the Cumberland Plateau. In Georgia these features include:

- | | |
|-----------------|------------------|
| Sand Mountain | Lookout Mountain |
| Pigeon Mountain | Fox Mountain |

Valley & Ridge - This province is made up of the Georgian part of the Appalachian Valley, which extends from Canada to northern Georgia & northern Alabama. Valley & Ridge consists of parallel valleys, separated by steep or well rounded ridges. Valley & Ridge is comprised mostly of Silurian and Ordovician rocks, with some Mississippian and some Cambrian rocks. In Georgia, features in the Valley & Ridge province include:

- | | |
|----------------|---------------------|
| Taylor Ridge | Shankle Ridge |
| Hawkins Ridge | Peavine Ridge |
| Shinbone Ridge | Dick Ridge |
| Johns Mountain | Mill Creek Mountain |

The **crystalline belt** consists of metamorphic (altered by heat of stress) and intrusive igneous (molten) rock, with small amounts of metasedimentary (partially altered) and sedimentary rock. It is divided into two parts, the igneous intrusives and metamorphics of the piedmont plateau and the metamorphics associated with the Blue Ridge mtns of the Appalachian chain. The crystalline belt is bounded by the Cartersville fault to the north and the "Fall Line" to the south. The "Fall Line" is the contact between the metamorphic crystalline belt and the sedimentary Coastal Plain. The contact is often associated with a series of bluffs, hence the fall line. The rocks in this region are associated with



the Paleozoic and Precambrian eras making these the oldest rocks in the state. The "Fall Line" can be approximated as follows: from Augusta, through Milledgeville, Macon and finally through Columbus. The crystalline belt can be subdivided into two more parts based on topography.

Piedmont - Relatively smooth upland surface sloping gradually southeastward. No ridge or valleys stand out conspicuously above the surrounding terrain. The valleys are broad and shallow and have long gentle slopes. Basoliths (Stone mtn, Kennesaw mtn) extend high above the surrounding terrain exist in a band of intrusive igneous rocks.

Unaka Mountains & Blue Ridge - Numerous irregular ranges, often separated by narrow valleys and deep gorges. Metamorphic rocks are predominant but thin layers of metasedimentary rocks can be found (limestones, shales, siltstones, ...). A high degree of deformity exists in this province.

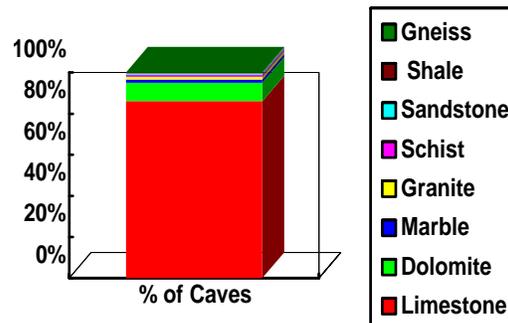
Gulf and Atlantic Coastal Plains - As a single region, it is an emerged portion of the continental shelf, brought about by an uplift of the land or a lowering of the sea. Sedimentary rocks in this region are sometimes not completely consolidated (fairly "soft rock") and the whole province is overlain with unconsolidated Quaternary soils and clays. The terrain is generally featureless and gradually slopes southeastward.

Gulf Coastal Plain - Rocks in this region are of the Cretaceous & Tertiary periods. They tend to be more consolidated than the Quaternary rocks. There also tends to be slightly more relief with some shallow valleys and small hills, some deep gorges do exist (Providence Canyon). Water from this region flows into the Gulf of Mexico.

Atlantic Coastal Plain - Rocks in this region are of the Cretaceous & Tertiary periods. There tends to be little or no topographic relief other than the gentle southeastward slope. Water from this region flows into the Atlantic Ocean.

The GSS currently uses the following geologic descriptive units:

- KN - Knox Formation
- NK - Newala Formation
- FP - Fort Payne Formation
- MO - Monteagle Limestone
- BA - Bangor Limestone
- TM - Tampa Limestone



Each of these descriptive rock units are identifiable and mappable in the field. Each corresponds to a time when the state of Georgia was underwater. Because the descriptive name corresponds both to time and to the composition of the rock, other places may have different names for rocks deposited at the same time or for rocks that are of a different time but similar in content. If you are unsure refer to a geologic map or be general in naming the rock. To help understand what type of rock is being described I have included, where ever possible, the location the rock was named for and the person who first used the name in describing the rock unit.

