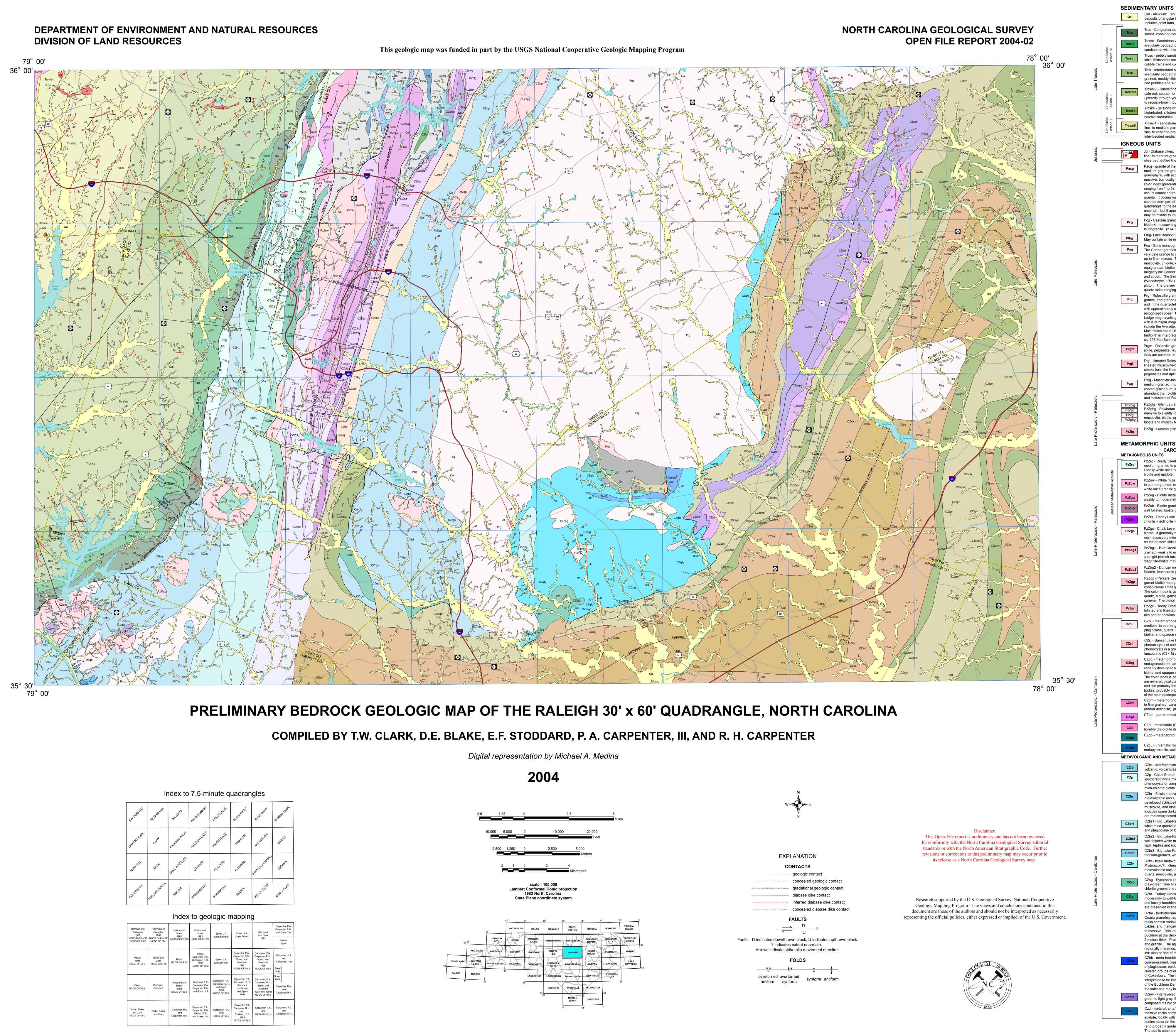
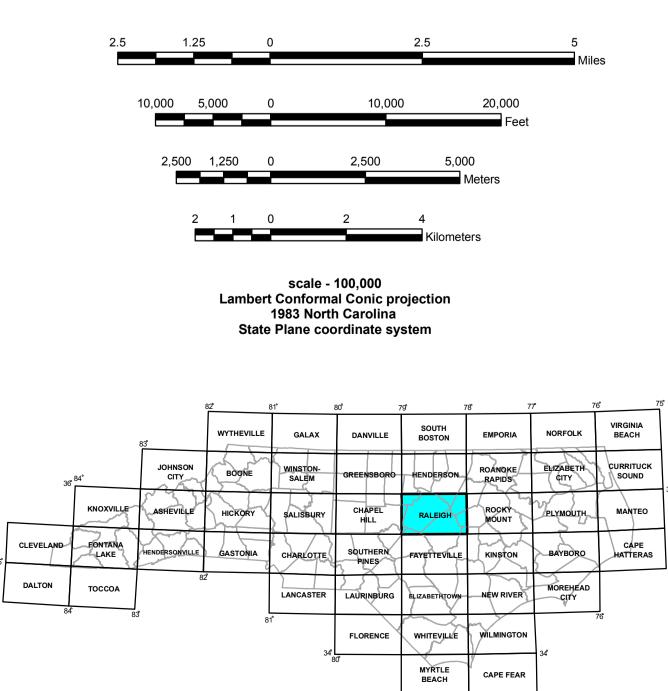
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF LAND RESOURCES



