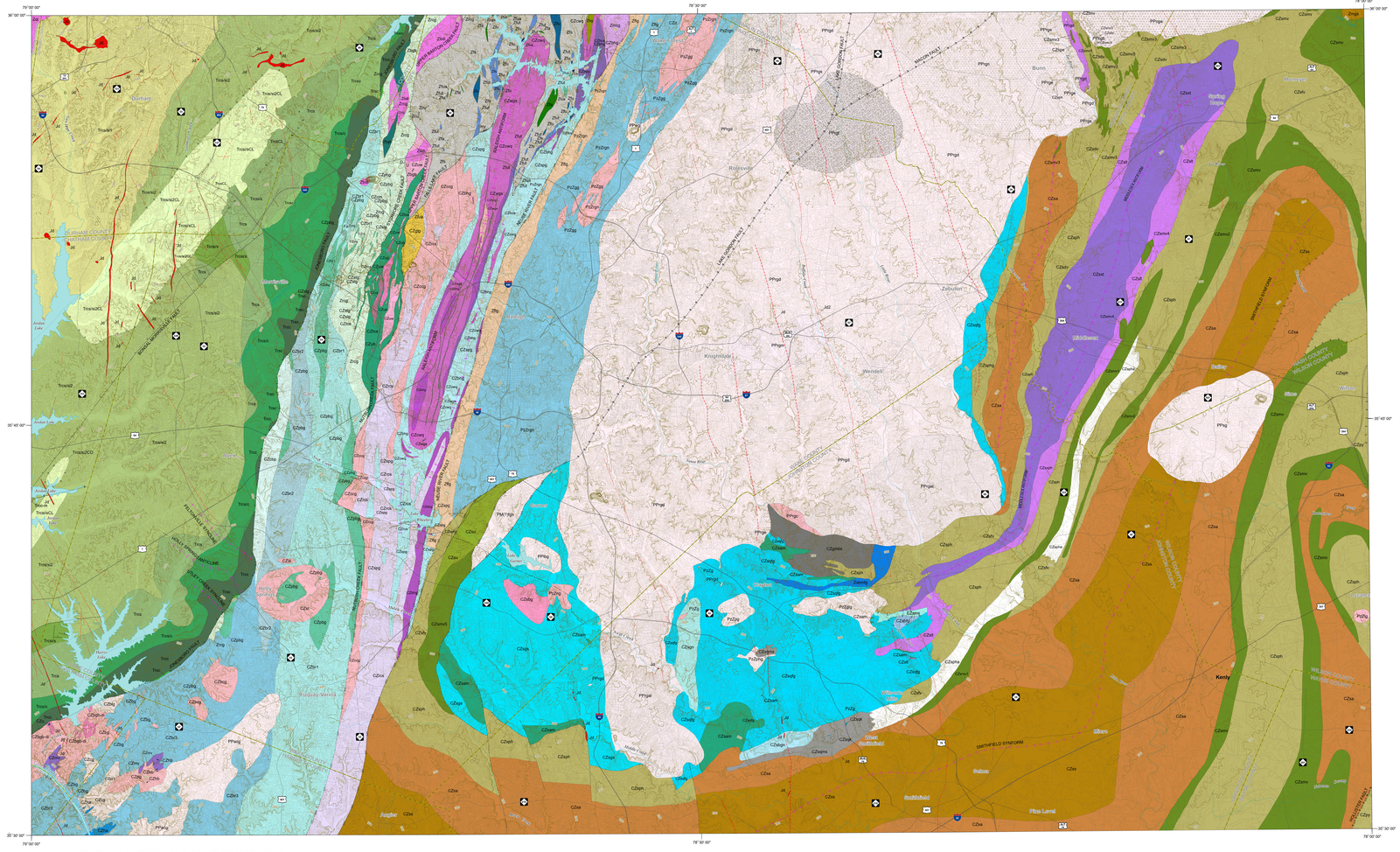
North Carolina Department of Environmental Quality
Division of Energy, Mineral and Land Resources
William E. Toby Vinson, Jr., Director
Dwain M. Veach, State Geologist and Section Chief

This Geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.

North Carolina Geological Survey
Open File Report 2026-05

Compiled Bedrock Geologic Map of the Raleigh 30' x 60' Quadrangle (Raleigh 100K), North Carolina



EXPLANATION OF MAP SYMBOLS

CONTACTS, FAULTS AND OTHER FEATURES

Note for dikes and veins in map area

Many dikes and veins are unlabeled or are too small to be easily found on this 100K-scale map in PDF or paper format. Specific dikes and veins can be searched in the MapUnitLines FeatureClass in the GeMS database. For site specific investigations, the GeMS database should be used in conjunction with the best available scale source map.