The names for descriptive rock units are presented in order from oldest to youngest (except where noted).

Rock Systems

Cambrian Rocks

Rome Formation The Rome consists of sandstone, siltstone, and claystone. The siltstone & claystone are fissile (*easily split into layers*), the sandstone is fine grained and beds are less than 4" thick. The Rome fm can be green, yellow, red, or brown. The entire formation is tightly folded and exposed beds are steeply tilted or vertical. Named from Rome, Floyd County, Ga. by C.W. Hayes (1891). Before 1891 this was named the Knox Sandstone of the Knox group.

Conasauga The Conasauga consists of siltstone, claystone, shale, and limestone. The lower part of the formation is mostly siltstone and claystone and only a few scattered beds of limestone. The siltstone and claystone contain enough lime to give them the appearance of limestone when unweathered. After weathering removes the lime content the siltstone and claystone are reduced to a brownish or greenish shale-like rock. The top of the formation is a light to dark gray thick bedded limestone that corresponds with the Maynardville ls of the Conasauga Group in Tennessee. Named from exposures along the Conasauga River in Whitfield and Murray Counties, Ga. by C.W. Hayes (1891). Before 1891 this rock unit was named the Knox Shale of the Knox group.

Ordovician Rocks

Knox Group The Knox group is a sequence of rocks that corresponds to the Knox Dolomite named from Knox County, Tn. by J.M. Safford (1869). The Knox Group consists of in ascending order:

Copper Ridge Dolomite A thickly to massively bedded dolomite containing no limestone except one or two beds near the base. the Dolomite is brownish gray and has a asphaltic odor especially when the rock is freshly broken. The upper half is light gray dolomite and some light brownish gray dolomite in thin to thick beds. Chert layers are more abundant in the upper half. Named from Copper Ridge Tn. by E.O. Ulrich (1911).

Chepultepec Dolomite Mainly dolomite with several beds of limestone. Mostly light gray but may also be light red or brownish gray. The beds vary from thin to thick, a few layers of chert are up to 10 feet thick but most is in thin layers and nodules. Thin sandstone beds interbedded with chert sometimes occur at the top of the formation. Named from Chepultepec, Blount Co, Al. by E.O. Ulrich (1911) who described it as being highly magnetic at that locality.

Longview Limestone Light gray to light olive gray cherty limestone and dolomite. Layers and nodules of reddish chert are characteristic of the Longview. Unconformably overlies Chepultepec. Named from Longview, Shelby, Co., Al. by E.O. Ulrich (1924).

Chickamauga Ls Silty & clayey limestones and limy siltstones. The composition and texture of rock vary with location. Most of the formation is thin bedded but some limestone beds are 3 or 4 feet thick. A high degree of fracturing and jointing is characteristic of this rock unit. Described from exposures along the Chickamauga Creek near Chattanooga Tn. by Hayes in 1890. The following are subdivisions of the Chickamauga supergroup:

Stones River Group A series of limestone that are slightly fossiliferous (having fossils) and argillaceous (clayey) and fucoidal (contains fossil remnants of brown algae or rockweed). Lower parts have increasing amounts of interbedded shales and tend to be more dolomitic. Named from Stone River, Nashville, Tn. by J.M. Safford (1851).

Newala Limestone	Lowest member of Stones River group. Is made up of thick bedded, pure, blue limestone, finely crystalline. Also may be known as the Pond Spring Formation. Named from Newala Station, Shelby County Al. by C.W. Butts (1928).
Trenton Limestone	Also known as the Nashville Group in Tn. The lowest layer is poorly bedded argillaceous medium to olive gray limestone. The middle layer is medium dark gray, fine grained, well bedded (2" - 6" thick), fossiliferous limestone. An interim layer that is unfossiliferous and inter bedded with gray-yellow siltstone. The upper layer is very thin and irregularly bedded and is abundantly fossiliferous. Named from Trenton Falls, Ny. by L. Vanuxem (1838).
Sequatchie Formation	Mottled grayish-red calcareous (limy) mudstones, red and green calcareous shales and greenish-gray argillaceous (clayey) limestones. Unconformably overlies the Nashville group and unconformably underlies Red Mountain formation. Named from the Sequatchie Valley by E.O. Ulrich (1912).