muex to 7.5-minute quadrangles										
SW DIRHAM	SEDURIAN	BATLEAN	WANEFOREST	ROLESVILLE	BUMMINEST	BUMILAST	SPRING HOPE			
GREENLEVEL	CART	PALEIGH MEST	RALEGHERST RANT	ANGHDALE	TEBULON	MODIESET	BALLEY			
NEWHILL	Reet	LAKE WHEELER	CARNER	CLAYFON	FLOWERS	STANCILS CHAPTE	LUCAMA			
CONESBURY	FUCUATVARINA	ANOTER	EDMONDSON	POWHATAN	SELMA	4EINT WEST	KENTERST			

Hoffman and Gallagher 1989 NCGS Bulletin 92 NCGS OF 89-2	Hoffman and Gallagher 1989 NCGS Bulletin 92 NCGS OF 89-1	Horton and others 1992 USGS OF 92-269	Horton and others 1992 USGS OF 92-269	Speer, J.A. (unpublished)	Speer, J.A. (unpublished)	Stoddard and Clark 1992	Carpenter, P.A., Carpenter, R.H., and Clark, T.W. Stetler 1997
Watson 1998 NCGS OF 98-3	Blake and Clark NCGS GMS 16	Blake NCGS GMS 15	Speer, Carpenter, P.A., Carpenter, R.H., 1998 NCGS OF 98-6	Speer, J.A. (unpublished)	Carpenter, P.A., Carpenter, R.H., Speer, and Stoddard 1996 NCGS OF 96-2	Carpenter, P.A., Carpenter, R.H., Speer, and Stoddard 1996 NCGS OF 96-1	Carpenter, P.A., and Carpenter, R.H. Speer 1989
Clark NCGS OF 96-3	Clark and Stoddard	Stoddard and Heller 1998 NCGS OF 98-5	Stoddard, E.F., Carpenter, P.A., Carpenter, R.H., and Speer, J.A.	Carpenter, P.A., Carpenter, R.H., and Speer 1998 NCGS OF 98-4	Carpenter, P.A., Carpenter, R.H., Stoddard, Huntsman, and Speer 1998	Carpenter, P.A., Carpenter, R.H., Speer, and Stoddard 1994 (rev. 1995) NCGS OF 94-3	Speer 1989 Carpenter, P.A., and Carpenter, R.H.
Butler, Blake, and Clark NCGS OF 96-3	Blake, Butler, and Clark	Carpenter, P.A., and Carpenter, R.H.,	Carpenter, P.A., Carpenter, R.H., Wilson, W.F., and Speer, J.A.,	Carpenter, P.A., 1990 NCGS OF 90-7	Carpenter, P.A. Carpenter, R.H., and Stoddard, E.F. 1998 NCGS OF 98-1	Carpenter, P.A., and Carpenter, R.H.,	Carpenter, P.A., and Carpenter, R.H.,



fine- to medium-grained, micaceous, feldspathic, crossbedded sandstone; fine- to very fine-grained biotite is a distinctive accessory mineral; unit includes inter-bedded reddish-brown, bioturbated siltstone and muddy, fine-grained sandstone. Jd - Diabase dikes: steeply dipping to subvertical dikes of gray to bluish-black, fine- to medium-grained diabase that may be olivine bearing. Solid lines where observed; dotted lines where inferred from aeromagnetic data. Pacg - granite of the Avents Creeks type: Light gray to pinkish gray, fine- to medium-grained granite composed mainly of quartz, microcline perthite, and granophyre, with accessory biotite, garnet, magnetite, and muscovite; generally massive, but locally foliated near contacts. The granite is characterized by low color index (percentage of dark-colored minerals, generally less than 2, and

