GEOLOGIC TIME SCALE

				Approximate age of boundaries (millions of years)
Cenozoic Era	Quaternary Period			
	Tertiary Period	Neogene Period		
		Paleogene Period		
Mesozoic Era	Cretaceous Period			
	Jurassic Period			
	Triassic Period			245
Paleozoic Era	Permian Period			290
	Carboniferous Period	Pennsylvanian Period		
		Mississippian Period		330
	Devonian Period			360
	Silurian Period			408
	Ordovician Period			438
	Cambrian Period			570
Proterozoic	Late Proterozoic Era			1000
	Middle Proterozoic Era			1600
	Early Proterozoic Era			2500
Archeozoic	Archeozoic Eras			3400
	Oldest known rocks in U.S.			3800
	Oldest known rocks in world			4600

Adapted from U.S. Geological Survey, 1965; Compton, 1966; Cloud, in Geological Society of America, 1968; U.S. Geological Survey Bulletin 1230-A, p. 1-9.

*Kano, T. E., Fleuranne, F.F., Rioux, M.C., and Rowell, R.C., 1984, Geology, geochronology, and paleomagnetism of the Triassic Deerfield basin, Franklin County, Massachusetts: Northeastern Geology, v. 6, p. 81-94.

**Harland, W. B., Cox, A. V., Llewellyn, P. G., Pickton, C. A. G., Smith, A. G., and Walton, R., 1982, A geologic time scale: Cambridge, Cambridge University Press, 131 p.

***Odin, G. S., and Odin, C., 1990, Message of the Glauconies, in Odin, G. S., ed., Phanerozoic time scale and stratigraphy, Paris, Dahlem Conferences, p. 475-485.

MURPHY BELT

METAMORPHIC ROCKS

- Pzm — MINERAL SLUDGE FORMATION — Quartz-sericite-sericite schist and phyllite with thin sillimanite-fibrolite-bearing schist interbedded; graphite-bearing schist; sillimanite schist; chlorite-biotite schist; and amphibolite
- Pzm — MURPHY MARBLE; ANDREWS FORMATION, AND NOTTELY QUARTZITE, UNDIVIDED — Marble; quartzite; quartz-sericite-chlorite schist; biotite-hornblende gneiss; Andrews Formation: calcareous cross-bedded schist
- Pzm — BRASSTOWN FORMATION — Cross-bedded schist; includes miscaceous quartzite
- Pzm — NANTAHALA FORMATION AND TUGQUITAS QUARTZITE, UNDIVIDED — Nantahala Formation: slate and metasiltstone; dark gray, laminated to thin bedded; sulfidic
- Pzm — CAPTAIN DAVIS FORMATION — Light colored to gray, numerous, thin-plate layers

INTRUSIVE ROCKS

- Pzm — AMPHIBOLITE — Fine-grained, massive, foliated, and lineated; diorite to basalt in phase and only slightly metamorphosed

BLUE RIDGE BELT

SEDIMENTARY AND METAMORPHIC ROCKS

- Pzm — ROME FORMATION — Shale and siltstone, variegated red to brown; interbedded fine-grained sandstone and minor dolomite
- Pzm — SHADY DOLOMITE — Light gray, fine grained, massive, locally thin bedded dolomite
- CHILHOWEE GROUP
  - Pzm — UPPER CHILHOWEE — Vitreous quartz arenite, white to light gray; interbedded quartz siltstone and shale; Erwin and Hampton Formations of Rankin (1967)
  - Pzm — LOWER CHILHOWEE — Feldspathic arenite, white to yellowish gray; feldspathic quartz sandstone, pebble and conglomerate in basal part; Unicoi Formation of Rich Springs sandstone