Silurian Rocks

Red Mountain Fm Sandstone to shale, small amounts of limestone. To the east more sandstone, to the west mostly shale. Unweathered sandstone is gray to cream, after weathering it is red to buff. A few beds of hematites occur. Unweathered shale is gray, weathered shale is brown to maroon. Named from Red Mountain near Birmingham and Bessemer Al. by E.A. Smith (1876).

Devonian Rocks

Chattanooga Shale The shale is highly fissile (easily cleaved) most often black but may be brown where weathered. The formation is about 15 feet thick with the upper foot being a layer of greenish clay containing phosphatic nodules between ½" and 2" in diameter (this may be the same as the Maury fm of Tn). Chattanooga shale is folded and cleaved. The Red Mountain fm below and the Fort Payne chert above are relatively undeformed. Named from Chattanooga Tn. by C.W. Hayes (1891).

Mississippian Rocks

Fort Payne Chert Stratified chert and dark compact calcareous (limy) shale or argillaceous (clayey) limestone. Beds range in thickness from 2" to 1' and are irregularly furrowed. Small quartz geodes ¼" to 2½" in diameter are abundant in the lower part. Named from Fort Payne, Dekalb County Al. by E.A. Smith (1890).

St. Louis Limestone A thick bedded dark, fine grained cherty limestone, generally non-oolitic. Named from St. Louis Mo. by G. Englemann (1847).

Monteagle Limestone White & light gray, fine to coarse grained, thin to very thick bedded, fossiliferous and oolitic limestone. Named from a roadcut 1¼ mile south-east of Monteagle Tn. on US highway 41. Named by Vail (1959) in an unpublished thesis. In other parts of the Southeast the Monteagle may be described as being made up of the following:

Ste. Genevieve Ls Named from Ste. Genevieve Co., Mo. by B.F. Shumard (1860).

Gasper Limestone Very similar to the Ste. Genevieve ls. Named separately because of geology in western Kentucky and southern Illinois. Named from the Gasper River, Warren Co., Ky by C.W. Butts (1917).

Golconda Formation Shale and interbedded thin platy limestone. The total formation is less than 20 feet thick. Named from Golconda, Hardin County, Ill. by A.P. Brokaw (1916). Linked by fossil evidence. In TAG often mapped with the Hartselle Fm.

Hartselle Sandstone 5' to 10' of sandstone or sandy limestone that weathers to sandstone. Probably the same as the Hartselle sandstone of Al. Named from Hartselle, Morgan Co., Al. by E.A. Smith (1894).

Bangor Limestone Bluish gray, thick bedded, coarsely crystalline limestone. Named from Bangor, Blount Co., Al. by E.A. Smith (1890). Restricted to units above the Hartselle and below the Pennington by C. Butts (1926).

Pennington Shale A gray shale that weathers to yellow and red, the red beds are a distinguishing characteristic. Some beds of limestone and sandstone occur. The shales have an abundance of marine fossils that do not occur in the overlying Pennsylvanian rocks. Named from Pennington Gap, Va. by C.W. Hayes (1891).

Floyd Shale Gray to black fossiliferous (having fossils) shale. May contain, in places, limestone or sandstone. East of Taylor Ridge all Mississippian rock above the Fort Payne is identified as the Floyd shale. Named from Floyd County, Ga. by C.W. Hayes (1891).

Pennsylvanian Rocks

Lookout Sandstone Named from prominent exposures on Lookout mtn Tn. by C.W. Hayes (1892). Made up of the following:

Gizzard Member Fine-grained sandstone and gray shale. Named from Little Fiery Gizzard Creek, Marion Co., Tn. by J.M. Safford (1869).

