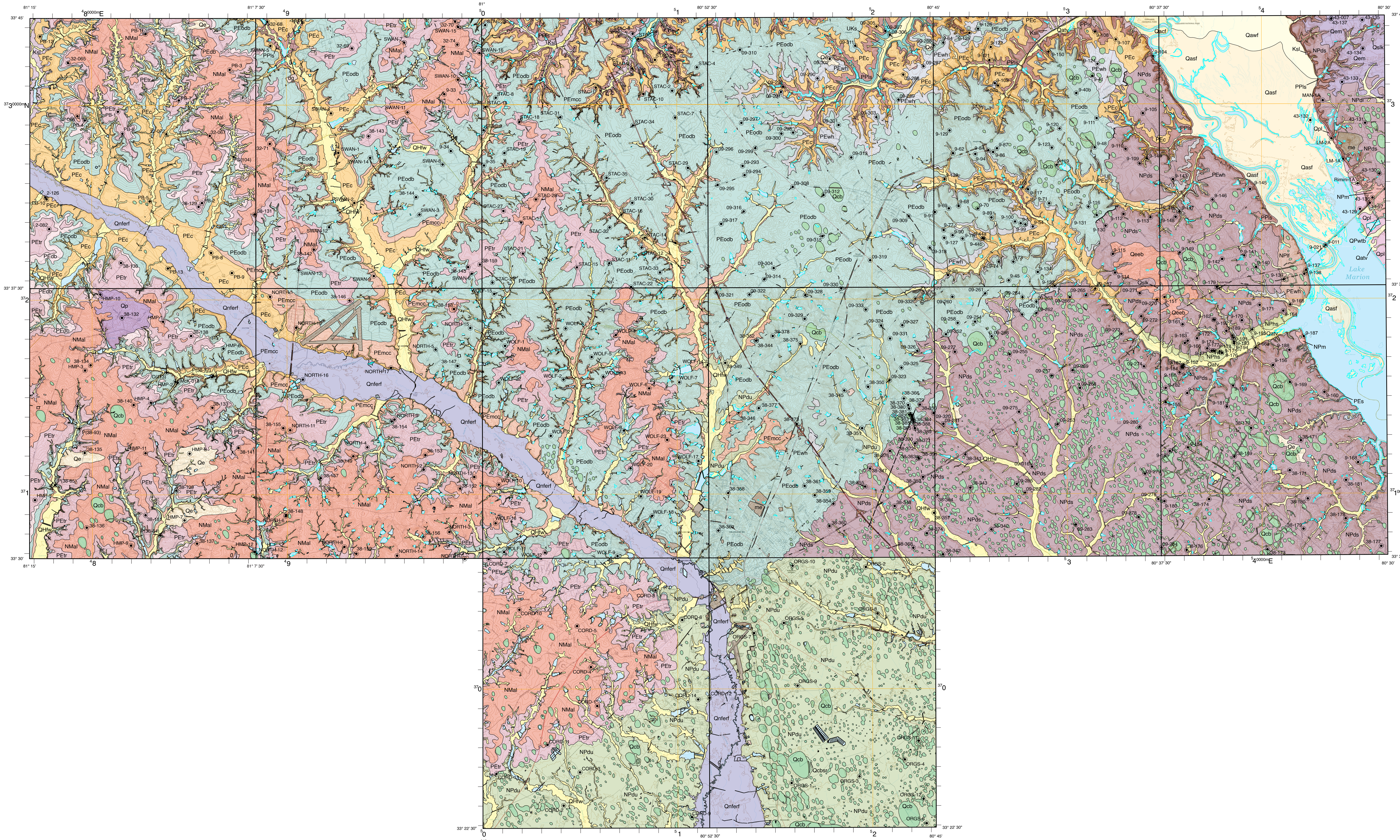
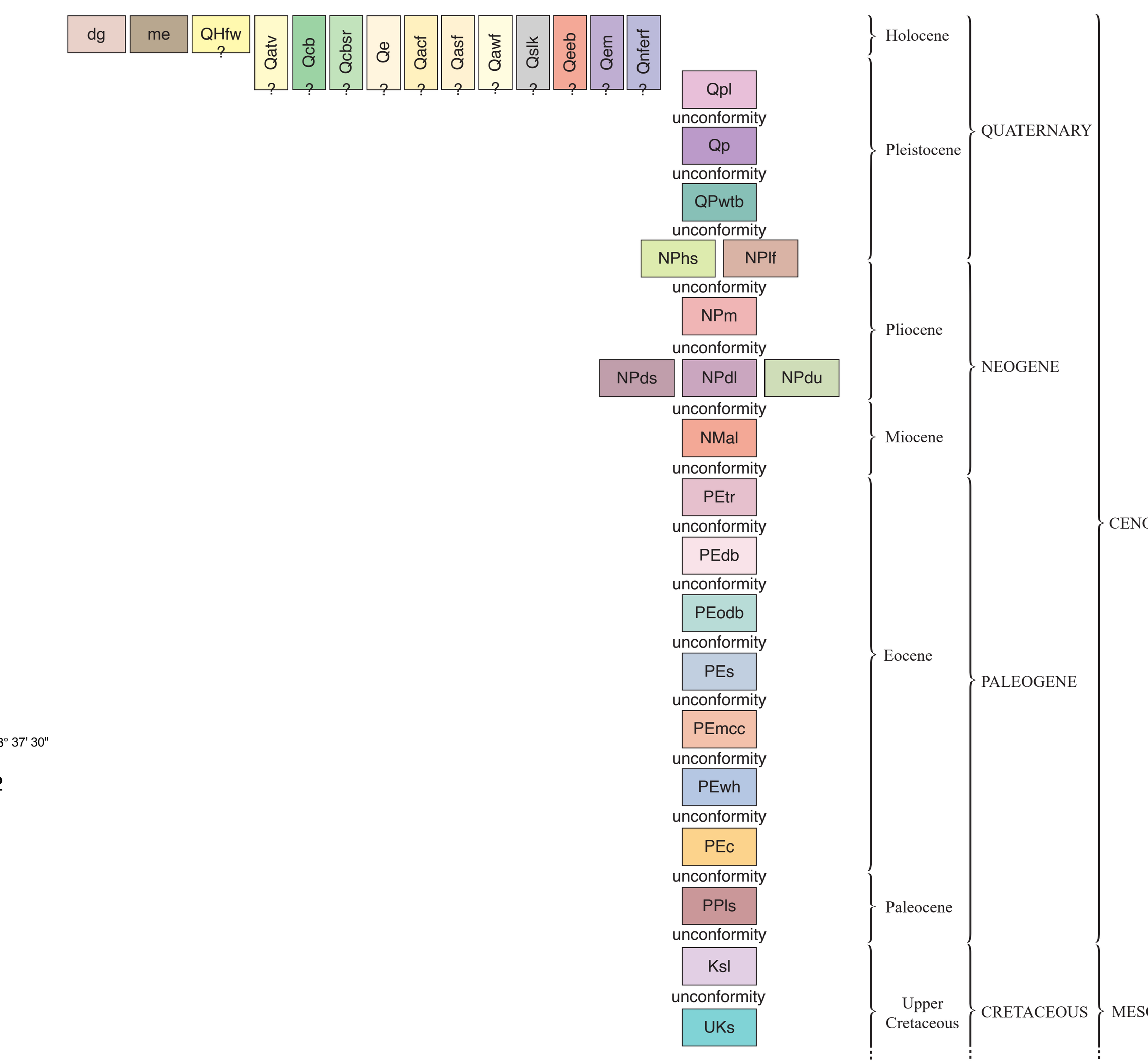
This geologic map was funded in part by the USGS Earth Mapping Resources Initiative, Award #G21AC10498, 2021



