



### CORRELATION OF MAP UNITS

FLUVIAL	PHYSICOCHEMICAL DEPOSITS	SLOPE DEPOSITS	
ALLUVIUM	KARST RESIDUUM	DEBRIS FLOWS	HOLOCENE
TERRACES	DEBRIS FLOWS	COLLUVIUM	PLEISTOCENE
	DEBRIS FANS		TERTIARY

### DESCRIPTION OF MAP UNITS

#### FLUVIAL DEPOSITS AND LANDFORMS

**ALLUVIUM**

- Qa Alluvium (Holocene)** - Unconsolidated silt, sand, cobbles, and small boulders along and beneath streams, floodplains and alluvial plains. Sediments well to poorly stratified, commonly in fining upward sequences as much as 20 ft (6 m) thick. Includes alluvial terraces, colluvium, and debris from adjacent slopes as much as 40 ft (12 m) above stream channel. Bedrock outcrops too small to portray are exposed locally.
- Qac Coarse alluvium (Holocene)** - Cobbles and large boulders mostly of massive metamorphosed sandstone and conglomerate along upper reaches of streams and flood plains in the Blue Ridge highlands. Coarse alluvium may be transitional with boulder debris on slopes. Rounded and sub-rounded boulders were derived and reworked from debris and colluvial deposits.

**TERRACES**

- Qt Terrace deposits (Holocene and Pleistocene)** - Unconsolidated sand, gravel, cobbles, and boulders are comprised mostly of quartz-rich rocks; metasediment cobbles may also be present. Deposits have been left by rivers along most major drainages. Deposits range from 10 to 30 ft (3 to 9 m) thick and are on terraces cut into bedrock. Terraces are as much as 30 ft (9 m) above present flood plain alluvium and some grade down-slope into alluvium. Deposits have been eroded from some terraces. Terraces shown in Cades Cove, Tuckaleechee Cove, and south of Cosby are transitional with up slope debris deposits.
- Qtt Upper level terrace and deposits (Pleistocene)** - Unconsolidated sand, gravel, cobbles and boulders of quartz-rich rocks mostly deposited by rivers. Deposits largely have been eroded from terraces that are as much as 200 ft (60 m) above present flood plain alluvium. Elevated landform and deposit are from an old erosion surface. In Tuckaleechee Cove, upper level terrace may be transitional with metasediment debris.

#### LANDFORMS AND DEPOSITS OF PHYSICOCHEMICAL WEATHERING

- Qts Sinkholes (Holocene)** - Solution depressions (sinkholes) and hummocky karst consisting of clusters of sinkholes and bedrock pinnacles, and cave openings in areas underlain by carbonate bedrock. Sinkholes are common in the Tennessee Valley but are also found within the tectonic windows, in the foothills of the western Blue Ridge of Tennessee. Sinkholes are developed in alluvial valleys, on mountain tops, and within debris fan deposits and fluvial terraces.
- Qtr Residuum (Holocene)** - Pebbles, cobbles, and small boulders of sub-angular chert, quartz, and jasperoid in red clay and silty soil overlying carbonate bedrock units in the western foothills. Includes a mixture of gravel of quartzite and vein quartz, pebbles of manganese and iron, sand, and deep red silt in broad areas of the Tennessee Valley that may be old alluvium mixed with residuum (Meunier and Wilson, 1980).

#### SLOPE DEPOSITS

##### DEBRIS FLOWS

- Qdf Debris-flow scars and deposits (Holocene)** - Debris flow scars, tracks, and deposits in the Blue Ridge highlands as the result of modern and historic storms with high rainfall. Scars at the head areas are underlain by mostly slate bedrock, but bedrock, minor rubble, and vegetation are on scars in hollows and chutes oriented down slope. Deposits consist of shaly boulders, cobbles, and finer rock fragments of fresh slate and metasediment, minor soil, and vegetation including trees and shrubs. On lower slopes, scars in channels have deposits consisting of logs and rock rubble that form terraces as much as 30 ft (9 m) thick. Debris flow scars, tracks, and deposits of post-1900 to pre-1970, and post-1970 debris flows are usually free of vegetation (Schultz, 1999).

##### COLLUVIUM

- Qc Colluvium (Holocene and Pleistocene)** - Boulder streams, boulder fields, and talus containing minor alluvium and debris. Boulder streams and boulder fields are chiefly Pleistocene in age, whereas colluvium ranges from Pleistocene to Holocene. Deposits are clast-supported diamiction of angular to sub-rounded boulders and cobbles of quartz-rich rock. Sandstone and quartzite on Chilhowee Mountain, Tennessee, and metasediment, metaconglomerate, quartzite, and gneiss in the Blue Ridge highlands form distinct colluvium types but are not differentiated on the map. The sandstone and quartzite on Chilhowee Mountain forms equidimensional, 0.5m angular blocks of colluvium. Gneiss and quartzite form meter-long shaly blocks of colluvium. Metasediment and metaconglomerate colluvium blocks range more widely in size. Colluvium deposit surfaces are blocky and sparsely vegetated, and occur on higher slopes as talus near bedrock outcrop and escarpments, and as fill in steep hollows. Colluvium grades down slope and is transitional into debris fans. Thickness ranges from 10 to 100 ft (3 to 30 m).