Sewanee Member Coarse grained generally massive bedded white to buff conglomerate sandstone. Forms much of the prominent rim around Lookout Mountain. Studied at Sewanee Tn. by J.M. Safford (1893).

Whitwell Shale Thin bedded light to dark gray shale. Formation is 50' at its thickest and thins to 5' to the south. Named from Whitwell mines near Whitwell, Marion Co., Tn by C.W. Butts & W.A. Nelson (1925).

Bonair Sandstone Crossbedded fine to coarse grained light colored sandstone that weathers to reddish brown. Similar to the Sewanee Member except it does not contain pebbles. Named from Bonair, White Co., Tn. by M.R. Campbell (1899).

Vandever Shale Coal, gray shale, and sandy shale. Considerable amounts of coal have been mined in the Vandever Shale. Named from Vandever, Cumberland Co., Tn. by C.W. Butts (1910).

Rockcastle Sandstone The lower part is coarse grained, thick bedded, crossbedded, and resistant to weathering. The upper part is an interbedded sandstone and shale that contains three seams of coal. Named from Rockcastle River Ky. by M.R. Campbell (1898).

The following rocks are found only north of the "Fall Line" in Georgia and outside of the Paleozoic region. These metamorphic rocks may have little or no correspondence to their original sedimentary form. Instead they are more often graded by the degree of metamorphism than by original rock composition.

The Rocks of the Crystalline Belt are mainly schists, shales, quartzites, marbles, gneisses, and granites. They are often differentiated by the grade of metamorphism using isograds. We won't go into the use of descriptive facies for these rocks as few caves have been found here and simply naming the type of rock that the cave is in seems to be sufficient.

The following rocks are found only south of the "Fall Line" in Georgia.

Because of the relative recent age of the following descriptive rock units, the names presented may not be found in all places in the Coastal Plains. In general the surface rocks in the Coastal Plain tend to be partially consolidated sands and clays, and soils to the north and both more consolidated and having a greater lime content towards Florida.

Cretaceous Rocks

Tuscaloosa Formation Pink & white kaolinic micaceous sand. Crossbedded sands are common but thin clay beds are rare. Named from Tuscaloosa Al. by Smith & Johnson (1887).

Tertiary Rocks

Eocene Series Rocks

McBean Formation Gray & yellow calcareous sand & fossiliferous limestone beds. Named from McBean, Richmond Co., Ga. by Veatch & Stephenson (1911).

Barnwell Brilliant red sand grading downward into interbedded yellow sand & gummy clay lamina. Thin fossiliferous limestone beds are present though sporadically leached away. Named by E. Sloan (1905).

Oligocene Series Rocks

Suwanee Limestone Yellowish cherty limestone & some mottled clay. Named from Suwanee River, Fla. by MacNeil (1947).

Miocene Series Rocks Hawthorn Formation Beds of phosphatic rock more or less broken up, enclosed in a younger matrix. Contains, in this order, phosphatic oolite, soft sandstone, ferruginous (rust colored) gravel, sand or sandstone, and greenish yellow clays. Named from Hawthorn, Alachua Co., Fla. by W.H. Dall (1892).

Tampa Limestone Yellow to gray limestone, sometimes cherty, with greenish clay. Named from exposures in Tampa, Fla. where it underlies the city, by L.C. Johnson (1888).

The following Table shows the sequence of descriptive rock units in order from oldest to youngest that is valid in each province. In the crystalline belt (Piedmont, Unaka & Blue Ridge) no valid sequence exists, so rock is described by composition only, without regard to the time that the rocks were originally laid as sediments (Era).

