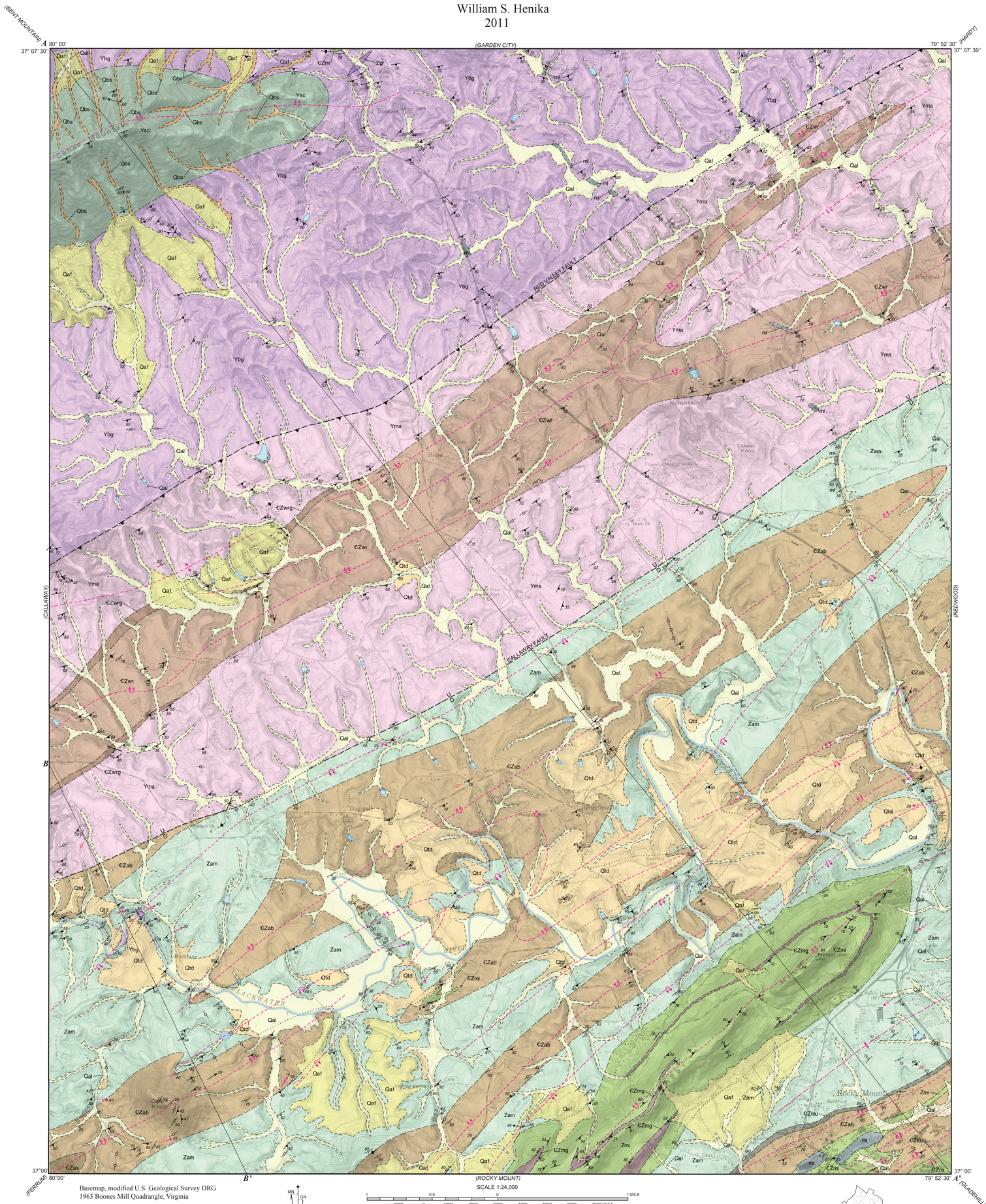
GEOLOGIC MAP OF THE BOONES MILL QUADRANGLE, VIRGINIA

William S. Henika
2011



Basemap, modified U.S. Geological Survey DRG
1963 Boones Mill Quadrangle, Virginia

Polyconic projection: UTM zone 17, NAD 1927

Digital cartography by Peter J. Hof, Amy Gilmer
Elizabeth V.M. Campbell, and Aaron Cross

MN GN
8.3° 151 MILS
0°39' 12 MILS
2011 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24,000
1 0.5 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology mapped from 1980-1983 and 2004-2005

DESCRIPTION OF MAP UNITS

QUATERNARY

ml — **Modified land -** Areas of extensive cut and fill related to construction site preparation and landscaping.

