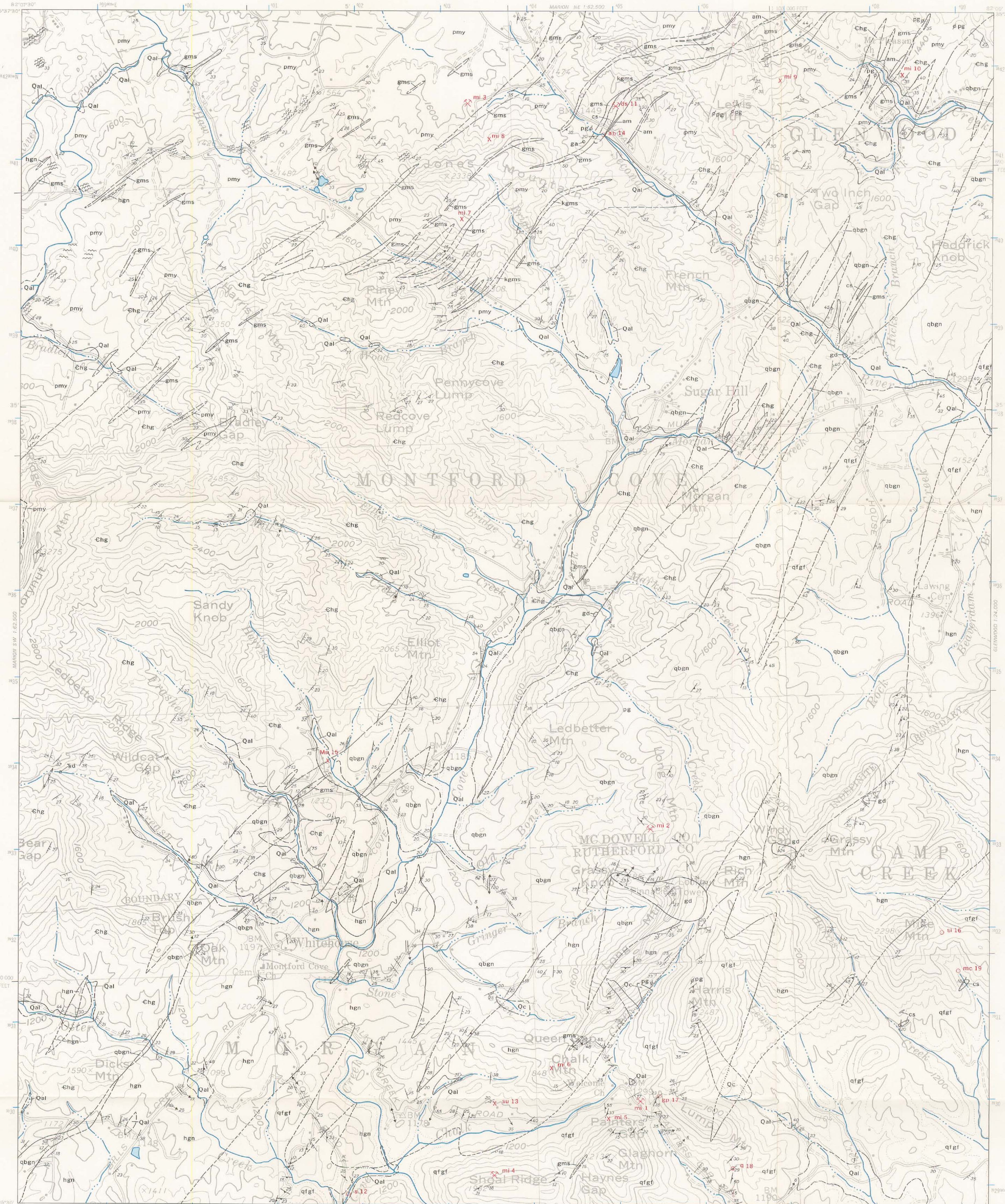
PREPARED IN COOPERATION WITH
TENNESSEE VALLEY AUTHORITY

STATE OF NORTH CAROLINA
DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
Stephen G. Conrad, *State Geologist*

GEOLOGIC MAP
SE 1/4 MARION QUADRANGLE
NORTH CAROLINA
GM 210-SE



Base from U. S. Geological Survey 1:62,500, 1962

Geologic map cartography and printing by TVA

1,000-meter Universal Transverse Mercator Grid ticks, Zone 17, shown in blue

10,000-foot grid based on North Carolina Coordinate System

Field and compilation sheets are on open file at Raleigh, N.C.

UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
(MN; GN; 3° 53 MILS; 0°37' 11 MILS)

SCALE 1:24 000
1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 80 FEET
DOTTED LINES REPRESENT HALF-INTERVAL CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

Geology by J. S. Whisnant, 1971-72; assisted by W. A. Ranson, 1972

Map preparation and editing by J.S. Whisnant, L. S. Wiener, C. E. Merschat, and R. J. Floyd

GEOLOGIC MAP OF THE SE 1/4 MARION QUADRANGLE, NORTH CAROLINA

By
Jack S. Whisnant
1979

MAP UNITS

QUATERNARY
- Qal — Alluvium
- Qc — Colluvium

Unmetamorphosed rocks:

TRIASSIC-JURASSIC
- ꞦRd — Mafic dikes

UPPER PALEOZOIC
- ga — Gabbro

MIDDLE PALEOZOIC
- ∅pg — Pegmatite

Metamorphosed rocks (*Stratigraphic relationships uncertain*):

MIDDLE PALEOZOIC
- gd — Granodiorite

CAMBRIAN
- Ꞓhg — Henderson Gneiss

LOWER PALEOZOIC(?)–PRECAMBRIAN
- qfgf (gms, cs) — Quartzo-feldspathic granofels
  - *cs*, Chlorite schist
  - *gms*, Garnet-muscovite-biotite schist
- hgn — Hornblende gneiss
- qbgn (gms, cs) — Quartz-biotite-plagioclase gneiss
  - *cs*, Chlorite schist
  - *gms*, Garnet-muscovite-biotite schist
- pmy (gms, hgn, cs, kgms, am) — Porphyroclastic mylonite schist and gneiss
  - *cs*, Chlorite schist
  - *am*, Hornblende amphibolite
  - *hgn*, Hornblende gneiss
  - *gms*, Garnet-muscovite-biotite schist
  - *kgms*, Kyanite-garnet-muscovite-biotite schist

DESCRIPTIONS OF MAP UNITS[1]

Qal — **ALLUVIUM**—Unconsolidated stream deposits of gravel, sand, silt, and clay. Generally less than 5 feet thick. Only larger bodies shown on map.

Qc — **COLLUVIUM**—Unconsolidated boulder rubble on steep slopes. Large bodies mapped in southeastern part of quadrangle were developed or moved significantly during extremely heavy rains in 1927, according to local residents. Smaller bodies not mapped.

Unmetamorphosed Intrusive Rocks

ꞦRd — **MAFIC DIKES**—Dark-colored, very fine grained. Composed of plagioclase and pyroxene in a cryptocrystalline matrix, possibly devitrified glass. Individual dikes are less than 1 foot thick. (Too small to show at map scale; location indicated by a very small circular outcrop area.)

ga — **GABBRO**—Dark-gray, fine- to medium-grained. Composed of plagioclase, augite, hornblende, magnetite, and minor hypersthene.

∅pg — **PEGMATITE**—Medium- to coarse-grained. Composed of quartz, plagioclase, microcline, muscovite, and biotite; none appear to be zoned. Generally concordant podiform bodies less than 5 feet thick. (Too small to show at map scale; location and trend of larger bodies indicated by ∅.)

Metamorphosed Rocks

gd — **GRANODIORITE**—Light-gray, fine- to coarse-grained, massive to poorly foliated. Composed of plagioclase, quartz, biotite, and muscovite; with minor microcline, chlorite, epidote, allanite, zircon, and opaque grains. Xenoliths of adjacent intruded rock types common in granodiorite bodies at Long Mountain and Windy Gap. Probably emplaced during high-grade regional metamorphism.

Ꞓhg — **HENDERSON GNEISS**—Biotite augen gneiss, light-gray, fine- to coarse-grained, moderately foliated and layered. Composed mainly of microcline, quartz, plagioclase, and biotite; with minor muscovite, allanite, epidote, and magnetite. Augen are mainly microcline. Along the northwest boundary of the Henderson Gneiss is a zone, as much as several thousand feet wide, of fine-grained laminated mylonite with minor layers of porphyroclastic mylonite and biotite-quartz-feldspar schist. The laminated mylonite, evidently cataclastically derived from the biotite augen gneiss, is mineralogically similar but contains additional minor chlorite and garnet.

qfgf — **QUARTZO-FELDSPATHIC GRANOFELS**—Pinkish-gray and light-brownish-gray to light-gray, fine- to medium-grained; schistosity poorly to moderately developed. Composed mainly of quartz, plagioclase, muscovite, and clinozoisite; with minor to trace amounts of microcline, chlorite, zircon, allanite, garnet and sphene. Kyanite and sillimanite present locally. Includes mapped bodies of chlorite schist (cs) and garnet-muscovite-biotite schist (gms) described below. Also contains unmapped minor interlayers and isolated outcrops of medium-grained biotite granitic gneiss, amphibolite, metaquartzite, muscovite-quartz schist, and graphitic quartz schist.