CORRELATION OF MAP UNITS



EXPLANATION OF MAP SYMBOLS

Contact – Identity and existence certain, location approximate.

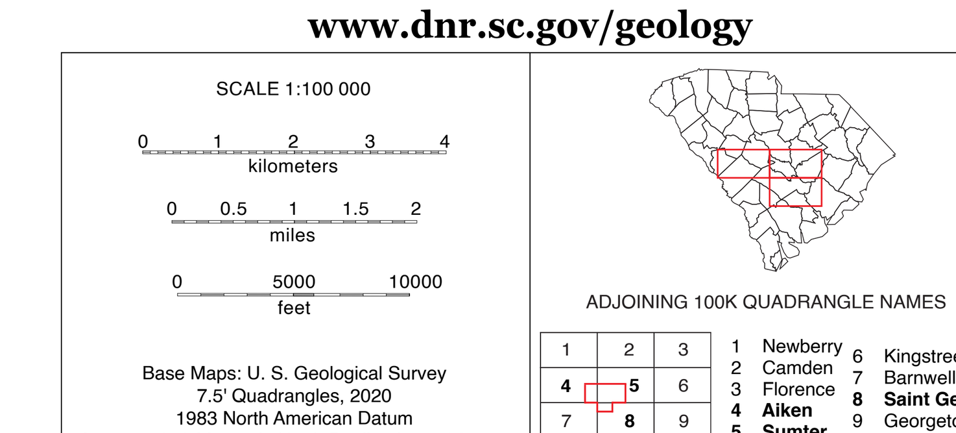
Gradational contact.