Trcs/si1 - sandstone with interbedded siltstone: pinkish-gray to light-olive-gray,

occurs almost entirely as a component of perthite, so the rock is a hypersolvus granite. It occurs mainly in a large pluton exposed along Avents Creek in the southeastern part of the quadrangle and extending into the Fuquay-Varina quadrangle to the east and the Mamers quadrangle to the south. The age is uncertain, but it appears to be younger than the granites listed below and may be middle to late Paleozoic. Pcg - Castalia granitoid: fine to medium-grained, generally equigranular, biotite+/-muscovite granitoid. It is represented dominantly by biotite-muscovite leucogranite. (314 +/-11 ma date.) Plbg- Lake Benson Pluton: medium-grained, locally porphyritic biotite granite. **Pibg** May contain white mica, epidote, allanite, and zircon. Psg - Sims monzogranite: The Sims pluton is a composite body with two major lithologies. The Conner granitoid facies of the Sims pluton is coarse-grained, inequigranular, megacrystic, very pale orange to grayish-orange monzogranite with abundant perthitic microcline grains up to 5 cm across. The groundmass is plagioclase and biotite with local alteration to muscovite, chlorite, epidote, and rutile. The Sims facies of the Sims pluton is coarse-grained, equigranular, biotite monzogranite in which the alkali feldspars are smaller is size than in the megacrystic Conner granitoid facies. Accessory minerals are apatite, monazite, thorite (?), and zircon. The Sims granitoid facies has a Rb/Sr whole-rock age of 288+/-13 Ma

(Wedemeyer, 1981). An area of greisen is present in the southwest portion of the Sims

ranging fron 1 to 5), and by an abundance of perthitic alkali feldspar. Plagioclase

pluton. The greisen constists primarily of muscovite and guartz rock with muscovite: quartz ratios ranging from 90:10 to 10:90. Prg - Rolesville granitoid:- medium-to coarse-grained to megacrystic monzogranite, granite, and granodiorite. Pegmatites are common near the border of the granitoid and in the quartzofeldspathic gneiss. The Rolesville batholith is a composite pluton with approximately sixteen texturally and mineralogically distinct granitoid facies recognized (Speer, 1994). One distinct facies of the Rolesville batholith is the Archers Lodge megacrystic granitoid. The Archers Loge is a coarse-grained biotite monzogranite with K-feldspar megacrysts up to 3 cm long. Other facies within the Raleigh 100k sheet include the Averette. Bunn, Lassiter, Marks, Mitchell, and Rolesville Main. The Rolesville Main facies has a U/Pb date of 297.6 +/- 3.2 Ma (Schneider and Samson, 2001). The batholith is interpreted to have been constructed by a single pulse of magmatism at ca. 298 Ma (Schneider and Samson, 2001). Prgm - Rolesville granitoid marginal phase: muscovite rich granitoid dominated by aplite, pegmatite, leucogranite, and quartz-muscovite greisen. Pegmatite dikes 1" to 3" thick are common in granite in the Prgm. Prgl - lineated Rolesville granitoid: fine to medium-grained, light-gray to light pink, lineated muscovite-biotite-quartz-feldspar granite. Locally contains garnet. Biotite steaks form the lineation. Some layers are coarser grained. Cut by numerous pegmatites and aplite stringers.

Pwg - Muscovite-biotite granite of Wyatt pluton (Pennsylvanian): Very light gray, medium-grained, muscovite-biotite monzogranite and pinkish-gray, medium- to coarse-grained, muscovite-biotite monzogranite. Presence of muscovite (less abundant than biotite) and accessory garnet are distinctive. Granite is foliated, and inclusions of Raleigh gneiss are common. PzZglg - Glen Laurel granitoid, PzZpg - Pythian granitoid, PzZg - granitoid, PzZphg - Powhatan granitoid: Medium to coarse-grained, light-gray to pale-pink, massive to slightly foliated granitoid composed of quartz, plagioclase, k-feldspar, muscovite, biotite, epidote, chlorite, and garnet. Locally, contains clusters of biotite and muscovite. PzZlg - Lucama granitoid: Biotite granite.