- inferred contact, dotted where concealed, ? where uncertain
- inferred gradational contact
- inferred fault, dotted where concealed
- inferred normal fault, dotted where concealed, ball on downthrown side
- inferred strike-slip fault: right lateral, dotted where concealed, ? where uncertain
- dabbase dike inferred, dotted where concealed
- dabbase dike inferred from aeromagnetic data
- Jd2 dabbase dike, dotted where concealed
- CzMzqv inferred quartz veins and breccia, dotted where concealed, ? where uncertain
- CZwgs layer inferred, dotted where concealed
- trace of anticline hingeline inferred, dotted where concealed
- trace of antiform hingeline inferred, dotted where concealed
- trace of syncline hingeline inferred, dotted where concealed
- trace of synform hingeline inferred, dotted where concealed
- trace of overturned anticline hinge inferred, dotted where concealed
- trace of overturned syncline hinge inferred, dotted where concealed
- trace of overturned antiform hinge inferred, dotted where concealed
- trace of overturned synform hinge inferred, dotted where concealed

BASE MAP FEATURES

- Interstate
- US Route
- NC Route
- Secondary Route
- index contours (10 foot interval)
- minor contours
- river, creek or stream
- lake or pond

Index to geologic mapping

SCALE 1: 100 000

CONTOUR INTERVAL - 10 FEET

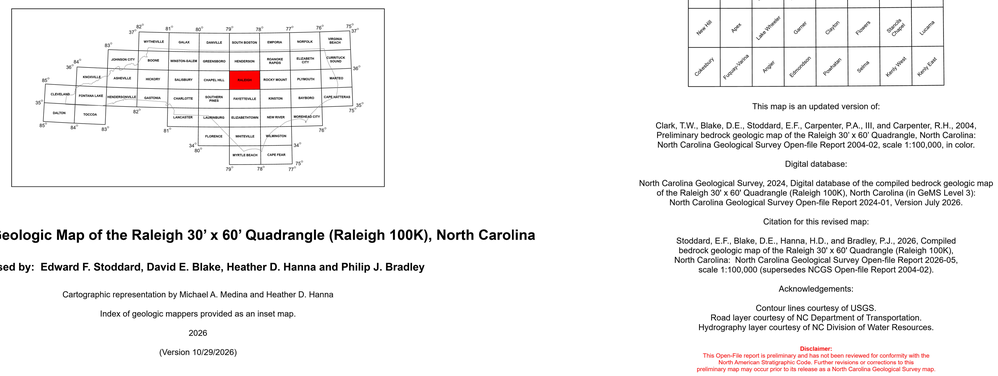
Projection - Lambert Conformal Conic
Coordinate system - NAD 1983 State Plane North Carolina FIPS 3200 (Meters)

1 0 1 2 3 4 5 6 7 8 Miles

1 0 1 2 3 4 5 6 7 8 9 10 Kilometers

5,000 0 5,000 10,000 15,000 20,000 25,000 30,000 Feet

Index to 7.5-minute quadrangles



DESCRIPTION OF MAP UNITS

LATEST PERMIAN TO EARLY CENOZOIC ROCKS

FAULT ROCKS

CzMzqv - vein quartz and quartz breccia (Mesozoic to Cenozoic) - White to light gray, coarse-crystalline, highly fractured and cataclastic vein quartz. Locally contains pink to brown K-feldspar veins, locally contains sericite and/or chlorite phyllonite clasts. Down-dip slickenline lineation common on fracture planes. Locally includes/includes subfederal quartz crystals as vein infilling in the Oxford 7.5-minute quadrangle. May be equivalent to CzMzqc in Henderson 100K.

PzPgm - Mylonite and mylonite gneiss (Paleozoic-Neoproterozoic) - Recrystallized mylonite and thinly layered ribbon gneiss along Falls Lake fault.

INTRUSIVE ROCKS (UNMETAMORPHOSED)

Jd - Diabase (Jurassic) - Steeply dipping to vertical dikes of dark green-black or gray to bluish-black or black, melanocratic, slightly to severely weathered, fine- to medium-crystalline diabase that may be olivine-, magnetite-, and ilmenite-bearing. Weathers to tan-gray, spheroidally exfoliated boulders. Locally contains abundant plagioclase phenocrysts. Dikes are typically <50 m wide, but along strike may attain a width of 200 m. Locally contains porphyritic plagioclase. Typically present as dikes up to 30 m (100 ft) wide. Mapped partly on the basis of aeromagnetic signature (e.g. Parker, 1979).

Jd2 - Two-pyroxene diabase (Jurassic) - Steeply dipping to vertical, gray to bluish-black, medium-crystalline and typically plagioclase porphyritic, olivine-free augite + pigeonite diabase commonly containing quartz and/or alkali feldspar granophyre. Contains magnetite.

TRIASSIC SEDIMENTARY ROCKS OF THE NEWARK SUPERGROUP

DEEP RIVER BASIN

LITHOFACIES ASSOCIATION II

Tcsa - Arkosic sands of the Chatham Group Lithofacies III (Triassic) - Reddish-brown to dark brown, irregularly bedded, poorly sorted, coarse-grained lithic, feldspathic sandstone; locally contains laterally discontinuous pebble and cobble trains and lag gravels.