Qal — **Alluvium** - Unconsolidated flood-plain deposits of light-brown to light-gray, well-stratified clay, silt, sand, and gravel.

Qbs — **Boulder streams -** Debris-flow deposits in mountain hollows. Deposits consist of continuous streams of blocks and boulders with little matrix. Large trees on steep slopes in these hollows indicate a relatively long recurrence interval between scouring of debris chutes in storm events.

Qaf — **Fan deposits -** Poorly stratified overlapping debris-flow deposits that consist of dark-reddish-brown clay, silt, sand and gravel matrix with well-rounded cobbles and boulders.

Qtd — **Terrace deposits -** Dissected remnants of older alluvium and slope deposits that occur on gentle slopes and benches above flood plains. Deposits consist of poorly sorted, well-rounded quartz pebbles and cobbles with deeply weathered, dark reddish-brown clay, silt, and sand matrix.

LATE PROTEROZOIC TO CAMBRIAN

FRIES THRUST SHEET SOUTHEAST OF RED VALLEY FAULT

ЄZwr — **Wills Ridge Formation (Rankin and others, 1993) -** Medium- to light-gray, laminated, garnetiferous gneiss and dark-gray, graphitic mica schist. Mafic and felsic metavolcanic gneiss, including greenish-gray amphibole-bearing metatuffs and tuffaceous metagraywacke layers are locally present at the base.

ЄZwrg — **Wills Ridge Formation (Rankin and others, 1993) -** Light-gray conglomeratic mica gneiss-schist layers near the base of the unit contain clasts of basement rocks.

FRIES THRUST SHEET SOUTHEAST OF CALLAWAY FAULT

ЄZab — **Lynchburg Group, Alligator Back Formation (Conley, 1985) -** Dark-greenish-gray, fine-grained amphibole schist (metabasalt); medium- to light-gray, laminated gneiss with thin, silver-gray mica schist partings; fine- to coarse-grained, micaceous, banded marble; gray to greenish-gray, fine-grained, graphite mica schist and quartzite; light-gray, medium- to fine-grained garnet-mica schist; massive micaceous quartzite with blue-quartz-granules; and metabasalt pebble-bearing metaconglomerate beds.

METAMORPHOSED STRATIFORM VOLCANIC COMPLEX

ЄZas — **Amphibolite and metasedimentary rocks -** Dark-greenish-gray to light-yellowish-green, fine-grained amphibolite or amphibole schist (metabasalt); tuffaceous metasandstone with thin quartz-mica phyllite interlayers; quartzite; calc-silicate quartzite; metagraywacke; and lens-shaped deposits of white and pink marble. Contains pillow lavas.

ЄZmg — **Metagabbro -** Black and white to greenish-gray, coarse-grained, granoblastic epidote amphibolite (hornblende metagabbro).

ЄZmu — **Soapstone -** Light greenish-gray, fine- to medium-grained tremolite-actinolite-magnesite schist and fine-grained, granoblastic talc-chlorite-serpentine rock.

ЄZmi — **Mafic metaigneous rocks -** Undifferentiated unit containing greenish to black, fine-grained chlorite-amphibole schist (metabasalt); greenish-gray, fine-grained, talc-chlorite-serpentine schist; and greenish-gray, coarse-grained granoblastic-textured epidote amphibolite.

Zam — **Lynchburg Group, Ashe Formation, biotite gneiss (Conley, 1985) -** Medium- to light-gray, coarse-grained to very coarse grained, thick-bedded to massive, conglomeratic biotite schist and gneiss, with feldspar, quartz, and granitic clasts. Conglomeratic unit is interlayered with salt-and-pepper-textured, two-mica plagioclase gneiss with mica schist in the upper part.

MIDDLE-LATE PROTEROZOIC BASEMENT COMPLEX

Zgr — **Granite and granitic gneiss -** Medium-gray, poorly foliated to massive biotite or hornblende granitoid composed mainly of perthitic felspar and quartz with relict hypidiomorphic granular texture and xenoliths of porphyritic volcanic or subvolcanic rocks. Fluorite and allanite are diagnostic accessory minerals. Gradational to medium-gray, fine- to medium-grained mylonite gneiss near sheared contacts with plutons. Granite from the pluton along White Oak Creek is dated at 745-736 Ma (Fokin, 2003).

HORSEPEN MOUNTAIN PLUTONIC SUITE (Bartholomew and Lewis, 1984)

Yma — **Mylonitic augen and flaser gneiss -** Light- to medium-gray, medium- to coarse-grained muscovite-biotite gneiss and schist that contain polycrystalline quartz-feldspar augen.