Era	Cumberland Plateau	Valley & Ridge	Piedmont, Unaka & Blue Ridge	Coastal Plains
Cambrian	Rome Fm Conasauga Grp	Rome Fm Conasauga Grp	Granite Gneiss Marble Slate Schist Quartzite	
Ordovician	Knox Grp Chickamauga Ls	Knox Grp Chickamauga Ls		
Silurian	Red Mtn Fm	Red Mtn Fm		
Devonian	Chattanooga Sh	Chattanooga Sh		
Mississippian	Fort Payne Chert St. Louis Ls Monteagle Ls Hartselle Ss Bangor Ls Pennington Sh	Fort Payne Chert Floyd Sh		
	Pennsylvanian	Lookout Ss Whitwell Sh Bonair Ss Vandever Sh Rockcastle Ss		
<i>Break in Sequence</i>				
Cretaceous				Tuscaloosa Fm McBean Fm
Tertiary -Eocene				Barnwell Ss Suwanee Ls
Tertiary - Oligocene				Hawthorn Fm Tampa Ls
Tertiary - Miocene				

Origins of the Names for Periods

- Cambrian -** Cambrii (Roman name for what is now Wales England). First studied by Adam Sedgewick of Cambridge Univ in 1833.
- Ordovician -** Ordovcii (ancient tribe that lived in Wales from 200 B.C.E. to 500 C.E.). First studied by Charles Lapworth of Birmingham Univ. in 1879.
- Silurian -** Silures (tribe of ancient Britons). Named by Roderick Murchison in 1835.

Devonian -	Devonshire England. Adam Sedgewick & Roderick Murchison in 1835.
Mississippian -	Mississippi Valley, previously this and the Pennsylvanian were grouped under Carboniferous (coal bearing).
Pennsylvanian -	Named from coal fields of western Pennsylvania.
Permian -	Perm mountains (on the western flank of the Ural mtns in Russia). Roderick Murchison in 1841.
Triassic -	Trias (in Germany this is easily divided into 3 prominent units. Hence the Trias). F. van Albertii in 1834.
Jurassic -	Jura (mtns of eastern France and northern Switzerland) A. Borngniart & A. von Humboldt.
Cretaceous -	Creta (Latin for chalk) for the chalk cliffs on both sides of the English Channel by O.D'Halloy in 1827.

Names for Eras

Paleozoic =	Ancient Life
MesoZoic -	Middle Life
Tertiary -	Third period of Life

Physiographic Province

Code	Number	Description
		of Caves
C	182	Cumberland Plateau (undifferentiated)
G	25	Gulf & Atlantic Coastal Plains (undifferentiated)
P	4	Piedmont
U	12	Unaka Mountains & Blue Ridge
V	169	Valley & Ridge
Coded but not used		
E	0	Eastern Escarpment, Cumberland Plateau
N	0	Cumberland Plateau proper (Pennsylvanian)

Geologic Formation

Code	Number	Description
		of Caves
BA	174	Bangor ls
DO	27	dolomite
FP	9	Fort Payne fm
GN	1	gneiss
GR	5	granite
KN	2	Knox fm (<i>code not valid, but used in 1992</i>)
LS	134	limestone
MB	6	marble
MO	1	Monteagle ls
NK	4	Newala fm
SC	4	schist
SH	1	shale
SS	2	sandstone
TM	15	Tampa ls
XX	3	other (explained in data cards)
Coded but not used		
TR	0	Trenton ls
PN	0	Pennington sh

Most GSS members are partially familiar with these names, in some form or another. The purpose of this document is to provide a basis for uniform usage for these terms in the State of Georgia and in association with the description of caves in Georgia.

For consistency I have included names that are already encoded into the list of caves, but I have provide descriptions of names that I fealt were likely to be used in the future or names that are more appropriate now.

(The following were approved by the GSS membership at the annual meeting March '94)

In that regard I propose, after careful consideration, that the GSS abandon the use of Trenton Limestone and instead use Nashville Group or Nashville Limestone. I also propose that the GSS abandon the use of the descriptive name Newala and instead include those units in the Stones River Group.

Now	Proposed	Reason
Trenton ls	Nashville Group	standardize with the USGS, TVA, state of Georgia ...
Newala fm	Stones River grp	Newala has been incorrectly mapped into Knox Group, Stones River is a standard.
E	nothing (removed)	Eastern Escarpment, Cumberland Plateau is not well defined in Georgia
N	nothing (removed)	Cumberland Plateau proper (Pennsylvanian) is not well defined in Georgia

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