Tccc - Conglomerate of the Chatham Group Lithofacies III (Triassic) - Reddish-brown to dark brown, irregularly bedded, poorly sorted, cobble to boulder conglomerate. Muscovite is rare to absent in the very coarse-grained to gravelly matrix. An arbitrary cut-off greater than 50 percent conglomeratic distinguishes this facies from Tcsa/c. Clasts are chiefly miscellaneous felsic and intermediate metamorphic rocks, quartz, epidote, bluish- gray quartz crystal tuff, muscovite schist, and rare metagranite material. Maximum clast diameters are in excess of 2 m locally.

Tcsc - Interbedded sandstone and pebbly sandstone of the Chatham Group Lithofacies III (Triassic) - Reddish-brown to dark brown, irregularly bedded to massive, poorly to moderately sorted, medium- to coarse-grained, muddy lithic arkose, with crossbedding and lag gravels. Contains 10 to 50 percent, but typically 20 to 30 percent, conglomeratic material. Locally contains abundant mudcracks and beyond-the-fan gray reduction halos. Beds are tabular, 1-3 m thick, with good lateral continuity. Unit grades eastward into Tcsc.

Tcs/c - Sandstone with interbedded conglomerate of the Chatham Group Lithofacies III (Triassic) - Reddish-brown to dark brown, irregularly bedded, poorly sorted, coarse-grained to pebbly, muddy lithic sandstone with interbedded pebble to cobble conglomerate. Muscovite is rare to absent in the matrix. Well-defined conglomerate beds distinguish this unit from conglomeratic basal lag gravels of Trcs. An arbitrary cut-off of less than 50 percent conglomeratic distinguishes this facies from Tccc conglomerate. Conglomerate beds are channel-shaped and scour into the underlying sandstone beds. Unit grades eastward into Tcsc.

Tcs/CL - Interbedded sandstone and pebbly sandstone with chert and limestone of the Chatham Group Lithofacies III (Triassic) - Interbedded sandstone and pebbly sandstone with chert and limestone. Unit contacts are based on Wheeler and Textoris (1978).

LITHOFACIES ASSOCIATION I

Trcs/s12 - Sandstone with interbedded siltstone of the Chatham Group Lithofacies Association II (Triassic) - Cyclical depositional sequences of whitish-yellow to grayish-pink to pale-red, coarse- to very coarse-grained, trough cross-bedded lithic arkose that fines upward through yellow to reddish-brown, medium- to fine-grained sandstone, to reddish-brown, burrowed and rooted siltstone. Bioturbation is usually moderate to strong with a large reduction halos. Coarse-grained portions contain abundant muscovite, and basal lag gravels consist of clasts of quartz, bluish-gray quartz crystal tuff, and mudstone rip-up.

Trcs/s - Sandstone with interbedded siltstone of the Chatham Group Lithofacies Association II (Triassic) - Reddish-brown, extensively bioturbated, feldspathic sandstone and siltstone with local occurrence of chert and less common limey sediments and nodular and thin limestones. Bioturbation is usually surrounded by greenish blue to gray reductions halos.

Trcs/s/CL - Sandstone with interbedded siltstone with chert and limestone of the Chatham Group Lithofacies Association II (Triassic) - Arkosic sandstone, sandstone and siltstone with local occurrence of chert and less common nodular and thin limestone. Unit contacts are based on Bain and Harvey (1977) and Wheeler and Textoris (1978).

Trcs/s/CL, Sidestone with interbedded sandstone with chert and limestone of the Chatham Group Lithofacies Association II (Triassic) - Mainly sidestone with local occurrence of chert and less common nodular and thin limestone. Unit contacts are based on Bain and Harvey (1977) and Wheeler and Textoris (1978).

Trcs/s/CL - Sandstone with interbedded siltstone with coal of the Chatham Group Lithofacies Association II (Triassic) - Arkosic sandstone, sandstone and siltstone with local occurrence of thin coal and shale layers. Unit contacts are based on Bain and Harvey (1977) figure 24 and Bain and Brown (1980) figure 4.

LITHOFACIES ASSOCIATION I

Trcs/s - Sandstone with interbedded siltstone of the Chatham Group Lithofacies Association I (Triassic) - Pinkish-gray, light-gray, and light-tan, fine- to coarse-grained, micaceous, slightly clayey, moderately poor to moderately well sorted, subangular to subrounded arkose and lithic arkose; maroon, very silty, micaceous, moderately well-sorted, fine-grained sandstone, and dark red to reddish brown, massive, and thickly laminated, bioturbated, micaceous to very micaceous siltstone and mudstone. Muscovite flakes up to 3 mm in diameter are common especially in the siltstone. In the arkose and lithic arkose, fine flakes of biotite are common as an distinctive accessory mineral. Randomly oriented or vertical cylindrical fractures, often filled with pale green, fine-grained quartz sandstone are interpreted to be burrows. Bedding, where observed, is parallel to slightly wavy, occurring as thin laminations or thick beds (0.5-5 cm).