Fault – Identity and existence certain, location accurate. Location approximate where dashed.

Orangeburg Scarp – Identity and existence certain, location approximate. Hachures point off the scarp in the direction of the younger unit.

PB-3 South Carolina Department of Natural Resources Geological Survey (SCDNR) well log locations with log identification numbers. All logs are on file at SCGS.

www.dnr.sc.gov/geology



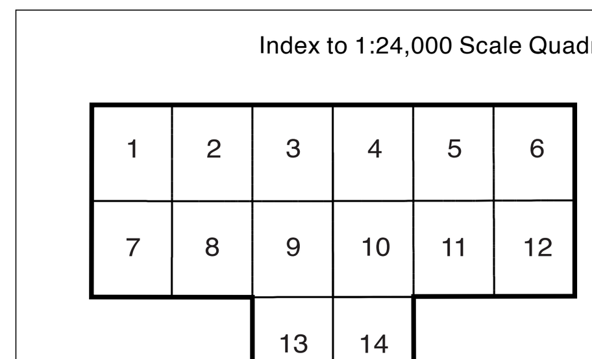
Base Maps: U. S. Geological Survey
7.5' Quadrangles, 2020
1983 North American Datum
Approx. 2019 Magnetic North Declination 7 1/2° west

1 Newberry
2 Camden
3 Florence
4 Aiken
5 Sumter
6 Kingstree
7 Barnwell
8 Saint George
9 Georgetown

	Date	*Version*
Geology	1996-2024	1.0
Cartography	2024	1.0

Geology mapped 1996 - 2024
Digital cartography by Gerald Krieger, 2024
For publications contact:
South Carolina Geological Survey
5 Geology Road, Columbia, SC 29212
(803) 896-7931

Index to 1:24,000 Scale Quadrangle Maps



1 Pond Branch
2 Swansea
3 Staley Crossroads
4 Saint Matthews
5 Fort Motte
6 Lone Star
7 Harleys Millpond
8 North
9 Wolfton
10 Orangeburg North
11 Cameron
12 Elloree
13 Cordova
14 Orangeburg South

GEOLOGIC MAP OF THE ORANGEBURG AREA, AIKEN, CALHOUN, CLARENDON, LEXINGTON, ORANGEBURG, RICHLAND, AND SUMTER COUNTIES, SOUTH CAROLINA

W. R. Doar, III, C. Andrew Wykel, Courtney N. Pierce, Ralph H. Willoughby, Gered Lennon, R. Zach Zelaya, C.W. Clendenin, Jr., Darby DeBruhl, and Gerald Krieger

2024

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2024

DESCRIPTION OF MAP UNITS

Bodies of water – Water, fresh, brackish, or salt. This designation includes altered shorelines (usually shoreline retreat or stream meanders) or flooded lands (manmade ponds) covered by water after publication of the base map. Water boundaries are delineated from 2006 digital ortho-quarter quadrangle photos (DOQQs). In the Pond Branch, Cordova, Orangeburg South, and Harleys Millpond quadrangles, boundaries are delineated from 2020 Near-Infrared Aerial Photos.

dg **Disturbed ground** – Any area of excavation for mining or borrow pits.

me **Moved Earth (Holocene)** – Earth material moved in bulk by humans. Color is highly variable and dependent on source location. Maximum thickness is 24 feet.

QHfw **Freshwater marsh and swamp deposits (Holocene)** – Silty clay and peat, black (N1), silty clay and peat deposited in stream valleys and areas of locally low elevation. Deposits are identified by the organic material content, sediment type, water salinity, and ecozones. Deposits occur in areas of poor drainage, such as a swale in a dune field or the slow drainage of a stream system. The transition from a freshwater deposit to an estuarine or saltwater deposit can be variable near higher salinity waters. The variability results from changes in rainfall, inflow from groundwater lowering the salinity, and rising tides importing high salinity waters. Also included in this unit are silty, clayey, and organic-rich deposits accumulating in man-made drainage ditches. These ditches are found on level drainage divides and are used to drain excess water from farming fields. Drainage ditches are recognized by their rectangular patterns. Maximum thickness is 40 feet.