OCOEE SUPERGROUP

- Pzm — HAUSER CREEK GROUP, UNDIVIDED — Slate to metasiltstone; local beds and pods, interbedded with quartzite; Ashe Formation: slate and phyllite
- Pzm — LEATHERMAN FORMATION — Slate and metasiltstone; dark green to black; Metaconglomerate lenticle in upper part; calcareous metasandstone; Ashe Formation: quartzite and phyllite; Ashe Formation
- Pzm — GREAT SMOKY GROUP, UNDIVIDED — Thick monomictic metaarenite of massive to graded beds of metagraywacke and metarkosites with subordinate slate and phyllite; Snowbird Group
- Pzm — CEDAR FORMATION — Sericite schist with sporadic chlorite, and garnet porphyroblasts; Snowbird Group: sericite schist, quartzite, and metaarkose
- Pzm — WHITEWATER METAMORPHIC METALSTONE AND ARCADIA SCHIST — Basic and lenses of calc-silicate rock locally abundant; Ocoee Supergroup: Ocoee Formation: Ocoee Formation: Ocoee Formation (partial listing): Snowbird, Hughes Gap and Wolfscrew formations in southern area; Horse Branch Member of Ammons Formation and Snowbird Group in northern area
- Pzm — VERVLETT FORMATION — Slate to schist, dark gray; graphitic and sulfidic; includes minor lenses, metagraywacke, and conglomerate
- Pzm — CAPE FEAR FORMATION — Phyllite, slate, and metasiltstone; minor quartzite; includes dark gray slate, rhyse schist, and nodular calc-silicate rock
- Pzm — SLATE, UP COPPERING, FORMATION — Slate to phyllite, dark gray; graphitic, sulfidic; includes metagraywacke with local graded bedding
- Pzm — PHYLLITE — Dark olive gray, graphitic and sulfidic
- Pzm — ANAKEESTA FORMATION — Slate to schist, dark gray, graphitic and sulfidic; includes interbedded argillaceous, feldspathic metagraywacke and quartzite
- Pzm — BUCK GAP FORMATION — Dark gray; highly-sulfidic slate and metaarkosite interbedded and gradational with metagraywacke; Stratigraphic position uncertain; in Cherokee County includes upper part of Buck Gap Formation
- Pzm — RICE BLUFF, SINGING FORE — Feldspathic, interbedded with dark argillaceous beds and laminae; Stratigraphic position uncertain
- Pzm — BROWNBERG GROUP, UNDIVIDED — Feldspathic metasiltstone; metaarenite and phyllite; Basal schist contains lenses of quartz-pebble conglomerate
- Pzm — PIGEON SILTSTONE — Thin bedded to laminated, commonly cross-laminated, feldspathic metasiltstone; minor feldspathic metaarenite and arkosic metaarkosite grading to silty metaarkosite
- Pzm — ROARING FORK SANDSTONE — Greenish-gray, fine to medium grained, massive, feldspathic metaarenite; metaarkosite, interbedded metasiltstone and phyllite
- Pzm — LONGARM QUARTZITE — Cross-bedded, feldspathic, locally conglomeratic; Basal beds include quartz-pebble conglomerate
- Pzm — WADNO BRANCH FORMATION — Sandy slate to coarse-grained pelitic metagraywacke with local graded bedding; Basal quartz sericite schist on phyllite
- MOUNT ROGERS FORMATION
  - Pzm — Metaarkosite (Late Proterozoic; 820 my, 38) — Light-colored porphyritic extrusive rock
  - Pzm — Metagraywacke — Interbedded with metaconglomerate, laminated metasiltstone, and slate; minor calcareous metasandstone, greenstone, and metarhyolite
- Pzm — ALLIGATOR BACK FORMATION
  - Pzm — Micaschist and phyllite — Laminated to thin-layered, interlayered with minor biotite-muscovite gneiss and amphibolite
  - Pzm — Gneiss — Finely laminated to thin layered, locally contains muscovite and biotite-muscovite porphyroblasts; minor amphibolite, quartzite, and amphibolite
  - Pzm — Amphibolite — Equigranular, massive to well foliated, interlayered, minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock
- ASHE METAMORPHIC SUITE AND TALLULAH FALLS FORMATION
  - Pzm — Metagraywacke — Foliated to massive, locally conglomeratic, interlayered with minor biotite-muscovite gneiss, micaceous quartzite, gneiss, and rare graphitic schist
  - Pzm — Micaceous quartzite — Locally sulfidic; interlayered with graphitic schist, minor biotite-muscovite gneiss, and amphibolite
  - Pzm — Mica schist — Locally sulfidic and graphitic; minor interlayered micaceous gneiss and amphibolite
  - Pzm — Biotite gneiss — Interlayered with biotite-garnet gneiss, biotite-muscovite gneiss, micaceous quartzite, and amphibolite
  - Pzm — Amphibolite — Equigranular, massive to well foliated, interlayered with minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock
- Pzm — COWETA GROUP — Quartz-diorite gneiss; feldspar-quartz-biotite gneiss, biotite-muscovite gneiss, and biotite-hornblende gneiss; minor amphibolite, gneiss, and minor amphibolite; Quartz diorite gneiss gradational
- Pzm — SOUTH DEKALB — Migmatitic; interlayered and gradational with biotite-muscovite gneiss, biotite-hornblende gneiss, and amphibolite; Quartz diorite gneiss gradational
  - Pzm — Amphibolite — Equigranular, massive to well foliated; interlayered with minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock

