

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF VIRGINIA
DIVISION OF MINERAL RESOURCES

GROTTOES QUADRANGLE
VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

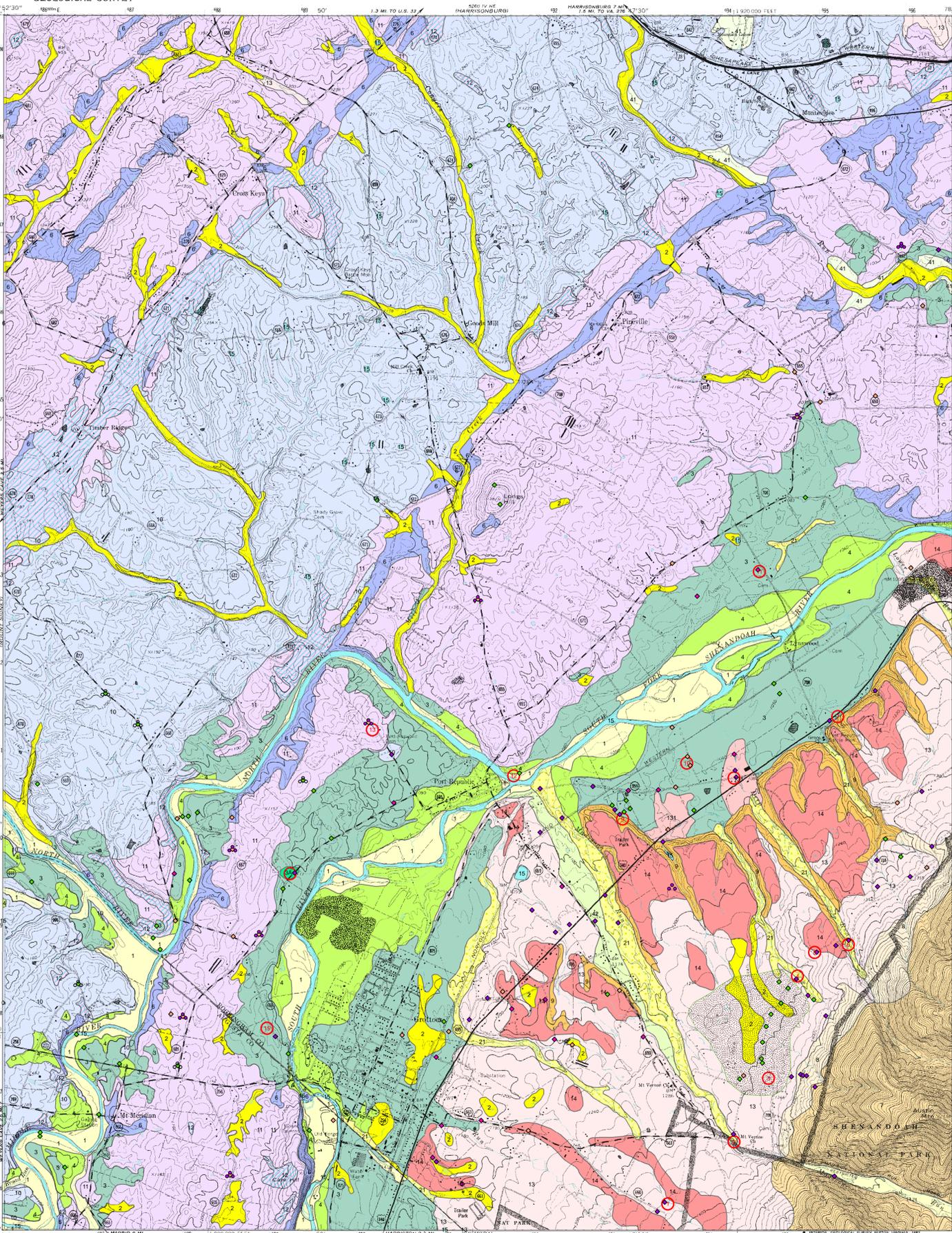
PRELIMINARY SURFICIAL GEOLOGIC MAP OF THE GROTTOES QUADRANGLE, VIRGINIA

Hugh Mills, Elizabeth Campbell, Julie Floyd, Harry Hibbitts, Scott Williams

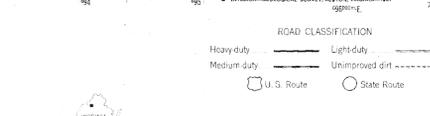
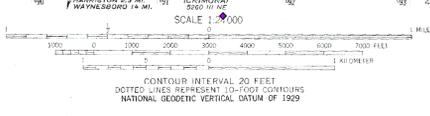
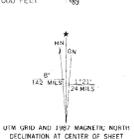
February 2005