METAMORPHIC UNITS

CAROLINA TERRANE META-IGNEOUS UNITS PzZrg - Reedy Creek metagranodiorite: leucocratic (CI<10) light tannish-gray, medium-grained to porphyritic, foliated and lineated to massive, metagranodiorite. Locally white mica rich and/or contains blue quartz phenocrysts and clots of biotite and epidote. PzZuw - White mica granitic gneiss: leucocratic (CI<5) white to tan, mediumto coarse-grained, moderately to well foliated, white mica metagranite to white mica granitic gneiss. PzZug - Biotite metagranite: Leucocratic (CI<10) pink to tan, medium-grained, weakly to moderately foliated locally porphyritic biotite and quartz metagranite. PzZub - Biotite granitic gneiss: mesocratic (CI<35) gray, medium- to fine-grained, well foliated, biotite granitic gneiss. PzZrs - Reedy Lake schist: dark green, coarse-grained, moderately to well foliated, chlorite + actinolite + talc schist. PzZgc - Chalk Level metagranite: Light gray to pinkish white, fine- to medium-grained biotite. It generally has a distinct foliation and a color index of 5 to 8. Biotite is the main accessory mineral. The granite forms small plutons west of Chalk Level Church on the eastern side of the Cape Fear River valley and the lower valley of Parkers Creek. PzZbg1 - Burt Creek metagranite: Mixed facies of dark gray to bluish-gray, fine- to mediumgrained, weakly to moderately foliated, mesocratic (CI>25) garnet-bearing biotite metagranite and light pinkish-tan, fine- to medium-grained, weakly to moderately foliated, leucocratic (CI<5) magnitite-biotite metagranite. PzZbg2 - Duncan metagranite: Light pinkish-gray, medium-grained, nonfoliated to weakly foliated, leucocratic (CI<10) garnet- and epidote-bearing biotite metagranite. PzZgp - Parkers Creek metagranite: Dark gray, generally fine grained, foliated to massive, garnet-biotite metagranite. It is characterized in hand specimen by abundant biotite and conspicuous small garnet crystals, which give it a darker appearance than other nearby granites. The color index is generally 15 to 20. The main minerals are plagioclase, perthitic microcline, quartz, biotite, garnet, and epidote, with small amounts of opaque minerals, muscovite, and sphene. The pluton crops out on both sides of Parkers Creek in its middle reaches. PzZgr - Reedy Creek metagranodiorite: Light tannish-gray, medium-grained to porphyritic, foliated and lineated to massive, leucocratic (CI<10) metagranodiorite. Locally white mica rich and/or contains blue quartz phenocrysts and clots of biotite + epidote. CZbl - metamorphosed leucogranite of the Buckhorn Dam intrusive suite: Light-colored, medium- to coarse-grained rocks with poorly developed foliation; composed mainly of plagioclase, quartz, and microcline, with minor amounts of chlorite, sericite, epidote, biotite, and opaque minerals. The color index is usually less than 5. CZsI - Sunset Lake Pluton: A distinctive porphyritic rock, containing abundant euhedral phenochrysts of sodic plagioclase, beige where fresh, and sparse roundish quartz phenocrysts in a groundmass of a vermicular intergrowth of feldspar and quartz. Very leucocratic (CI < 5) with traces of chlorite, epidote, garnet, titanite, zircon, and opaques.

CZbg - metamorphosed granitoid rocks of the Buckhorn Dam intrusive suite: Metatonalite, metagranodiorite, and metagranite: Dark-colored, medium- to fine-grained rocks with variably developed foliation; composed mainly of plagioclase, quartz, epidote, microcline, biotite, and opaque minerals, with minor amounts of sericite, sphene, chlorite, and garnet. The color index is generally high, ranging from 15 to 30. The more felsic granitoid rocks are mineralogically and chemically similar to the felsic metavolcanic rocks described below, and are probably the intrusive equivalents. The unit includes a number of small granitoid bodies, probably originally dikes and plugs, intruding felsic metavolcanic rocks northeast of the main outcrops of Buckhorn Dam intrusive suite. CZbm - metamorphosed mafic rocks: Metagabbro and metadiorite: Dark green, coarseto fine-grained, variably foliated rocks composed mainly of epidote, chlorite, hornblende (and/or actinolite), plagioclase, opaque minerals and minor quartz. CZqd - quartz metadiorite: metamorphosed quartz diorite. CZdi - metadiorite (Cambian and (or) Late Proterozoic?): Metamorphosed biotite- and hornblende-biotite diorite to quartz diorite. CZgb - metagabbro: metamorphosed hornblende gabbro.