UNCONFORMITY

- Pzm — GRANODIORITIC GNEISS (Middle Proterozoic; 1176 my; 2) — Granular gray to pinkish gray, porphyroblastic to mylonitic; epidotic, sericitic, and chlorite-bearing
- Pzm — TOMKINS GNEISS (Middle Proterozoic; 1250 my; 1) — Poorly foliated to well foliated, equigranular to inequigranular; granitic
- Pzm — BOOTE GNEISS (Middle to Late Proterozoic; 990-1250 my; 1) — Gneiss, mylonitic, and granitic gneiss; Stratigraphic position uncertain; Boote quartz monzonite; includes variably mylonitized porphyraceous and paragneiss; Stratigraphic position uncertain; Boote gneiss of the Ashe County area; Sugarloaf Fork window, and Elk River window
  - Pzm — Amphibolite — Equigranular, massive to well foliated, interlayered with minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock
- Pzm — MOSMATTIC BIOTITE-HORNBLENDE GNEISSES (Middle Proterozoic; 1214 my; 3) — Layered, quartz-poor, biotite-hornblende gneiss; Stratigraphic position uncertain; Mosmatic gneiss; Mosmatic gneiss; Bacon rock
  - Pzm — Amphibolite — Equigranular, massive to well foliated, interlayered with minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock

INTRUSIVE ROCKS

- Pzm — PEGMATITES (Devonian to Ocoee; 365-430 my; 21) — Lenticular to irregular, zoned, quartz-feldspar-muscovite-tourmaline-garnet-beryl-monazite-columbite-tantalite; Ashe County area, Spruce Pine district, Hickory District (in part)
- Pzm — TRONDHJEMITE — Postmetamorphic dikes and sills; Foliated and lineated; trondhjemite, weakly foliated; Trondhjemite granodiorite to tonalite; Trondhjemite of Ashe County area; Trondhjemite of Ashe County area
- Pzm — QUARTZ DIORITE OR GRANODIORITE (Devonian; 365 my; 4) — Contains biotite, muscovite, and sericite; includes Whiteside Mountain, Cherokee County, and Spruce Pine, and other smaller plutons
- Pzm — NABLUS GNEISS (Ordovician; 450 my; 18) — Weakly foliated biotite gneiss to quartz monzonite
- Pzm — METALUTAMATIC ROCK — Metamorphosed dunite, local peridotite, serpentinite, talc, and talc-carbonate, and other altered ultramafic rock; Only larger bodies shown
- Pzm — AMPHIBOLITE — Equigranular, massive to well foliated; diorite to basalt in phase and only slightly metamorphosed
- Pzm — METAMORPHOSED GRANITIC ROCK (Late Proterozoic; 680-710 my; 25, 27) — Massive to foliated; locally migmatitic; Beech, Crossnore, Shoe-string, Linville, and Grandfather Mountain Plutons
- Pzm — MAN PATCH GRANITE — Metaalbite and light green; coarse-grained to pegmatitic; Man Patch pluton
- Pzm — BANNER ELK METAGABBRO (Late Proterozoic; 724 my; 16) — Thin dikes and sills; Not shown separately; areas of abundance shown by pattern