Ybg — **Biotite augen gneiss** - Dark-gray, medium- to coarse-grained, protomylonitic biotite augen gneiss. Contains large, monocrystalline alkali feldspar porphyroclasts.

Ysc — **Sandy Creek Granulite Gneiss (Bartholomew and Lewis , 1984) -** Light-gray to dark-grayish-green, medium-to coarse-grained, segregation-banded, biotite granofels with local enclaves of layered pyroxene granulite gneiss. Garnet and hornblende commonly replace earlier pyroxene. Dark-green, uralitic, amphibole-bearing mylonite gneiss is also common.

Ypg — **Pyroxene granulite gneiss (in cross-section only) -** Medium- to dark-greenish-gray, fine- to medium-grained, garnet-pyroxene-quartz-feldspar-granulite. Surrounds plutons and is also present as xenoliths in Grenville and Iapetan Intrusive suites. Gradational to greenish-gray mylonite and mylonite gneiss along ductile deformation zones that separate major plutonic units. Correlated with the Lady Slipper Granulite Gneiss, dated at 1130 Ma (Sinha and Bartholomew, 1984).

MAP SYMBOLS

For all contact and fold symbols: lines are solid where the location is exact, long-dashed where the location is approximate, short-dashed where the location is inferred, or dotted where the location is concealed. Queries added where identity or existence may be questionable. For geologic observation symbols, observation sites are centered on the strike bar or at the intersection point of multiple symbols.

Contacts

Faults
- Reverse - sawteeth on upthrown block
- Normal - U = upthrown, D = downthrown

Folds
- Anticline
- Syncline
- Anticline (overturned)
- Syncline (overturned)

- Strike and dip of inclined beds
- Strike and dip of overturned beds
- Strike and dip of inclined schistosity
- Strike of vertical schistosity
- Strike and dip of inclined joint
- Strike of vertical quartz vein
- Strike of vertical pegmatite dike
- Strike and dip of inclined compositional layering
- Strike of vertical compositional layering
- Bearing and plunge of lineation
- Inclined fold hinge of small, minor syncline
- Inclined fold hinge of small, minor anticline
- Inclined symmetric minor fold hinge
- Inclined asymmetric minor fold hinge
- Inclined fold hinge of generic small, minor fold
- Strike and dip of minor fault

REFERENCES

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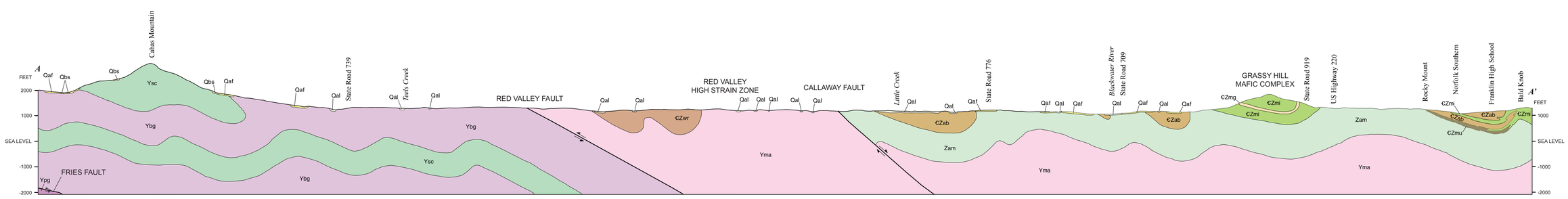
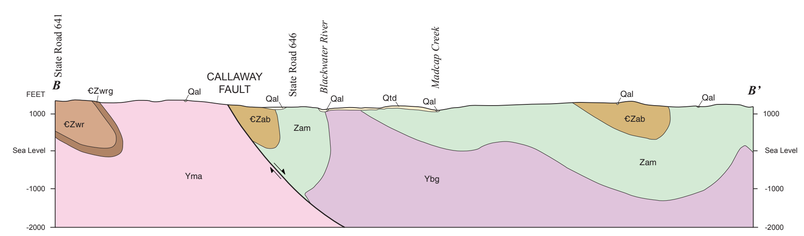
SUGGESTED REFERENCE

Henika, William, 2011, Geologic map of the Boones Mill quadrangle, Virginia: Virginia Division of Geology and Mineral Resources Open File Report 2011-1, Map Scale 1:24,000.



Interpretive cross-sections:
1. No vertical exaggeration except surficial deposits
2. Subsurface structures interpreted from surface measurements