CZcu - ultramafic rocks (undivided): Variably altered ultramafic rocks including metapyroxenite, actinolite-chlorite schist, and talc schist. METAVOLCANIC AND METASEDIMENTARY UNITS CZic - undifferentiated crystalline rocks of the Carolina Slate Belt: metamorphosed volcanic, volcaniclastic, and intrusive rocks. CZp - Coles Branch phyllite: tan to dark silvery gray, fine-grained, well foliated, leucocratic white mica phyllite locally containing quartz and plagioclase phenocrysts or compositional layering including mesocratic white mica-chlorite-biotite phyllite and greenstone. CZbr - Felsic metavolcanic rocks: Mainly white to light gray, fine-grained metavolcanic rocks, with rhyolitic or dacitic composition; generally with welldeveloped schistosity; composed mainly of quartz, plagioclase, microcline, muscovite, and biotite, commonly with small amounts of garnet. The unit also includes some darker colored rocks of intermediate to mafic composition that are metamorphosed to mica phyllite. CZbr1 - Big Lake-Raven Rock schist 1: light tan to white, fine- to medium-grained white mica quartzitic schist containing abundant relict phenocrysts of blue quartz and plagioclase or local white to gray lapilli and rock clasts.

CZbr2 - Big Lake-Raven Rock schist 2: light tan to white, fine- to medium-grained, well foliated white mica schist containing fragmental textures including white to gray lapilli tephra and rock clasts. CZbr3 - Big Lake-Raven Rock schist 3: Light tan to orange-brown, fine- to medium-grained, white mica schist to gneiss. CZfv - felsic metavolcanic rock and phyllitic metasiltstone (Cambrian and (or) Late Proterozoic?): Generally fine-grained, almost massive to phyllitic, mainly dacitic metavolcanic rock, and fine-grained phyllitic metasiltstone composed mostly of quartz, muscovite, and plagioclase. CZsg - Sycamore Lake greenstone: variably light green to dark black-green to gray-green, fine- to medium-grained, unfoliated to well foliated, epidote actinolite chlorite greenstone and chlorite + biotite + actinolite phyllite. CZta - Turkey Creek amphibolite: dark black-green, fine- to medium-grained, moderately to well-foliated and locally lineated, amphibolite, biotite amphibolite,

and locally hornblende gneiss and metagabbro. Relict plagioclase phenocrysts are preserved in fine-grained amphibolite. CZha - hydrothermally altered rocks and mineralized zones, regionally metamorphosed: Quartz granofels, epidosite, muscovite-quartz schist, biotite schist, and iron ore. The rocks contain various combinations of quartz, muscovite, epidote, garnet, biotite, iron oxides, and manganese oxides. The rocks are fine- to medium-grained, and schistose to massive. This unit includes the Buckhorn-type iron ore deposits. Judging from boulders at the Buckhorn iron mine, the main seams of iron ore were as much as 2 meters thick. Protoliths of the altered rocks are probably felsic metavolcanic rocks and granite. The age of alteration and mineralization is uncertain, but the rocks are regionally metamorphosed and appear to be associated with the Avents Creek granitic intrusion or one of the older granites. CZhb - meta-hornblendite and hornblende metagabbro: Greenish-black, medium- to coarse-grained, massive rocks composed mostly of hornblende, with lesser amounts of plagioclase, epidote, biotite, guartz, and opague minerals. The rocks occur in four isolated groups of outcrops and residual boulders, on both sides of Avents Creek north of Cokesbury. The largest body is about 250 meters across. The occurrences are interpreted to be intrusive plugs. The rocks are mineralogically similar to some rocks of the Buckhorn Dam intrusive suite but are spatially separated from the main part of the suite and may be unrelated. CZmv - interlayered mafic, intermediate, and felsic metavolcanic rocks: Mainly dark green to light gray, fine-grained metavolcanic rocks with well-developed schistosity; composed mainly of quartz, feldspar, epidote, chlorite, actinolite, biotite, and muscovite. Czu - meta-ultramafic rocks: Dark green, coarse- to fine-grained, semi-schistose to

massive rocks composed mainly of chlorite, actinolite, talc (?), opaque minerals, and epidote, locally with relict clinopyroxene. Rocks occur in three small areas; two small bodies occur on the western bank of the Cape Fear River and one is associated with (and probably gradational into) metagabbro just south of the Jonesboro fault near Corinth. The age is uncertain, but the rocks are possibly related to the Buckhorn Dam intrusive suite.