EXPLANATION

- 1** **Floodplain along major stream, fines**
Mainly sand and silt. Elevation generally <10 ft above modern stream level.
 - 2** **Floodplain along tributary streams, fines**
Mainly sand and silt with some larger clasts. Elevation generally <10 ft above modern stream level.
 - 21** **Floodplain along tributary, gravels**
Abundant pebbles, cobbles, and/or boulders. Elevation generally <10 ft above modern stream level.
 - 4** **Low terrace along major streams, fines**
Mainly sand and silt with some larger clasts. Elevation generally 10-30 ft above modern stream level.
 - 41** **Low terrace along tributary, fines**
Mainly sand and silt with some larger clasts. Elevation generally 10-30 ft above modern stream level.
 - 42** **Low terrace along tributary, gravels**
Abundant pebbles, cobbles, and/or boulders. Elevation generally 10-30 ft above modern stream level.
 - 3** **High terrace along major streams, fines**
Mainly sand and silt with some larger clasts. Elevation generally 30-70 ft above modern stream level.
 - 3A** **High terrace along major streams, gravels**
Abundant pebbles and cobbles. Elevation generally 30-70 ft above modern stream level.
 - 6** **Rock outcrop - soil complex**
Soil thin and patchy with common rock outcrops.
 - 7** **Mountain slope colluvium**
Bouldery colluvium on very steep slopes.
 - 8** **Footslope colluvium**
Colluvium located between fan heads and steep mountain slopes.
 - 9** **Colluviated fan debris on steep slopes**
Fan debris on steep erosional slopes that has been reworked and moved downslope by colluviation, to include creep, windthrow, minor sliding, and sheet wash.
 - 10** **Residuum over shale**
Shale bedrock is only a few feet below surface.
 - 11** **Residuum over limestone**
Underlain by thick red clay (i.e., typical limestone residuum).
 - 12** **Residuum undifferentiated**
May be underlain by shale and/or carbonate or other bedrock.
 - 13** **Blue Ridge fan, young or undifferentiated age**
Pebbles, cobbles, and/or boulders are common.
 - 131** **Small, probably Holocene fan**
Built at the mouths of streams incising the large older fans.
 - 14** **Blue Ridge fan, old**
Surfaces of these fans are relatively flat, generally incised, and excavation reveals weathered material in the upper 10 ft or so. They are abandoned surfaces, no longer subject to deposition.
 - 15** **Water bodies**
 - Sand deposits**
Contains few if any clasts. Occurs on some fan surfaces; origin unknown.
 - 5** **Scattered stream gravels over residual soil**
- Y** **Locations where rounded clasts exist on residuum**
- N** **Locations where rounded clasts do not exist on residuum**



Mapped, edited, and published by the Geological Survey
Controlled by USGS, NOS/NOAA, and USCE
Topography by photogrammetric methods from aerial
photographs taken 1963. Field checked 1964.
Photonic projection. 10,000-foot grid ticks based on
Virginia coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks,
zone 17, shown in blue
1927 North American Datum
To place on the predicted North American Datum 1983
move the projection lines 9 meters south and
22 meters west as shown by dashed corner ticks
Fine red dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is uncheck
There may be private inholdings within the boundaries of the
National or State reservations shown on this map



GROTTOES, VA.
38075-07-TT-024

1964
PHOTO-REVISED 1987
DMA 5260 IV, SE. SERIES V434

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80226 OR RESTON, VIRGINIA 22092,
AND VIRGINIA DIVISION OF MINERAL RESOURCES, CHARLOTTEVILLE, VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in purple and woodblock compiled in cooperation
with Commonwealth of Virginia agencies from aerial photographs
taken 1984 and other sources. This information not field checked
Map edited 1987

Field Trip Stops

- Abundant**
- Common** *Clasts can be located without a search.*
- Scattered** *A search is required to locate clasts.*
- None**

Clast Frequency

- Abundant**
- Common** *Clasts can be located without a search.*
- Scattered** *A search is required to locate clasts.*
- None**

This preliminary 1:24,000-scale surficial geologic map of Grottoes, Virginia 7.5-minute quadrangle is based on USDA digital soil map data combined with field mapping. This map was created to determine whether or not it was possible to create a useful 1:24,000-scale surficial geologic map within a few weeks using USDA digital soil map data.

Source Material
U.S. Department of Agriculture, Natural Resources Conservation Service, 20021028, Soil Survey Geographic (SSURGO) database for Augusta County, Virginia; U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, Texas.

U.S. Department of Agriculture, Natural Resources Conservation Service, 20021230, Soil Survey Geographic (SSURGO) database for Rockingham County, Virginia; U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, Texas.

U.S. Department of Agriculture, Soil Conservation Service, 1982, Soil Survey of Rockingham County, Virginia; U.S. Government Printing Office, Washington, D.C.

U.S. Department of Agriculture, Soil Conservation Service, 1979, Soil Survey of Augusta County, Virginia; U.S. Government Printing Office, Washington, D.C.

U.S. Geologic Survey, Digital Raster Graphic of the 1987 Grottoes Va 7.5-minute quadrangle.

Virginia Geographic Information Network, 2003, Virginia Base Map Project, Scans of raw 2002 aerial photographs.

This map was prepared in cooperation with the U.S. Geological Survey under the National Cooperative Geologic Mapping Program - STATEMAP component.

Map Projection:
NAD_1983_UTM_Zone_17N
Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -78.750000
Scale_Factor: 0.998600
Latitude_Or_Origin: 0.000000

Base map is a modified U.S. Geological Survey DRG
Grottoes Quadrangle, Virginia 1964 (photo revised 1984)
7.5-minute NAD27 series (1:24,000)

The soils map data from which this map is derived are based on the NAD83 quadrangle. The area on the ground covered by the NAD83 quadrangle is slight different from that covered by the NAD27 quadrangle.