OTHER UNITS OF THE DURHAM SUBBASIN

Trcs - Sandstone of the Durham Subbasin - Red, tan-brown, and white silicified cataclastic commonly stained with hematite or limonite and/or displaying hematite-filled fractures. Other fractures are infilled with/or quartz crystals or massive milky quartz. Commonly contains angular clasts of Triassic sedimentary rocks and highly silicified and foliated crystalline rocks along the Jonesboro normal fault.

Trcs-m - Conglomerate of the Chatham Group in the Merry Oaks area - Reddish-brown to dark brown, irregularly bedded, poorly sorted, cobble to boulder conglomerate. Clasts are chiefly miscellaneous felsic and intermediate metavolcanic rocks and quartz. Typically present adjacent to border faults. Present as a very small polygon adjacent to Jordan Lake in the west-central edge of map.

MISSISSIPPIAN TO PERMIAN INTRUSIVE ROCKS

ROLESVILLE BATHOLITH

PPrgs - Granitoid facies e (Permian-Pennsylvanian) - Fine- to medium-crystalline, non-porphyritic, locally foliated muscovite +/- biotite +/- garnet leucogranite and granite. CI = 4-10. Occurs with/on/along the western margin of the Rolesville main phase in the Bunn East quadrangle and sporadically elsewhere, notably near and within pluton reentrants, intermingled with sillimanite-muscovite schist. Locally contains pegmatite dikes, and quartz-muscovite-garnet+/-tourmaline pegmatite dikes in the Bunn East quadrangle.

PPrgn - Bunn granitoid (Speer, 1994) (Permian-Pennsylvanian) - Massive, medium- to coarse-crystalline biotite + muscovite granitoid, chemically similar to Rolesville granitoid (PPrgt) except containing accessory monazite. Zoned pegmatite dikes with smoky quartz relatively common.

PPrgt - Mitchell granitoid (Speer, 1994) (Permian-Pennsylvanian) - Massive, medium-crystalline (1-4 mm) leucocratic (CI = 5) biotite + muscovite monzogranite to granodiorite. Distinguished by white feldspars and overall white color.

PPrgr - Averette granitoid (Speer, 1994) (Permian-Pennsylvanian) - Massive, coarse-crystalline biotite +/- muscovite granitoid, having abundant subidiomorphic orange K-feldspar megacrysts to 1 cm. Locally flanked near western margin of batholith.

PPrgd - Rolesville granitoid (Permian-Pennsylvanian) - Fine to coarse-crystalline, but primarily medium-crystalline equigranular to moderately porphyritic (very megaporphyric), nearly foliated, pink or salmon and white biotite +/- muscovite monzogranite. Commonly has an almost idiomorphic fabric with well-formed K-feldspar and plagioclase crystals. CI = 5-12. Contains common biotite schlieren and local biotite clots. Pegmatite dikes and pods are extremely common; locally, isolated xenocrysts of alkali feldspar 1-4 cm in length also occur. Unit also contains relatively common xenoliths of Raleigh and Warren terrane country rocks. Less commonly contains autoliths of fine grandiorite or diorite. Contains accessory magnetite. Distinguished by abundant biotite-rich and biotite-poor phases. Weathered surfaces are commonly nubbly, friable and/or cavernous. Rolesville main phase of Speer (1994).

PPrgc - Lineated Rolesville granitoid (Permian-Pennsylvanian) - Fine to medium-crystalline, light-gray to light pink, lineated muscovite-biotite granite. Locally contains garnet. Biotite steaks form the lineation. Some layers are coarser crystalline. Cut by numerous pegmatite and aplite stringers.

PPrgs - Lawler granitoid (Speer, 1994) (Permian-Pennsylvanian) - Fine-crystalline light gray biotite-muscovite monzogranite. CI = 10.

PPrgm - Marks granitoid (Speer, 1994) (Permian-Pennsylvanian) - Massive, medium-crystalline (1-3 mm), commonly porphyritic biotite-muscovite granitoid. CI = 5. Contains K-feldspar to 5 mm.

PPrgal - Archers Lodge granitoid (Speer, 1994) (Permian-Pennsylvanian) - Coarse-crystalline biotite monzogranite with K-feldspar megacrysts, and to 3 cm long.

CASTALIA PLUTON

PPrgd - Granitoid facies e (Permian-Pennsylvanian) - Moderately K-feldspar porphyritic, medium- to coarse-crystalline, buff weathering, white or pink and white, unfoliated biotite granite and monzogranite. Constitutes the main body of the Castalia pluton. CI = 10.

PPrgg - Granitoid facies g (Permian-Pennsylvanian) - Medium- to coarse-crystalline, equigranular, unfoliated white, gray and pale pink biotite +/- garnet +/- muscovite granite and leucogranite. Locally contains magnetite. CI = 5-10. Occurs along the margins of the Castalia pluton.

