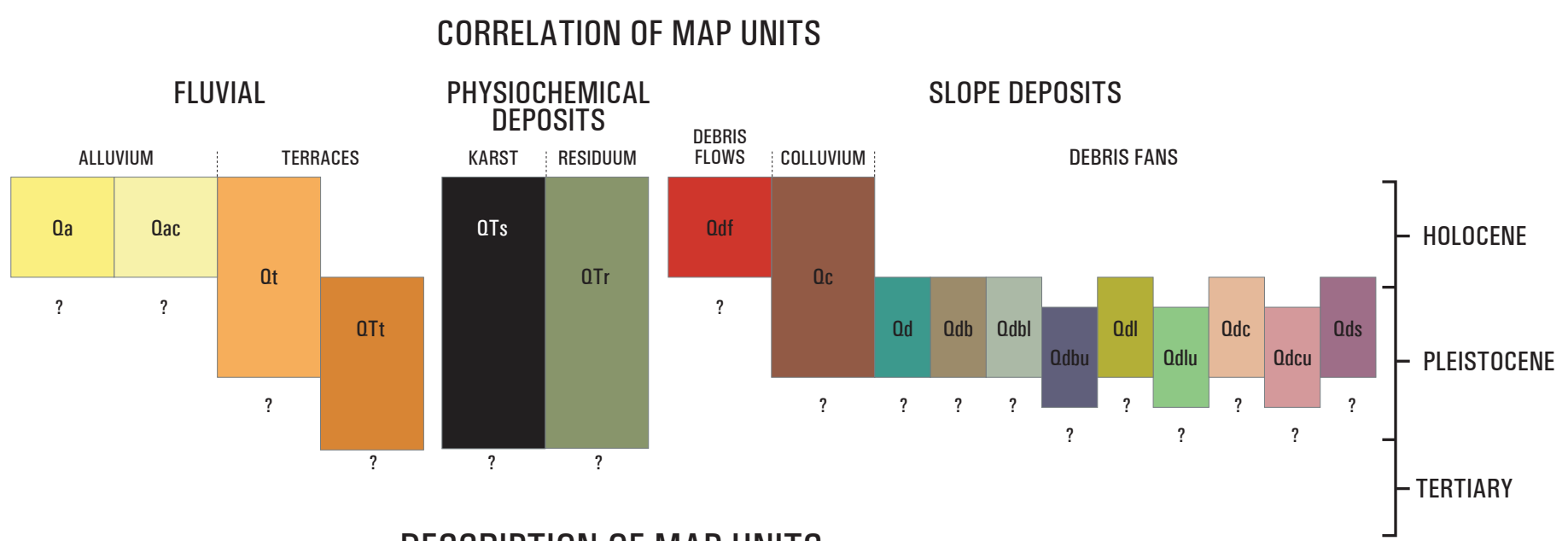




SURFICIAL GEOLOGIC MAP OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK REGION,
TENNESSEE and NORTH CAROLINA

By
Scott Southworth, Art Schultz, Danielle Denenny, and James Triplett
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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; metasedimentary cobbles may also be present. Deposits have been left by rivers
| along most major drainages. Deposits range from 17 to 30 ft (5 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, Tuckaleeche
| Cove, and south of Cosby are transitional with up slope debris deposits
QTI 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 Tuckaleeche Cove, upper level terrace may be transitional with metasedimentary

LANDFORMS AND DEPOSITS OF PHYSIOCHEMICAL 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 silt soil overlying carbonate bedrock units in the western foothills. Includes a mixture of
| gravel of quartzite and vein quartz, pellets of manganese and iron, sand, and dispersed silt in broad areas
| of the Tennessee Valley that may be old alluvium mixed with residuum (Mumman 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 in scars in
| hollows and chutes oriented down slope. Deposits consist of slabby boulders, cobbles, and finer
| rock fragments of fresh slate and metasedimentary, minor soil, and vegetation including trees and
| shrubs. On lower slopes, scars or 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
Qdc 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
| metasedimentary, 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 equipment, 0.5m angular blocks of colluvium. Gneiss and quartzite form meter-long
| slabby blocks of colluvium. Metasedimentary 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
Qdfc Metasedimentary debris fans (Pleistocene) - Matrix-supported diamiction that forms fans on lower slopes and
| valleys of the foothills 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 Walden Creek Group from the foothills of the western Blue Ridge, Tennessee. Vegetation
| and boulders occur on the surface

Qdfc 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)

Qdfu 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

Qdfu 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

Qdfc Metasedimentary 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 metasedimentary 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 scattered on the surface

Qdfu Upper-level metasedimentary debris fan above carbonate bedrock (Pleistocene) - Three fans of cobbly meta-
| sandstone debris in Tuckaleeche Cove, TN, are elevated as much as 80 ft (24 m) above adjacent fans of
| metasedimentary debris, and represent a former erosional surface

Qdfc 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 downslope to modern alluvium

Qdfc 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 reddish 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

Qdfc 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

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



This report is preliminary and has not been reviewed for conformity with
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