##### DEBRIS FANS

- Qd Metasediment debris fans (Pleistocene)** - Matrix-supported diamiction that forms fans on lower slopes and valleys of the western Blue Ridge in Tennessee. Consists of poorly-sorted sub-rounded boulders, cobbles, and pebbles of quartz-rich rock in a matrix of pebbles, sand, silt and clay that may be locally stratified. Fan-shaped deposits consist of metamorphosed sandstone and conglomerate of Cades Sandstone and the Walker Creek Group from the foothills of the western Blue Ridge, Tennessee. Vegetation and boulders occur on the surface.
- Qdb Boulder debris fans (Pleistocene)** - Matrix-supported diamiction that forms fans on lower slopes and valleys in the Blue Ridge highlands. Consists of sub-rounded boulders, cobbles, and pebbles of massive metamorphosed conglomerate and sandstone of the Great Smoky Group. Matrix ranges from stratified to unstratified pebbles, sand, silt and clay. Fan is vegetated and boulders occur on the surface. Thickness 10 to 100 ft (3 to 30 m).
- Qdbi Boulder debris fans above carbonate bedrock (Pleistocene)** - Matrix-supported diamiction that forms bouldery fans on lower slopes of coves underlain by carbonate bedrock. Consists of sub-rounded boulders, cobbles, and pebbles of massive metamorphosed conglomerate and sandstone of the Great Smoky Group. Matrix consists of pebbles, sand, silt and clay. Thickness unknown; base may be modified by karst. Fan deposits are vegetated by grass fields and forests, and boulders are scattered on the surface.
- Qdhu Upper-level fan of boulder debris (Pleistocene)** - Matrix-supported diamiction fan of sub-rounded boulders, cobbles, and pebbles of metamorphosed conglomerate and sandstone of the Great Smoky Group that underlies a terrace. Fan is as much as 120 ft (36 m) above adjacent boulder debris fans and alluvium near Cosby, TN, and is the remnant of an older debris fan.
- Qdl Metasediment debris fan above carbonate bedrock (Pleistocene)** - Matrix-supported diamiction that forms cobbly fans on slopes and valleys of coves underlain by carbonate rock in the foothills of the western Blue Ridge. Consists of sub-rounded boulders, cobbles, and pebbles of metasediment and metaconglomerate in a matrix of pebbles, sand, silt and clay that is locally stratified. Fan-shaped deposits are transitional down-slope to fluvial terraces and alluvial plains. Thickness unknown; base may be modified by karst. Fan deposits are vegetated by grass fields and forests, and boulders are sparsely scattered on the surface.
- Qdlu Upper-level metasediment debris fan above carbonate bedrock (Pleistocene)** - Three fans of cobbly metasediment debris in Tuckaleechee Cove, TN, are elevated as much as 80 ft (24 m) above adjacent fans of metasediment debris, and represent a former erosional surface.
- Qdc Sandstone debris fan (Pleistocene)** - Matrix-supported diamiction that form fans on Chilhowee Mountain, TN. Unconsolidated stony material consists of sub-rounded boulders, cobbles, and pebbles of sandstone and quartzite of the Chilhowee Group supported in a red matrix of predominantly sand, with pebbles, silt and clay. Boulders and cobbles in the oxidized red and yellow matrix exposed in excavations have thick weathering rinds, are friable and are weathered to saprolite. Fan deposits are vegetated; sub-rounded boulders and cobbles are present. Thickness ranges from a thin veneer to as much as 40 ft (12 m). Fans are incised as much as 50 ft (15 m) by modern streams, and grade down-slope to modern alluvium.
- Qdcu Upper-level fan of sandstone debris (Pleistocene)** - Matrix-supported diamiction that form fans on Chilhowee Mountain, TN. Unconsolidated stony material consists of sub-rounded boulders, cobbles, and pebbles of sandstone and quartzite of the Chilhowee Group supported in a rubified matrix of of predominantly sand, with lesser pebbles, silt and clay. Boulders and cobbles in the oxidized red and yellow matrix exposed in excavations have thick weathering rinds, are friable, and are weathered to saprolite. Deposit surfaces are vegetated; sub-rounded boulders and cobbles are present. Thickness ranges from a thin veneer to as much as 40 ft (12 m). Fans are incised as much as 80 ft (24 m) by lower fans of sandstone debris and are as much as 100 ft (30 m) above modern streams.
- Qds Gneiss debris fan (Pleistocene)** - Matrix-supported diamiction forms fans in areas underlain by Mesoproterozoic gneiss. Slab-like boulders of gneiss lie within a matrix that is predominantly sand, silt, and clay. Slabs run parallel to their gneissic foliation and the long axis is generally oriented parallel to slope.

## SURFICIAL GEOLOGIC MAP OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK REGION, TENNESSEE and NORTH CAROLINA

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**EXPLANATION**  
 Boundary of the Great Smoky Mountains National Park  
 Bedrock and residuum



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