Qatv **Quaternary alluvium, tributary valleys (Pleistocene to Holocene)** – Sand, clay, and gravel tan (10YR 6/5), brownish-red (10R 5/4)and black (N-1) sand and clay. The active stream bed contains fine to very coarse, poorly sorted sand, gravel, and cobbles. Tributary stream valleys drain into larger flood plains and most of these tributary valleys contain a series of two or three moderately preserved fluvial tefw rraces, with the active tributary stream incised into the valley floor. The terrace deposits consist of layers of moderately sorted, subrounded, and medium-to coarse-grained sand with abundant granules and cobbles. Most tributary valleys are uneven with regard to terrace preservation, and in some cases younger colluvial deposits, slumping from the hillside, mask the terrace morphology. Maximum thickness is 30 feet.

Qcb **Carolina bay deposits (upper Pleistocene to Holocene)** – Sand, clayey sand, sandy clay, light gray to black (N7-N1-5Y 7/1), very dark grayish brown (10YR-3/2), light olive brown (2.5Y-5/6), to black (10YR-2/1) and mottled moderate strong brown (7.5YR-5/8), to red (5R-6/5), silt and clay matrix, clast-supported sand with variable mineral composition.

The sand is sourced from the underlying deposits. The sediments may contain organic material from freshwater swamps or lakes. The Carolina bays formed from the action of southwesterly prevailing winds transporting dry, loose sediment to the northeast; when the area became wet, ponded water developed and the prevailing winds elongated the feature into northwesterly oriented ellipses (Moore and others, 2016). Maximum ages are poorly constrained, but carbonaceous sediment in a bay in Sumter County is older than the range of reliable radiocarbon dates (older than approximately 25,000 to 30,000 years; after Brooks and others, 2001). Carolina bays on the Duplin Formation may have begun to form before the bays that overlie the fluvial sediments of Low Falls Landing. Maximum thickness is 12 feet.

Qcbsr **Carolina bay sand rims (upper Pleistocene to Holocene)** – Sand, light gray (N7), moderately well sorted, sub- to well rounded, fine- to coarse-grained sand, with variable mineral composition deposited by southwesterly prevailing winds on the leeward side of Carolina bays (Moore and others, 2016). The sand is sourced from the underlying deposits. Maximum thickness is 12 feet.

Qe **Eolian sand (upper Pleistocene to Holocene)** – Sand and granular sand, white (N-9) to light tan (10YR 8/4), incohesive, moderately sorted, fine- to very coarse-grained and mostly medium-grained quartz sand, to minor quartz granules; with negligible clay. Maximum thickness is 44 feet.

Qacf **Quaternary alluvium, Congaree River flood plain (Pleistocene to Holocene) –** Sand, silt, clay, and peat, light-tan to dark-brown, fine- to very coarse-grained, sand, silt, clay, and organic-rich peat deposits in the Congaree River flood plain. The geomorphology of the flood plain is simplified to a single unit for this map scale, but it is important to note that it contains a mosaic of fluvial features including abandoned channels, crevasse channels, numerous flood-plain streams, natural levee deposits, alluvial fans, back swamps, and ground-water rim swamps. Collectively, many of these features represent a complex of polymorphic landforms indicative of varied environmental conditions from the late Pleistocene to the present.

Qasf **Quaternary alluvium, Santee River flood plain (Pleistocene to Holocene) –** Sand, silt, clay, and peat, light-tan to dark-brown, fine- to very coarse-grained, sand, silt, clay, and organic-rich peat deposits in the Santee River flood plain. The geomorphology of the flood plain is simplified to a single unit for this map scale, but it is important note that it contains a mosaic of fluvial features including abandoned channels, crevasse channels, numerous flood-plain streams, natural levee deposits, alluvial fans, back swamps, and ground-water rim swamps. Collectively, many of these features probably represent a complex of polymorphic landforms indicative of varied environmental conditions from the late Pleistocene to the present. The Santee River flood plain begins at the confluence of the Congaree and Wateree Rivers; however, the demarcation between these flood plains is approximated and shifts from one flooding event to another.