OTHER PLUTONIC ROCKS

PPrag - Averitt Creek granite (Permian-Pennsylvanian) - Leucocratic (CI = 1-5), light gray to pinkish gray, fine to medium-crystalline, composed chiefly of quartz, microcline perthite, and granophyre. Low color index, abundance of perthitic alkali K-feldspar, and plagioclase occurring almost entirely as a component of perthite are characteristic of this hypersolvus granite. Has accessory biotite, garnet, magnetite, and muscovite. Generally massive outcrops, but locally foliated near wall-rock contacts. Forms a large northeast-trending pluton in the southwest corner of the Raleigh 100k sheet.

PPwg - Muscovite-biotite granite of Wyatt pluton (Permian-Pennsylvanian) - Very light gray, medium-crystalline, muscovite-biotite granite and monzogranite. Medium- to coarse-crystalline, muscovite-biotite monzogranite. Presence of muscovite does abundant than biotite, and accessory garnet are distinctive. Granite is foliated, and inclusions of gneiss of the Raleigh terrane are common.

PPrgl - Lake Benson granite (Permian-Pennsylvanian) - Muscovite, locally porphyritic biotite granite. May contain white mica, epidote, and allanite.

PPrgs - Sims monzogranite (Permian-Pennsylvanian) - The Sims pluton is a composite body with two major facies. The Conner granitoid facies is coarse-crystalline, inequigranular, megaporphyritic, very pale orange to grayish-orange biotite monzogranite with abundant perthitic microcline crystals up to 5 cm across. The crystal matrix is plagioclase and biotite with local alteration to muscovite, chlorite, epidote, and rutile. The Sims facies is coarse-crystalline, inequigranular, biotite monzogranite in which the K-feldspars are smaller is size than in the megaporphyritic Conner granitoid facies. Accessory minerals are apatite, monazite, thorite (?), and zircon. An area of gneiss in the southwest portion of the Sims pluton is interpreted as roof pendant of muscovite and quartz rock with muscovite-quartz veins ranging from 50 to 10 00. See Speer (1996).

PMzTgf - Foliated and mylonitic granitic gneiss (Permian-Mississippian) - Granitic and leucogranitic gneiss. Commonly mylonitic and locally foliated. Includes sparse hornblende gneiss and pegmatite.

ROANOKE RAPIDS TERRANE

PzZsg - Granitoid rocks of the Hollister fault zone (Cambrian-Neoproterozoic) - Light gray, light tan, and pale green, very fine grained, very thinly foliated, locally crenulated muscovite +/- chlorite phyllonite. Locally includes sheared metavolcanic rock. Hollister fault zone phyllonite.

SPRING HOPE TERRANE

PzZsg - Granitoid rocks (Paleozoic-Neoproterozoic) - Medium- to coarse-crystalline, light-gray to pale-pink, massive to slightly foliated biotite granite. Composed of quartz, plagioclase, K-feldspar, muscovite, biotite, epidote, chlorite, and garnet. Locally contains clusters of biotite and muscovite.

PzZlg - Lucama granitoid (Paleozoic-Neoproterozoic) - Tan to pink, coarse-crystalline granite. Composed of K-feldspar, plagioclase, quartz, and biotite. The granitoid is found in the extreme southwest corner of the mapped area along Black Creek.

PzZpg - Pythian granitoid (Paleozoic-Neoproterozoic) - Medium- to coarse-crystalline, light-gray to pale-pink, massive to slightly foliated granitoid composed of quartz, plagioclase, muscovite, biotite, and garnet. Locally contains clusters of biotite and muscovite.

PzZglp - Glen Laurel granitoid (Paleozoic-Neoproterozoic) - Medium- to coarse-crystalline, light-gray to pale-pink, massive to slightly foliated granitoid composed of quartz, plagioclase, muscovite, biotite, and garnet. Locally contains clusters of biotite and muscovite.

PzZg - Granitoid (Paleozoic-Neoproterozoic) - Medium- to coarse-crystalline, light-gray to pale-pink, massive to slightly foliated granitoid composed of quartz, plagioclase, muscovite, biotite, and garnet. Locally clusters of biotite and muscovite.

PzZng - Nottingham granitoid orthogneiss (Paleozoic-Neoproterozoic) - Streaky to weakly layered, generally moderately well-foliated, locally porphyritic, tan, light brown, or brownish-orange biotite granitic orthogneiss. Contains local biotite-rich enclaves that may be xenolithic; epidote, titanite, and white mica are interpreted as products of metamorphism and/or low-temperature alteration.

CZabg - Biotite granitic orthogneiss (Cambrian-Neoproterozoic) - Medium-crystalline, weakly layered, weakly porphyritic well-foliated granitic gneiss. Megacrysts are K-feldspar; also contains white mica, epidote, and titanite.