GRANDFATHER MOUNTAIN WINDOW

METAMORPHIC ROCKS

- Pzm — SNAKE DEN GNEISS — Light gray, fine-grained, massive, locally thin-bedded quartz-feldspar gneiss
- CHILHOWEE GROUP, UNDIVIDED
  - Pzm — UPPER CHILHOWEE — Vitreous quartzite, white to light gray; interbedded sandy metasiltstone and slate
  - Pzm — LOWER CHILHOWEE — Feldspathic quartzite, white to yellowish gray; Basal quartz-pebble conglomerate; Stratigraphic position uncertain
- GRANDFATHER MOUNTAIN FORMATION
  - Pzm — Metaarkosite — Schistose, massive, locally cross-bedded, interlayered metasiltstone and slate
  - Pzm — Metagraywacke — Massive, massive conglomeratic, interlayered with metasiltstone-sericite schists, includes Kona-Sourwood Member (metaarkosite and slate)
  - Pzm — Phyllite and sericite-mica schist (Late Proterozoic; 800 my; 26) — Phyllite to schistose; contains subordinate calcareous phenocrysts of plagioclase and pink potassic feldspar; Rosemedes quartzite and mica-quartz schist
  - Pzm — Metasiltstone — Locally contains thin bedded non-bearing siltstone; interbedded with phyllite, lithic-graywacke, and minor metaarkosite
  - Pzm — Metagraywacke — Crossbedding and graded bedding common; Basal conglomerate; Stratigraphic position uncertain
  - Pzm — Felsic metasiltstone; micro and metasedimentary rocks (Late Proterozoic; 820 my; 26) — Tentatively correlated with Grandfather Mountain Formation
- SNAKE DEN GNEISS — Migmatitic; interlayered and gradational with biotite-muscovite gneiss, biotite-hornblende gneiss, and amphibolite; Stratigraphic position uncertain
  - Pzm — Amphibolite — Equigranular, massive to well foliated; interlayered with minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock

UNCONFORMITY

- Pzm — GRANODIORITIC GNEISS (Middle Proterozoic; 1176 my; 2) — Granular gray to pinkish gray, porphyroblastic to mylonitic; epidotic, sericitic, and chlorite-bearing
- Pzm — TOMKINS GNEISS (Middle Proterozoic; 1250 my; 1) — Poorly foliated to well foliated, equigranular to inequigranular; granitic
- Pzm — BOOTE GNEISS (Middle to Late Proterozoic; 990-1250 my; 1) — Gneiss, mylonitic, and granitic gneiss; Stratigraphic position uncertain; Boote quartz monzonite; includes variably mylonitized porphyraceous and paragneiss; Stratigraphic position uncertain; Boote gneiss of the Ashe County area; Sugarloaf Fork window, and Elk River window
  - Pzm — Amphibolite — Equigranular, massive to well foliated, interlayered with minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock
- MOSMATTIC BIOTITE-HORNBLENDE GNEISSES (Middle Proterozoic; 1214 my; 3) — Layered, quartz-poor, biotite-hornblende gneiss; Stratigraphic position uncertain; Mosmatic gneiss; Mosmatic gneiss; Bacon rock
  - Pzm — Amphibolite — Equigranular, massive to well foliated, interlayered with minor biotite-hornblende gneiss; Stratigraphic position uncertain; Basal rock, may include metasedimentary rock

INTRUSIVE ROCKS

- Pzm — PEGMATITES (Devonian to Ocoee; 365-430 my; 21) — Lenticular to irregular, zoned, quartz-feldspar-muscovite-tourmaline-garnet-beryl-monazite-columbite-tantalite; Ashe County area, Spruce Pine district, Hickory District (in part)
- Pzm — TRONDHJEMITE — Postmetamorphic dikes and sills; Foliated and lineated; trondhjemite, weakly foliated; Trondhjemite granodiorite to tonalite; Trondhjemite of Ashe County area; Trondhjemite of Ashe County area
- Pzm — QUARTZ DIORITE OR GRANODIORITE (Devonian; 365 my; 4) — Contains biotite, muscovite, and sericite; includes Whiteside Mountain, Cherokee County, and Spruce Pine, and other smaller plutons
- Pzm — NABLUS GNEISS (Ordovician; 450 my; 18) — Weakly foliated biotite gneiss to quartz monzonite
- Pzm — METALUTAMATIC ROCK — Metamorphosed dunite, local peridotite, serpentinite, talc, and talc-carbonate, and other altered ultramafic rock; Only larger bodies shown
- Pzm — AMPHIBOLITE — Equigranular, massive to well foliated; diorite to basalt in phase and only slightly metamorphosed
- Pzm — METAMORPHOSED GRANITIC ROCK (Late Proterozoic; 680-710 my; 25, 27) — Massive to foliated; locally migmatitic; Beech, Crossnore, Shoe-string, Linville, and Grandfather Mountain Plutons
- Pzm — MAN PATCH GRANITE — Metaalbite and light green; coarse-grained to pegmatitic; Man Patch pluton
- Pzm — BANNER ELK METAGABBRO (Late Proterozoic; 724 my; 16) — Thin dikes and sills; Not shown separately; areas of abundance shown by pattern