Qawf **Quaternary alluvium, Wateree River flood plain (Pleistocene to Holocene) –** Sand, silt, clay, and peat, light-tan to dark-brown, fine- to very coarse-grained, sand, silt, clay, and organic-rich peat deposits in the Wateree River flood plain. The geomorphology of the flood plain is simplified to a single unit for this map scale, but it is important to note that it contains a mosaic of fluvial features including abandoned channels, crevasse channels, numerous flood-plain streams, natural levee deposits, alluvial fans, back swamps, and ground-water rim swamps. Collectively, many of these features probably represent a complex of polymorphic landforms indicative of varied environmental conditions from the late Pleistocene to the present.

Qslk **Sandhills lakebed deposits (upper Pleistocene to Holocene) –** Sand, white to light-gray quartz sand and gray to black, clayey quartz sand in lakebeds or savannahs. Deposits surrounded by eolian sand of East Bethel and of Manchester State Forest. Maximum thickness is 6 feet.

Qeeb **Eolian sand of East Bethel (upper Pleistocene to Holocene) –** Sand, white to light-tan, incohesive, moderately sorted, fine to very coarse and mostly medium quartz sand, to minor quartz granules; with negligible clay. Occupies interfluve of Warley Creek and Halfway Swamp in southeastern Fort Motte quadrangle and in the adjacent corners of Cameron, Elloree, and Lone Star 7.5-minute quadrangles. The eolian sand of East Bethel is named for East Bethel Church on the southeast side of Sherlock Road (Calhoun County road 9-157) at the intersection with Jones Road in southeastern Fort Motte quadrangle. Maximum thickness is 20 feet.

Qem **Eolian sand of Manchester State Forest (upper Pleistocene to Holocene) –** Sand and granules, white to light tan, incohesive, moderately sorted, fine to very coarse quartz sand to minor quartz granules; with negligible clay. Maximum thickness is 35 feet.

Qnferf **North Fork Edisto River floodplain (Pleistocene to Holocene) –** Peat and clay to gravel, gray (N3-N9), brownish-white (5Y 9/1), pale brown (2.5Y 8/2-8/3), brown (5YR 4/6), and yellowish-orange (10YR 6/6-8/6), clay, silt, high water-content woody peat, and sand with granules or pebbles. The sand is poorly to moderately sorted, very angular to well-rounded, very fine to very coarse, quartz sand; with minor amounts of lithic fragments, and opaque minerals. Consists of non-marine sediments deposited in the North Fork Edisto River floodplain. These sediments vary from channel, to bar, to floodplain, to swamp facies deposits in a historically meandering river system. Maximum thickness is 4 feet.

Qpl **Packs Landing beds (upper Pleistocene) –** Sand, granular sand, and silty clayey sand, tannish-orange to light-gray, dominantly incohesive to lightly cohesive, medium quartz sand to common quartz pebbles to 10 mm; locally with scattered white feldspar grains to 17 mm; with scattered dark, heavy minerals and locally with minor muscovite flakes. Subordinately cohesive to very cohesive, stiffly plastic to very stiff, silty to micaceous, orangish-brown, medium-brown, or medium-gray clay matrix, with abundant very fine quartz sand to very abundant medium to very coarse quartz sand; locally with wood fragments. A stem or root from abundant plant matter in this sediment at 34 to 35 feet depth (47 to 48 feet elevation) in SCGS drill hole 43-129 at Packs Landing, Sumter County, in Lone Star quadrangle, yielded a radiocarbon C-14 date of 25,960 +3,790/-2,570 years BP, C-13 corrected (29,720 to 23,390 years BP; from Geochron Laboratories). Alluvium of an ancient Santee River terrace. Maximum thickness is 37 feet.

Qp **Pinehurst Formation (Pleistocene) –** Sand, pale brown (10YR 8/2) to white (10YR 8/1), fine- to coarse-grained, subangular to subrounded, moderately sorted, quartz sand with rare very fine- to fine-grained opaques. The Pinehurst Formation is an eolian unit deposited by westerly winds. Thickness varies from 1 to 20 feet.

QPwtb **Wicomico Toney Bay Member (lower Pleistocene) –** Sand, silty- clayey sand, with a basal lag of coarse quartz sand to small quartz pebbles (to 11 mm), gray, orange, red (2.5YR 4/6 to 10R 4/6), reddish-brown, and yellowish-red (5YR 5/8), locally mottled, partly laminated, silty to clayey, angular, to subrounded, medium to coarse quartz sand; light-gray (5YR 7/1), pinkish-gray (5YR 7/2), red (2/5YR 5/6), light reddish-brown, and light-red (2/5YR 6/4 to 6/6), mottled, clayey silt to clay matrix with interspersed, medium to very coarse quartz sand. Equivalent to the Wicomico Formation of Colquhoun and Duncan (1964, 1966) and the Waccamaw(?) Formation of Weems and others (1997). Maximum thickness is 12 feet.