hgn — **HORNBLENDE GNEISS**—Medium- to dark-gray, fine-grained, laminated to thinly layered. Composed of hornblende, clinozoisite, and plagioclase; with minor chlorite, zircon, microcline, pyrite, magnetite, allanite, and white mica. Locally migmatitic, especially near contact with quartzo-feldspathic granofels.

qbgn — **QUARTZ-BIOTITE-PLAGIOCLASE GNEISS**—Medium-gray to medium-dark-gray, fine- to medium-grained, weakly foliated, thinly layered porphyroclastic mylonite gneiss. Composed mainly of plagioclase (principally as porphyroclasts), biotite, and quartz; with minor muscovite, microcline, and chlorite; and trace amounts of zircon, magnetite, and allanite. Includes mapped bodies of chlorite schist (cs) and garnet-muscovite-biotite schist (gms) described below.

pmy — **PORPHYROCLASTIC MYLONITE SCHIST AND GNEISS**—Mainly porphyroclastic mylonite schist, medium-gray, fine-grained. Composed of plagioclase porphyroclasts, quartz, biotite, and muscovite; with minor to trace amounts of microcline, chlorite, tourmaline, pyrite, magnetite, and allanite rimmed with epidote. Southeast of Jones Mountain the porphyroclastic mylonite schist grades into laminated to thinly layered mylonite gneiss with an increase in the quartz content and a concomitant decrease in the muscovite and biotite content. Unit includes mapped bodies of chlorite schist (cs), hornblende amphibolite (am), hornblende gneiss (hgn), garnet-muscovite-biotite schist (gms), and kyanite-garnet-muscovite-biotite schist (kgms) described below. Also contains minor unmapped interlayers and isolated outcrops of quartz-muscovite schist, tourmaline schist, porphyroclastic hornblende gneiss, and garnetiferous hornblendite.

cs — **CHLORITE SCHIST**—Greenish-gray, very fine to fine grained. Composed mainly of chlorite, actinolite, and epidote; with minor albite and magnetite. Talc (?) and thin veins of asbestos occur locally. Interpreted as altered ultramafic bodies.

am — **HORNBLENDE AMPHIBOLITE**—Dark-green to black, fine-grained, generally not layered. Composed of plagioclase, hornblende, quartz, minor garnet, and an unidentified opaque mineral. Weathers to distinctive orange-colored, blocky, porous saprolite.

gms — **GARNET-MUSCOVITE-BIOTITE SCHIST**—Medium-light-gray, fine- to medium-grained. Composed mainly of muscovite, biotite, plagioclase, and garnet; with minor chlorite, magnetite, microcline, epidote, and zircon. Staurolite is present locally. Garnets are especially abundant in soils derived from this unit.

kgms — **KYANITE-GARNET-MUSCOVITE-BIOTITE SCHIST**—Identical to the garnet-muscovite-biotite schist, except for the presence of abundant kyanite.

[1]Detailed manuscript of the map area is on open file with the North Carolina Department of Natural Resources and Community Development, Geological Survey Section, Raleigh, North Carolina 27611, and the Tennessee Valley Authority, Geologic Services Branch, Knoxville, Tennessee 37902. Copies may be obtained for the cost of reproduction.

Contact, dashed where approximately located, short dashed where inferred, dotted where concealed

Fault, approximately located

PLANAR FEATURES

[Where symbols are combined or joined, their intersection marks the point of observation]

- 22 — Strike and dip of compositional layering
- 18 — Strike and dip of foliation in nonschistose rocks
- 50 — Strike and dip of schistosity
- 36 — Strike and dip of axial plane (may be combined with symbol showing bearing and plunge of fold axis)

LINEAR FEATURES

- 10 — Bearing and plunge of fold axis; inclined, horizontal
- 11 — Bearing and plunge of minor antiform
- 10 — Bearing and plunge of minor synform
- 12 — Bearing and plunge of mineral elongation; inclined, horizontal

SPECIAL FEATURES

Areas of outcrops with pronounced cataclastic texture

MINERAL RESOURCES

- Mine or quarry, inactive
- X — Prospect
- O — Mineral occurrence
- 3 — Map numbers refer to descriptions in Mineral Resources Summary
- ab — Asbestos
- ds — Dimension stone
- gp — Graphite
- Mn — Manganese
- mi — Mica
- mc — Microcline
- q — Quartz
- s — Sand
- si — Sillimanite
- su — Sulfides