INNER PIEDMONT, CHAUGA BELT, SMITH RIVER ALLOCHTHON, AND SAURATOWN MOUNTAINS ANTICLINORIUM

METAMORPHIC ROCKS

- IPz — ROCKS OF BREVARD FAULT ZONE — "Tan-gum" schist and phyllonite, graphitic schist associated with hexagonite; Hexagonite-bearing rocks
- IPz — UPPER CHILHOWEE — Vitreous quartzite, white to light gray; interbedded sandy metasiltstone and slate
- IPz — LOWER CHILHOWEE — Feldspathic quartzite, white to yellowish gray; Basal quartz-pebble conglomerate; Stratigraphic position uncertain
- IPz — PIN GRANDIO SUITE (Ordovician) — Strongly foliated, minor layers of biotite gneiss
- IPz — MICA SCHIST — Garnet, staurolite, kyanite, or sillimanite occur locally; lenses and layers of quartz, schist, micaceous quartzite, calc-silicate rock, sillimanite-fibrolite schist, mica schist, and amphibolite; Contains minor layers of biotite gneiss
- IPz — METAMORPHIC ROCK — Interbedded felsic to mafic tuffs and flows(?)
- IPz — MICA SCHIST — Garnet, staurolite, kyanite, or sillimanite; occur locally; lenses and layers of quartz, schist, micaceous quartzite, calc-silicate rock, sillimanite-fibrolite schist, mica schist, and amphibolite; Contains minor layers of biotite gneiss
- IPz — AMPHIBOLITE AND BIOTITE GNEISS — Interlayered, minor layers and lenses of hornblende gneiss, metagabbro, mica schist, and garnet-mica schist
- IPz — AMPHIBOLITE — Metamorphosed mafic extrusive and intrusive rocks; includes hornblende gneiss; thin layers of mica schist; calc-silicate rock; and felsic gneiss; Contains minor layers of biotite gneiss and metagabbro
- IPz — HORNBLENDE GNEISS — Poorly layered to massive, medium to coarse grained; hornblende and quartz; local mica schist, amphibolite, and biotite gneiss
- IPz — MICA SCHIST — Interlayered with quartz-muscovite schist; contains muscovite, graphite, kyanite, or sillimanite
- IPz — METASEDIMENTARY AND MUSCOVITE-BIOTITE SCHIST — Metamorphosed felsic tuffaceous sedimentary rocks; Contains minor layers of biotite gneiss; minor marble and graphite schist
- IPz — METAMORPHIC AMPHIBOLITE, AMPHIBOLITE, AND KYANITE SCHIST — Metamorphosed mafic rocks; Contains minor layers of biotite gneiss; amphibolite and kyanite schist; minor sillimanite and graphite schist
- IPz — METAMORPHIC ROCK — Contains quartz and microcline porphyroblasts
- IPz — GNEISS (Ordovician) — Interlayered with biotite schist, monzogranite, and amphibolite; sillimanite-mica schist, and granitic rock
- IPz — PIN GRANDIO SUITE — Includes phyllonite and interlayered biotite gneiss
- IPz — NEGLIGNAMALAR BIOTITE GNEISS — Weakly foliated to massive, coarse grained; Contains hexagonite and rare, large megacrysts of quartz and feldspar
- IPz — ROBINHOOD BLASTIC GNEISS — Massive to foliated, granodiorite; migmatitic
- IPz — GARNET MICA SCHIST — Interlayered with amphibolite
- IPz — GRANITIC GNEISS (Middle Proterozoic; 1100 my; 7) — Megacrystic; in places contains hexagonite
- IPz — GNEISS — Dikes; gray to black