contains tourmaline and abundant opaque minerals. Contains minor layers of chlorite phyllite and mafic volcanic rock east of NC HWY 39. CZspha - altered phyllite: - Altered (sericitization, silicifaction, and pyritization alteration) phyllite which contains chloritoid and concordant zones of massive quartz in the Stancils Chapel quadrangle. CZsfv - fine-grained felsic volcanic rock: Aphanitic, gray, quartzo-feldspathic, volcanic CZsfv rock interpreted to be vitric and vitric crystal tuff. Locally, includes felsic lithic tuff with disseminated pyrite west of the Neuse River. Felsic volcanic rocks are commonly altered. CZsdv - dacitic metavolcanics: Distinctive bluish, gray, or white weathering, thinly layered and locally strongly fissle fine-grained rocks consisting predominantly of very strongly recrystallized mosaic matix of very fine quartz + plagioclase +/- microcline grains. Relict phenocrysts are present. Locally rock is viteous on fresh surface. Rock is distinctively hornfelsic near margin with Rolesville pluton. Chemistry data indicate that the rocks are dacitic. Interpreted to be pyroclasitic or lava origin. Locally identified as "bluestone" due to distinctive bluish color. CZsqms - Quartz-muscovite schist: medium-grained, white to light-gray, quartzmuscovite schist. Commonly contains pyrite disseminated and locally segregated into layers parallel to the schistosity. Includes very minor chlorite schist, quartzite, and intermediate volcanic rock. Commonly with well-developed small-scale folding. Contains quartz pods and quartz veins. Pods and clusters of kyanite are present locally. In places the kyanite is concentrated parallel to cleavage. CZsqk - Quartz-kyanite Rock: dense, massive, white quartzose rock containing disseminated kyanite and minor muscovite. Some areas shown as CZsqk on the map consist of float boulders. CZsbgn - Biotite gneiss: Predominantly fine-grained, 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 and cleavage. Metamorphic grade appears to increase to the north. CZsmv - mafic phyllites and greenstone: The unit consists of interlayered mafic and felsic phyllites and greenstones. Greenstone, occupies approximately 5-10% of unit, occurs as concordant and discordant bodies reportedly reaching up to 1.5 meters in thickness (Quartz + epidote greenstone is marker for unit) (Stetler, 1997). Units in Kenly East, Lucama, and Bailey quadrangles are covered with Coastal Plain sediments and their distribution is based on geophysical data and sparse outcrop locations. CZsmv1 - Meta-andesite: meta-andesite is interbedded and includes common alteration minerals of chlorite, epidote, and quartz. Zsmv2 - Meta-basalt: interbedded unit consists of meta-basalt. CZsmv3 - mafic metavolcanics: Bodies of mafic metavolcanics consisting of fine to medium-grained, dense rocks consisting of hornblende (or actinolite), epidote (or clinozoisite), plagioclase, and guartz. The rock is strongly recrystallized in the northwest portion of the Bunn East quadangle. Whole rock chemistry indicates a high Fe/Mg ratio for the rock compared to most basalts. CZmv4 - Mafic tuff and intrusive rock: Medium -to coarse grained, medium-to dark green mafic tuff (possibly basalt), mafic lithic tuff and mafic intrusive rock. The body south of NC Hwy 96 contains quartz tourmaline rock. CZmv5 - Mafic metavolcanic: chlorite +/- muscovite phyllite, grenstone, and sparse epidote-rich quartzofeldspathic rocks. Phyllite is the dominant lithology. Located in Lake Wheeler area. CZsu - Metavolcanic rocks and phyllite undivided: included chlorite phyllite, muscovite phyllite, greenstone, and quartz-feldspar-white mica phyllite. LOWER VOLCANIC SEQUENCE CZslt - Laminated epiclastic rocks and felsic lithic-crystal tuff: Medium- to coarse-grained, light-gray laminated rock. Consists of flattened pumice lapilli, quartz crystals, and layers of sediment in a matrix of quartz, feldspar, and mica. Locally phyllitic. Felsic epiclastic metasandstone and fine grained sandstone interlayed with crystal and crystal-lithic tuff Many of the crystals are well rounded suggesting reworking. CZsxt - Crystal tuff: Fine- to medium-grained, light-gray felsic volcanic rock containing phenocrysts of quartz and/or feldspar, locally up to 0.5 cm in size. Contains beds of mafic rock in the Middlesex quadrangle. FALLS LAKE TERRANE METASEDIMENTARY UNIT CZfs - Falls Lake schist: variably gray colored, mesocratic, medium- to coarsegrained, biotite-white mica-oligoclase-quartz schist locally having garnet, staurolite, kyanite, and chlorite porphyroblasts. Pods of talc schist exposed locally. CZfu - ultramafic rocks (undivided): Variably altered ultramafic rocks including metapyroxenite, actinolite-chlorite schist, and talc schist. Zfut - talc schist: White to gray talc-tremolite schist, talc-chlorite schist, and soapstone. Rhombohedral cavities suggest former presence of a carbonate mineral (ankerite?). CZfus - serpentinite: Pale greenish-gray, fine-grained, and massive to moderately-foliated; contains fibrous tremolite, clots of magnetite, and minor amounts of talc and dark green, unfoliated, chlorite actinolite rock. CZfua - actinolite rock and actinolite-chlorite schist: Dark green, schistose to almost massive, splintery rock composed of actinolite and varied amounts of chlorite; minor amounts of talc and magnetite octrahedra are common. CZfa - amphibolite: Dark gray to black, fine- to coarse-grained, well-foliated dikes generally parallel to foliation within country rock. CZfp - pebbly paragneiss and schist (Cambrian and (or) Late Proterozoic?): Biotitemuscovite-oligoclase-quartz paragneiss and schist containing rounded granitoid pebbles. Pebbles are matrix supported and typically sparse. Interpreted as metamorphosed pebbly mudstone or graywacke. CZfg - siliceous rock (Cambrian and (or) Late Proterozoic?): Mainly chalcedony with drusy quartz crystals; occurs in serpentinite at crest of Adam Mountain. CZfqz - quartzite (Cambrian and (or) Late Proterozoic?): White, granular, and well foliated. CRABTREE TERRANE META-IGNEOUS UNITS CZcc1- Crabtree Creek gneiss: leucocratic (CI=5-10) greenish-gray to pink, medium- to coarse-grained, well foliated and lineated, porphyroclastic granitic orthogneiss facies containing elliptical to rod-shaped quartz crystals, and white mica.