METAVOLCANIC AND METASEDIMENTARY UNITS

CZsa - Metasiltstone (Cambrian-Neoproterozoic) - Fine-crystalline, yellowish-gray to greenish-gray metasiltstone. Composed of quartz, plagioclase, muscovite, and chlorite. Accessory minerals include biotite, epidote, apatite, and magnetite (?). Lacks well-defined bedding structures.

CZfmv - Felsic metavolcanic rocks (Cambrian-Neoproterozoic) - Includes distinctive bluish, gray, or white weathering, thinly layered and locally thinly bedded, fine-crystalline rocks consisting predominantly of very strongly recrystallized mosaic matrix of very fine-quartz + sodic plagioclase +/- microcline crystals.

CZamv - Amphibolite and metabasalt/andesite (Cambrian-Neoproterozoic) - The unit consists of interlayered mafic and felsic phyllite and greenstone. Greenstone makes up approximately 5-70% of the unit and occurs as concordant and discordant bodies reaching 1.5 m in thickness. In the Zebulon quadrangle, quartz + epidote greenstone is a local marker horizon (Stetler, 1997). Where covered by Coastal Plain deposits, the mapped distribution of this unit is based partly on geophysical data.

CZamv1 - Meta-andesite (Cambrian-Neoproterozoic) - Meta-andesite that is interbedded with felsic metavolcanic and metasedimentary units and locally contains alteration minerals of chlorite, epidote, and quartz.

CZamv2 - Metabasalt (Cambrian-Neoproterozoic) - Metabasalt that is interbedded with felsic metavolcanic and metasedimentary units.

CZamv3 - Mafic metavolcanic rocks (Cambrian-Neoproterozoic) - Includes massive fine to medium-crystalline epidote + chlorite + actinolite + albite greenstone; chlorite phyllite and schist; weakly to non-foliated, medium to coarse-crystalline amphibolite consisting of hornblende and plagioclase. Locally includes relict pillow structures. Interbedded with felsic metavolcanic and metasedimentary units. Locally contains pyroxene-bearing, foliated local quartz +/- epidote amygdules. Locally includes quartz-epidote rock containing various relicts of microcline, plagioclase, epidote/clinozoisite, quartz, chlorite, and opaque minerals. Also includes very rare metagabbro. In the zone of hornfels adjacent to granite gneiss, contains abundant biotite and hornblende porphyroblasts. Fine-to medium-grained, muscovite-bearing, arkosic sandstone, usually interbedded with felsic metavolcanic rocks (CZfmv), and/or quartz-epidote rock (CZeqv), and/or actinolite, epidote (or clinozoisite), plagioclase, titanite, Fe-Ti oxide minerals, and locally quartz and/or chlorite. Plagioclase may be twinned or untwinned.

CZamv4 - Mafic tuff and intrusive rock (Cambrian-Neoproterozoic) - Medium- to coarse-crystalline, medium to dark green mafic tuff metamorphosed subsolidus), mafic lithic tuff and mafic intrusive rock. The body at NC Hwy 97 in the Middlesex quadrangle contains abundant tourmaline clots.

CZamv5 - Mafic metavolcanic (Cambrian-Neoproterozoic) - Mainly chlorite +/- muscovite phyllite with lesser greenstone and sparse epidote-rich quartzose rocks.

CZka - Argillite (Cambrian-Neoproterozoic) - Very fine-crystalline, light gray to light olive gray laminated argillite. Chlorite +/-muscovite, and +/- graphite (?) layers generally less than 1 mm thick alternate with thicker quartz-rich layers in the Middlesex, Stanclo Chapel, Selma, and Ellsworth quadrangles. Includes muscovite phyllite, slate, and sparse granular quartz-epidote rock and crystal tuff in the Bunn East quadrangle. Locally phyllitic with thinly laminated to massive mudstone in the Zebulon quadrangle. Laminated chlorite phyllite, greenstone, and metagraywacke (?) are locally interbedded with the argillites in the Spring Hope quadrangle. In areas adjacent to the Rolesville batholith, contains hornfelsed/contact-metamorphosed rock and schistose rocks including some with porphyroblasts of garnet, staurolite, and/or chloritoide (Gaughan, 1999).

CZamv6 - Felsic metavolcanic (Cambrian-Neoproterozoic) - Fine-crystalline, white to light gray phyllitic or schistic typically with strongly developed foliation. Locally includes felsic metavolcanic rocks and quartz-epidote rock. Unit is interpreted to be product of alteration of CZafv unit. In the Lake Wheeler quadrangle, the unit is a grayish-green muscovite phyllite and phyllonite commonly with lesser amounts of chlorite schist and greenstone.

CZaxph - Crystal phyllite (Cambrian-Neoproterozoic) - Quartz crystals are conspicuous in the quartz crystal phyllite.

CZqsfg - Muscovite schist and sericite phyllite (Cambrian-Neoproterozoic) - Fine-crystalline, white to light gray phyllitic or schist. Composed of white mica with minor quartz and garnet. Locally contains tourmaline and abundant opaque minerals. Contains minor layers of quartz-rich rock and greenstone. Exposed in the Wendell quadrangle.