INTRUSIVE ROCKS

- IPz — CHERRYVILLE GRANITE (Mississippian; 341 my; 20,21) — Massive to weakly foliated; northeast-trending; Shown flattening on east side
- IPz — CASTLE HAYNE GRANITE GNEISS (Devonian to Silurian; 408 my; 19) — Massive to weakly foliated; northeast-trending; massive to well foliated; contains biotite
- IPz — GRANITE GNEISS (Ordovician to Silurian; 438 my; 17) — Poorly foliated; northeast-trending; contains biotite
- IPz — MONANTOC GRANITIC GNEISS (Ordovician) — Foliated to massive; granitic to quartz monzonite; Contains biotite and muscovite
- IPz — METAMORPHOSED GRANITIC ROCK (Cambrian to Ordovician; 450-540 my; 22) — Foliated to massive; Contains biotite; Stratigraphic position uncertain; Tobacco Road Gneiss
- IPz — HENDERSON GNEISS (Cambrian; 524 my; 10) — Monzonite to granodiorite; Contains biotite
- IPz — METAMORPHOSED GABBRO AND UCAPITA — Foliated to massive
- IPz — METALUTAMATIC ROCK — Metamorphosed dunite, local peridotite, serpentinite, talc, and talc-carbonate, and other ultramafic rock; Only larger bodies shown
- IPz — METAMORPHOSED GRANITIC ROCK (Late Proterozoic to late Cambrian; 500-680 my; 5,7-10,23-25,27) — Megacrystic, weak foliation; Contains biotite; Contains hornblende; Chapel Hill, Cheatham, Farrington, Meadow Flats, Mt. Gilead, Pace, Concord-Kiokee, and Poplar Mountain and Stokes and Pine Hall Plutons
- IPz — METAMORPHOSED GRANITIC ROCK (Late Proterozoic to late Cambrian; 500-680 my; 5,7-10,23-25,27) — Megacrystic, weak foliation; Contains biotite; Contains hornblende; Chapel Hill, Cheatham, Farrington, Meadow Flats, Mt. Gilead, Pace, Concord-Kiokee, and Poplar Mountain and Stokes and Pine Hall Plutons
- IPz — METAMORPHOSED QUARTZ DIORITE — Foliated to massive

CHARLOTTE AND MILTON BELTS

METAMORPHIC ROCKS

- CZhf — FINE GRAINED BIOTITE GNEISS — Massive to strongly foliated; minor layers of biotite schist; Contains biotite
- CZhf — FELSIC MICA GNEISS — Interlayered with biotite and hornblende gneiss and mica schist
- CZhf — MICA SCHIST — Interlayered and migmatitic; Contains biotite, muscovite, garnet, staurolite, and sillimanite; Contains minor layers of biotite gneiss; Stratigraphic position uncertain; Contains biotite
- CZhf — METAMORPHIC ROCK — Interbedded felsic to mafic tuffs and flows(?)
- CZhm — MICA SCHIST — Garnet, staurolite, kyanite, or sillimanite; occur locally; lenses and layers of quartz, schist, micaceous quartzite, calc-silicate rock, sillimanite-fibrolite schist, mica schist, and amphibolite; Contains minor layers of biotite gneiss
- CZhm — METAMORPHIC ROCK — Interbedded felsic to mafic tuffs and flows(?)
- CZhm — MAFIC METACLASTIC ROCK — Metamorphosed basaltic to andesitic tuffs and flows; Contains biotite; Locally includes hypabyssal intrusive rocks; Stratigraphic position uncertain (of Albemarle)
- CZhm — FELSIC METACLASTIC ROCK — Metamorphosed dacitic to rhyolitic flows and tuffs; Light gray to pinkish gray; minor mafic and intermediate tuffs; Contains biotite; Stratigraphic position uncertain (of Albemarle)
- CZhm — QUARTZITE — Massive to well foliated; contains andalusite, kyanite, or sillimanite; Contains biotite
- CZhm — PHYLLITE AND SCHIST — Minor biotite, pyrite, and sillimanite; includes minor quartzite
- CZhm — METASILTSTONE — Interbedded felsic to mafic tuffs and flows(?)

INTRUSIVE ROCKS

- CZhm — DIABASE — Dikes; gray to black
- PPz — GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11,12) — Massive to equigranular; Contains biotite; Contains muscovite
- PPz — PHYLLITE AND SCHIST — Locally serrulated and pebbly; Includes phyllonite, sheared fine-grained metasediment, and metavolcanic rock; In Charlotte belt, Contains muscovite; Includes hornblende; Contains andalusite and school; Contains
- PPz — FOLIATED TO MASSIVE GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11,12) — Massive to foliated; Contains muscovite; Rowan County area, Salisbury area, Rowan and Cabarrus Counties
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metamorphosed dunite and peridotite, serpentinite, soapstone, and other altered ultramafic rock; Only larger bodies shown
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metagabbro, metadiorite, and metamafic plutonic-volcanic complex
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- CZhy — METAMORPHOSED GRANITIC ROCK — Megacrystic; weak foliation; Contains biotite
- CZhy — DIABASE — Dikes and sills; gray to black