CZcc2 - Crabtree Creek gneiss: leucocratic (CI=0-5) gray-white to white-pink, medium-grained, well foliated and lineated, granitic orthogneiss facies containing mica and feldspar porphyroclasts and elongate quartz aggregates. METAVOLCANIC AND METASEDIMENTARY UNITS CZcrc - Richland Creek schist: mixed unit of silver-gray, fine- to medium-grained, well foliated, pelitic garnet + staurolite + tourmaline + white mica + biotite phyllite schist and tan to white, fine-grained, moderately foliated felsic gneiss. Contains layers of CZcgs. CZcfg - Felsic gneiss: pinkish-gray to tan-white, fine- to medium-grained poorly to well foliated, weakly banded microcline-plagioclase-quartz-white mica gneiss and leucogneiss, locally with magnetite.

CZcwq - White mica-rich and quartz-rich schist: gold-gray to silver-gray, very fine- to fine-grained, moderately well foliated quartz-biotite and/or chlorite-white mica schist containing sparse to abundant garnet interlayered with silver-white, fine- to medium grained, moderately foliated white mica-plagioclase-quartz schist. CZcbh - Biotite +/- hornblende gneiss and schist: white-gray to black-gray, very fine- to fine-grained, moderately well foliated, unlayered to moderately layered, biotite +/hornblende-bearing white mica-quartz-microcline-plagioclase gneiss and schist. Interlayered with lesser green-black, fine-grained moderately foliated plagioclase-chloritebiotite schist and tan, fine-grained, weakly foliated epidote-hornblende-plagioclase rock. CZcm - ilmenite-magnetite quartzite (Cambrian and (or) Late Proterozoic?): Occurs near U.S. Highway 70 entrance to Umstead State Park.