CZafv - Fine-crystalline felsic volcanic rock (Cambrian-Neoproterozoic) - Relict aphanitic, gray, quartzofeldspathic metavolcanic rock interpreted as metamorphosed vitric and vitric crystal tuff. Locally includes felsic lithic tuff with disseminated pyrite, for example west of the Neuse River in the Selma quadrangle. Felsic metavolcanic rocks are commonly altered.

CZadv - Dacitic metavolcanic rocks (Cambrian-Neoproterozoic) - Distinctive bluish, gray, or white weathering, thinly layered and locally strongly foliate fine-crystalline rocks consisting predominantly of very strongly recrystallized mosaic matrix of quartz + plagioclase +/- microcline crystals. Relict phenocrysts are present. Locally rock is vitreous on fresh surface and is distinctly hornfelsic near the margin with Rolesville batholith. Chemistry data indicate that the rocks are dacitic. Interpreted to be product of felsic lava origin. Locally described as "bluestone" due to distinctive bluish color.

CZu - Ultramafic rocks and phyllite undivided (Cambrian-Neoproterozoic) - Includes chlorite +/- epidote phyllite, muscovite phyllite, greenstone, and quartz-feldspar-white mica phyllite. Also includes muscovite +/- chlorite schist. Locally phyllonitic. Toward the north, includes granite, locally mylonitic granitic gneiss, and pegmatite.

CZsmt - Interbedded crystal tuff - interlayered with other low-grade metamorphic rocks (Cambrian-Neoproterozoic) - Fine to medium-crystalline, light-gray felsic metavolcanic rock containing phenocrysts of quartz and/or feldspar, locally up to 0.5 cm in size. Contains interlayers of mafic rock in the Middlesex quadrangle.

CZalt - Laminated epiclastic rocks and felsic lithic-crystal metatuff (Cambrian-Neoproterozoic) - Medium- to coarse-crystalline, light-gray laminated rock. Consists of flattened pumice lapilli, quartz crystals, and layers of relict sediment in a matrix of quartz, feldspar, and mica. Locally phyllitic. Felsic epiclastic metasandstone and fine-crystalline metasandstone interlayered with crystal and crystal-lithic metatuff. Many of the rocks are probably felsic lithic crystal tuff.

CZqv - Muscovite phyllite and tuff - Dominantly white mica phyllite or fine schist, locally displaying pervasive crenulation cleavage. Locally contains flattened and disk-shaped relict quartz phenocrysts 2-5 mm in diameter. Locally includes quartz-epidote rock, metamorphosed siltstone, mudstone, graywacke, or impure quartzite. Also includes thin beds of medium- to coarse-crystalline, laminated muscovite rocks or lithic-crystal dacitic tuff containing local flattened pumice lapilli and/or quartz crystals. Interpreted to have mixed dacitic pyroclastic and volcaniclastic sedimentary protolith.

CZaphs - Altered phyllite (Cambrian-Neoproterozoic) - Altered (sericitization, silicification, and pyritization alteration) phyllite that contains disrupted and concordant zones of massive quartz. Stanclo Chapel quadrangle.

CZsqmv - Quartz-muscovite schist (Cambrian-Neoproterozoic) - Medium-crystalline, white to light gray quartz-muscovite schist. Composed of white mica and quartz with minor amounts of garnet and chlorite. Locally contains very minor chlorite schist, greenstone, and quartz-feldspar-white mica phyllite. Also includes muscovite +/- chlorite schist. Locally phyllonitic. Toward the north, includes granite, locally mylonitic granitic gneiss, and pegmatite.

CZsgn - Biotite gneiss (Cambrian-Neoproterozoic) - Predominantly fine-crystalline, white to pale-pink felsic gneiss with scattered biotite flakes. The felsic gneiss is interpreted as metatuff containing rock fragments parallel to the direction of foliation.

CZsgn/CL - Biotite gneiss and calc-silicate rock (Cambrian-Neoproterozoic) - Fine-crystalline, white, pale pink, or light gray and foliated quartzofeldspathic gneiss, commonly with scattered biotite flakes. Contains interbeds of light gray to pale-pink felsic gneiss and white to gray, fine-crystalline muscovite schist, quartz-muscovite schist, biotite schist, and greenish-black to black amphibolite. In the Powhatan, Clayton, and Flowers quadrangles, some layers contain abundant plagioclase crystals and sparse white lithic fragments alongside parallel to foliation. Interpreted as metatuff. Metamorphic grade appears to increase toward the north.

Zubmfg - Mill Creek gneiss (Neoproterozoic) - Fine- to medium-crystalline, light olive gray to gray, schistose rock containing abundant plagioclase crystals and quartz. The unit is more predominantly biotite-muscovite-felsic gneiss. Crystals are particularly prominent on weathered surfaces. Contains pyrite, locally. Includes discontinuous, narrow elongated, and pod-like lenses of very fine-crystalline, very finely stripped felsic rock enveloped in a biotite-rich schist. Gneiss from Mill Creek area in the Flowers quadrangle yields a U/Pb age of 620 +/- 9 Ma (Wortman, 2000).