CAROLINA SLATE BELT

METAMORPHIC ROCKS

- CZhy — TAKONI FORMATION — Metamorphosed graywacke, volcanic sandstone, and siltstone; Contains biotite and muscovite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — METAMUSTINE AND METAARGILLITE — Thin to thick bedded; Contains biotite and muscovite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — MICA SCHIST — Contains garnet, staurolite, kyanite, or sillimanite; Contains biotite and muscovite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — INJECTED GNEISS — Biotite gneiss and schist intruded by numerous sills and dikes of felsic and intermediate composition; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — FELSIC MICA GNEISS — Interlayered with graphitic mica schist and manganese schist; commonly with kyanite; minor hornblende gneiss
- CZhy — QUARTZITE AND MUSCOVITE SCHIST — Garnet, andalusite, kyanite, or sillimanite; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — HORNBLENDE GNEISS — Medium to coarse-grained; sparsely foliated; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — PHYLLITE AND SCHIST — Minor biotite, pyrite, and sillimanite; includes minor quartzite; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — METALUTAMATIC ROCK — Metamorphosed dunite and peridotite, serpentinite, talc, and talc-carbonate, and other altered ultramafic rock; Only larger bodies shown
- CZhy — VOLCANIC METACONGLOMERATE — Includes metapyroclastic and metasedimentary rocks
- CZhy — DIABASE — Dikes; gray to black

INTRUSIVE ROCKS

- PPz — GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11) — Megacrystic to equigranular; Contains biotite; Contains muscovite
- PPz — FOLIATED TO MASSIVE GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11,12) — Massive to foliated; Contains muscovite; Rowan County area, Salisbury area, Rowan and Cabarrus Counties
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metamorphosed dunite and peridotite, serpentinite, soapstone, and other altered ultramafic rock; Only larger bodies shown
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metamorphosed dunite and peridotite, serpentinite, soapstone, and other altered ultramafic rock; Only larger bodies shown
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metagabbro, metadiorite, and metamafic plutonic-volcanic complex
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METAMORPHOSED GRANITIC ROCK — Megacrystic; weak foliation; Contains biotite
- PPz — DIABASE — Dikes and sills; gray to black

RALEIGH BELT

METAMORPHIC ROCKS

- CZhy — AMPHIBOLITE — Metamorphosed mafic extrusive and intrusive rock; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — METAVOLCANIC-EPICLASTIC ROCK — Metamorphosed argillite, mudstone, and tuff; Contains biotite; Contains minor layers of felsic and mafic tuffs
- CZhy — FELSIC METAVOLCANIC ROCK — Metamorphosed dacite to rhyolite flows and tuffs; light gray to pinkish gray; minor felsic and mafic tuffs; Contains biotite; Contains minor layers of felsic and mafic tuffs
- CZhy — INJECTED GNEISS — Biotite gneiss and schist intruded by numerous sills and dikes of felsic and intermediate composition; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — FELSIC METAVOLCANIC ROCK — Metamorphosed dacite to rhyolite flows and tuffs; light gray to pinkish gray; minor felsic and mafic tuffs; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — QUARTZITE AND MUSCOVITE SCHIST — Garnet, andalusite, kyanite, or sillimanite; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — HORNBLENDE GNEISS — Medium to coarse-grained; sparsely foliated; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — PHYLLITE AND SCHIST — Minor biotite, pyrite, and sillimanite; includes minor quartzite; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — METAVOLCANIC-EPICLASTIC ROCK — Metamorphosed argillite, mudstone, volcanic sandstone, conglomerate, and volcanic tuff; Contains biotite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- CZhy — PHYLLITE AND SCHIST — Locally serrulated and pebbly; Includes phyllonite, sheared fine-grained metasediment, and metavolcanic rock; In Charlotte belt, Contains muscovite; Includes hornblende; Contains andalusite and school; Contains

INTRUSIVE ROCKS

- PPz — GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11) — Megacrystic to equigranular; Contains biotite; Contains muscovite
- PPz — FOLIATED TO MASSIVE GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11,12) — Massive to foliated; Contains muscovite; Rowan County area, Salisbury area, Rowan and Cabarrus Counties
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metamorphosed dunite and peridotite, serpentinite, soapstone, and other altered ultramafic rock; Only larger bodies shown
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metamorphosed dunite and peridotite, serpentinite, soapstone, and other altered ultramafic rock; Only larger bodies shown
- PPz — METAMORPHOSED GRANITIC ROCK (Late Proterozoic to late Cambrian; 500-680 my; 5,7-10,23-25,27) — Megacrystic, weak foliation; Contains biotite; Contains hornblende; Chapel Hill, Cheatham, Farrington, Meadow Flats, Mt. Gilead, Pace, Concord-Kiokee, and Poplar Mountain and Stokes and Pine Hall Plutons
- PPz — METAMORPHOSED QUARTZ DIORITE — Foliated to massive