CZchc - Horse Creek schist: Silvery gray, coarse-grained, well foliated, lineated and layered, white mica + biotite schist containing conspicuous porphyroblasts of garnet, kyanite, and minor staurolites. CZcgk/ CZcgs, CZcgs - Muscovite schist: fine-grained white mica phyllite and schist containing **Czcgs** garnet porphyroblasts. Locally includes fine-grained, slaty graphite schist with garnet

porphyroblasts - CZcgs. RALEIGH TERRANE CZrgn - Raleigh gneiss: pinkish-gray to tan-gray, medium-grained, weakly to moderately foliated biotite-bearing granitic orthogneiss; black-gray to tan-gray, medium-grained, moderately foliated, variably layered biotite +/- hornblende-bearing quartz-plagioclase gneiss and schist; and lesser gray-black, fine-grained amphibolite and gold-brown, medium-grained biotite schist. CZflg - Falls leucogneiss: leucocratic (CI<5) pink-gray to orange-tan, medium-grained, weakly to moderately foliated and strongly lineated, biotite magnetite granitic gneiss. CZra - amphibolite: Black to greenish-black, slightly foliated to lineated and locally schistose hornblende amphibolite. Contains minor interlavered felsic gneiss, biotite gneiss, muscovite schist, and biotite schist. Locally contains chlorite and/or biotite. CZrl - fine-grained leucocratic gneiss: very light gray, fine-grained, leucocratic epidoteplagioclase-quartz gneiss, locally containing darker, hronblende-bearing interlayers.

Composition suggests volcanic origin. CZrbg - Biotite granitic orthogneiss: medium-grained, weakly banded, weakly porphyritic well foliated granitic gneiss. Phenocrysts are alkali feldspar; also contains white mica, epidote, and titanite. PzZgg - gneissic biotite granitoid (Paleozoic?): Foliated biotite granitoid and granitoid orthogneiss interlayered with Raleigh gneiss. Includes Wake Forest pluton and Greshams Lake pluton. PzZng - Nottingham granitoid orthogneiss: Streaky to weakly banded, generally moderately well foliated, locally porphyritic, tan, light brown, or brownish-orange biotite granitic orthogneiss. Contains local biotite-rich enclaves which may be xenoliths; epidote, titanite, and white mica are interpreted as products of metamorphic and/or low-temperature alteration.

ROCKS OF UNCERTAIN AFFINITY CZqfq - guartzofeldspathic gneiss and schist: Fine- to coarse-grained, white to light gray, well foliated, quartzofeldspathic gneiss. Contains interlayers of light-gray to pale-pink felsic gneiss, white to gray, fine-grained muscovite schist, quartz-muscovite schist, biotite schist, and greenish-black to black amphibolite. In the Powhatan, Clayton, and Flowers quadrangles, local layers contain abundant plagioclase crystals and sparse white lithic fragments elongate parallel to foliation. CZgn - felsic gneiss - Pinkish-gray to tan-white, fine- to medium-grained poorly to well foliated, weakly banded microcline-plagioclase-quartz-white mica gneiss and leucogneiss, locally with magnetite.

Zbmfg - Mill Creek gneiss: fine- to medium-grained, 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-grained, very finely striped felsic rock enveloped in a biotite-rich schist. Gneiss from Mill Creek area in the Flowers quad has been given an U/Pb age of 620 +/- 9 Ma. mbs - muscovite biotite schist: fine grained, gray muscovite-biotite schist commonly mbs with white, wispy but locally heterolithic lapilli. gmbs - garnet-muscovite-biotite schist: medium-grained, gray to black muscovite-biotite schist containing small scattered pink garnets and , locally, staurolite. Contains minor interbedded felsic gneiss, biotite gneiss, and amphibolite.

> qms - quartz-muscovite schist: medium-grained, white to light-gray, quartz-muscovite schist. Commonly contains pyrite disseminated and locally segregated into layers parallel to the schistosity. Includes very minor chlorite schist, quartzite, and intermediate volcanic rock. Commonly with well-developed small-scale folding. Contains quartz pods and quartz veins. Pods and clusters of kyanite are present locally. In places the kyanite is concentrated parallel to cleavage. ph - sericite phyllite: fine-grained, white to light-gray phyllite or schist; typically with strongly developed crenulation cleavage. Locally includes felsic metavolcanic rock and quartz-epidote rock.

am - amphibolite: black to greenish-black, slightly foliated to lineated and locally schistose hornblende amphibolite. Contains minor interlayered felsic gneiss, biotite gneiss, muscovite schist, and biotite schist. Locally contains chlorite and/or biotite. FAULT ROCKS

ph

Trfb - fault breccia: silicified and/or hematite-stained fault breccia containing angular clasts of Triassic and pre-Triassic rock material along Jonesboro fault. my - mylonite and mylonite gneiss: Recrystallized mylonite and thinly banded ribbon gneiss along Falls Lake thrust.