CZgmbs - Garnet-muscovite-biotite schist (Cambrian-Neoproterozoic) - Medium-crystalline, gray to black muscovite-biotite schist containing small scattered pink garnet, and locally staurolite porphyroblasts. Contains minor interbedded felsic gneiss, biotite gneiss, and amphibolite. Near the Rolesville batholith in the Clayton and Flowers Branch quadrangles, Gaughan (1999) identified abundant evidence of thermal metamorphism.

CZam - Amphibolite (Cambrian-Neoproterozoic) - Black to greenish black, slightly foliated to lineated and locally schistose amphibolite. Contains minor interlayered felsic gneiss, biotite gneiss, muscovite schist, and biotite schist. Locally contains chlorite and/or biotite.

CZams - Mica schist (Cambrian-Neoproterozoic) - Muscovite +/- biotite schist and phyllite, locally garnet-bearing and crenulated.

CZmg - Metagabbro (Cambrian-Neoproterozoic) - Medium- to coarse-crystalline, massive to weakly foliated metagabbro with biotite and muscovite and sericitized plagioclase fabric. Contains abundant relict phenocrysts of heavily sericitized plagioclase which locally preserve relict idiomorphic outlines. Interpreted as a metamorphosed pluton.

CZsgn - Felsic gneiss (Cambrian-Neoproterozoic) - Pinkish-gray to tan-white, fine- to medium-crystalline poorly to well foliated, weakly banded microcline-plagioclase-quartz-white mica gneiss and leucogneiss, locally with magnetite.

CZgn - Biotite gneiss of the high-grade Spring Hope terrane (Cambrian-Neoproterozoic) - Extremely heterogeneous unit containing metagabbro, metagranite, biotite gneiss, biotite schist, granitic gneiss locally with epidote, hornblende gneiss and amphibolite locally with epidote or garnet, metagraywacke, leucogneiss, mafic and calcsilicate hornfels in contact zones of Pennsylvanian-Permian plutons. Also contains locally crenulated muscovite schist, rarely with garnet and/or staurolite. With sillimanite locally in contact zones. To the south and east, the abundance of biotite gneiss decreases, and metaceous rocks become more abundant. Small intrusions of granite and pegmatite become more profuse toward the large plutons.

Zmgs - Metasedimentary rocks (Cambrian-Neoproterozoic) - Predominantly metagraywacke and metasiltstone. Also includes minor metamudstone and metaconglomerate. Metagraywacke may be massive or poorly bedded. Typically shows good relict clastic texture of medium sand to silt-sized grains of sericitized feldspar and quartz. Metamorphic biotite and epidote are common in the matrix, as is white mica. As overall relict grain size decreases, white mica increases in abundance. Fine opaque mineral grains are common.

This geologic map, partially supported by the U.S. Geological Survey (USGS), National Cooperative Geologic Mapping Program under STATEMAP, compiles the entire bedrock portion of the Raleigh 30' x 60' Quadrangle (Raleigh 100K) into GeMS (Geologic Map Schema) in support of the USGS US Geoframework Initiative's (USGI) vision for a nation-wide, seamless geologic map. This map supersedes NCGS Open-File Report 2004-02.

Research supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program under STATEMAP (Award 2022, G22AC00395).

This map is an updated version of:

Clark, T.W., Blake, D.E., Stoddard, E.F., Carpenter, P.A., III, and Carpenter, R.H., 2004, Preliminary bedrock geologic map of the Raleigh 30' x 60' Quadrangle, North Carolina: North Carolina Geological Survey Open-file Report 2004-02, scale 1:100,000, in color.

Digital database:

North Carolina Geological Survey, 2024, Digital database of the compiled bedrock geologic map of the Raleigh 30' x 60' Quadrangle (Raleigh 100K), North Carolina (in GeMS Level 3): North Carolina Geological Survey Open-file Report 2024-01, Version July 2026.

Citation for this revised map:

Stoddard, E.F., Blake, D.E., Hanna, H.D., and Bradley, P.J., 2026, Compiled bedrock geologic map of the Raleigh 30' x 60' Quadrangle (Raleigh 100K), North Carolina: North Carolina Geological Survey Open-file Report 2026-05, scale 1:100,000 (supersedes NCGS Open-File Report 2004-02).

Acknowledgements:

Contour lines courtesy of USGS.
Road layer courtesy of NC Department of Transportation.
Hydrography layer courtesy of NC Division of Water Resources.

Disclaimer:
This Open-File report is preliminary and has not been reviewed for conformity with the North American Stratigraphic Code. Further revisions or corrections to this preliminary map may occur prior to its release as a North Carolina Geological Survey map.

Compiled Bedrock Geologic Map of the Raleigh 30' x 60' Quadrangle (Raleigh 100K), North Carolina

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