TRIASSIC BASINS

NEWARK SUPERGROUP

DAN RIVER GROUP

- Ꞓ — DAN RIVER GROUP, UNDIVIDED — Basinwarpen conglomerate and sandstone, red siltstone, mudstone, and argillite; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- Ꞓ — STONEFIELD FORMATION — Conglomerate, sandstone, and mudstone; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- Ꞓ — COB BRANCH FORMATION — Mudstone with minor sandstone; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
- Ꞓ — FIRE HILL FORMATION — Sandstone, mudstone, and conglomerate; Contains minor layers of felsic and mafic tuffs

DURHAM GROUP

- Ꞓ — DURHAM GROUP, UNDIVIDED — Conglomerate, feldspathic sandstone, and mudstone; Contains minor layers of felsic and mafic tuffs; Contains minor layers of felsic and mafic tuffs
  - Ꞓ — Arkosic sandstone, tan, medium to very coarse-grained, micaceous
  - Ꞓ — Sandstone and mudstone with thin lenticels of chert and impure limestone
  - Ꞓ — Arkosic sandstone and dolomitic sandstone, brown, interbedded with mudstone; Contains dolomitic sandstone and mudstone
  - Ꞓ — SHIPPING PORT FORMATION — Conglomerate, feldspathic sandstone, and mudstone
  - Ꞓ — CUMNOCK FORMATION — Sandstone and mudstone, gray to black; Contains coal and carbonaceous shale; Locally into Pekin and Sanford Formations
  - Ꞓ — PEKIN FORMATION — Conglomerate, sandstone, and mudstone
- Ꞓ — DIABASE — Dikes and sills, gray to black

EASTERN SLATE BELT

METAMORPHIC ROCKS

Rocks of Eastern slate belt are partly covered by Quaternary surficial deposits not shown; all deposits greater than approximately 25 feet are included for extent

- CZhy — METAVOLCANIC-EPICLASTIC ROCK — Metamorphosed argillite, mudstone, volcanic sandstone, conglomerate, and volcanic tuff
- CZhy — FELSIC METAVOLCANIC ROCK — Metamorphosed dacite to rhyolite flows and tuffs; light gray to pinkish gray; minor felsic and mafic tuffs; Contains biotite
- CZhy — INTERMEDIATE METAVOLCANIC ROCK — Metamorphosed andesite to dacite flows and tuffs; light gray to pinkish gray; minor felsic and mafic tuffs; Contains biotite
- CZhy — FELSIC METAVOLCANIC ROCK — Metamorphosed dacite to rhyolite flows and tuffs; light gray to pinkish gray; minor felsic and intermediate tuffs; Contains biotite
- CZhy — QUARTZITE AND MUSCOVITE SCHIST — Garnet, andalusite, kyanite, or sillimanite; Contains biotite
- CZhy — HORNBLENDE GNEISS — Medium to coarse-grained; sparsely foliated; Contains biotite
- CZhy — PHYLLITE AND SCHIST — Minor biotite, pyrite, and sillimanite; includes minor quartzite; Contains biotite
- CZhy — METAVOLCANIC-EPICLASTIC ROCK — Metamorphosed argillite, mudstone, volcanic sandstone, conglomerate, and volcanic tuff; Contains biotite
- CZhy — VOLCANIC METACONGLOMERATE — Includes metapyroclastic and metasedimentary rocks
- CZhy — DIABASE — Dikes; gray to black

INTRUSIVE ROCKS

- PPz — GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11) — Megacrystic to equigranular; Contains biotite; Contains muscovite
- PPz — FOLIATED TO MASSIVE GRANITIC ROCK (Pennsylvanian to Permian; 285-320 my; 11,12) — Massive to foliated; Contains muscovite; Rowan County area, Salisbury area, Rowan and Cabarrus Counties
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METALUTAMATIC ROCK — Metamorphosed dunite and peridotite, serpentinite, soapstone, and other altered ultramafic rock; Only larger bodies shown
- PPz — METAMORPHOSED GABBRO AND DIORITE — Foliated to massive
- PPz — METAMORPHOSED QUARTZ DIORITE — Foliated to massive
- PPz — METAMORPHOSED GABBRO AND DI