NPhs **Fluvial terrace deposits of Halfway Swamp (lower Pleistocene?; upper Pliocene?) –** Interbedded quartzose sand, sandy conglomerate, and minor sandy clay matrix and subrounded to rounded small quartz pebbles or clay pebbles, or a textural change to underlying sediments, mark the base of the deposits. Quartzose sand is buff-white to buff, orange, light-yellow, light-brown to reddish-brown, tan or khaki, slightly clayey, poorly to moderately sorted, subangular to subrounded, and medium to very coarse; includes minor to interstitial silt and clay; and includes minor heavy minerals. Minor beds are well sorted fine to medium quartz sand with lesser coarse quartz sand to quartz granules. Quartz granules and small quartz pebbles to 7 mm occur locally and at the base of the sand. Conglomerate is reddish-orange, orange, tan, and khaki; includes small quartz pebbles in matrix of poorly sorted, subangular, fine quartz sand to quartz granules; includes minor clay and is locally kaolinitic. Conglomerate occurs at or near the base of the deposits. Clay matrix is medium- to reddish-brown, light-gray, or tan and includes poorly sorted, subangular to rounded, locally bimodal, medium to coarse quartz sand. The terrace deposits f the Halfway Swamp occur lower than approximately 125 feet (38.0 m). Maximum thickness is 33 feet.

NPlf **Terrace sediments of Low Falls Landing (lower Pleistocene?; upper Pliocene?) –** Sand, clayey sand, and conglomerate, white, cream, buff-white, gray, orange, yellow, brown, and tan lightly to well cohesive, quartz sand, mixed quartz sand and clay, quartz-pebble to feldspar-pebble conglomerate, and minor stiff clay with minor quartz sand. Conglomerate is subrounded quartz pebbles in poorly to moderately sorted, coarse quartz sand with minor clay. Sand and pebble beds are poorly to moderately sorted, locally well-sorted, fine to coarse quartz sand to common quartz granules and commonly to quartz-pebble or quartz-and-feldspar conglomerate with pebbles to as much as 27 mm, especially at the base and includes minor to interstitial clay. Well sorted, subangular, medium to coarse quartz sand occurs locally. Quartz granules occur in quartz sand at the base in drill hole 9-165, where the unit is. Buff-white to orange clay matrix includes abundant, well-sorted, subangular, coarse to very coarse quartz sand. Locally, quartz grains are stained orange. Feldspar sand, granules, and pebbles are white and crumbly. Muscovite is minor to common locally. The Low Falls terrace occurs on the west side of Santee River or Lake Marion. The terrace sediments are more than 10 feet thick by the parking lot at Low Falls Landing. The terrace sediments unconformably overlie the Lang Syne Formation; they abut and unconformably terminate the Duplin Formation. The highest elevation of the terrace is approximately 120 feet (36.6 meters) and is considered separate from the Wicomico alloformation. The Low Falls terrace is a fluvial terrace deposited by Santee River. Maximum thickness is 54 feet.

NPm **Marietta unit (upper Pliocene?) –** Sand to slightly clayey to clayey sand, buff white, rose, rusty red, tannish brown, or brown, poorly to moderately sorted, subangular to subrounded, locally bimodal, medium to very coarse quartz sand; with minor heavy minerals; and with minor interstitial clay to clay matrix. Quartz granules and small quartz pebbles to 10 mm occur at the base. Laminated beds, partly mottled by weathering, were noted in drill hole 9-187. Quartz pebbles are common at the base but occur throughout. Lesser, silty, micaceous clay beds, to 7 feet thick, include interspersed quartz silt to very fine quartz sand, to locally small quartz pebbles to 6 mm, and traces of dark, heavy minerals. The informal Marietta unit (DuBar, 1971; Willoughby, 2002a, 2002b; Willoughby and Clendenin, 2002) is equivalent to the "Okefenokee Formation" of Colquhoun and Duncan (1964, 1966). Maximum thickness is 54 feet.

NPds **Duplin sands (Pliocene) –** At the base- moderately cohesive, dark gray-green, fossiliferous, moderately calcareous clay with abundant shell fragments and uncommon, soft white feldspar sand.

Above the clay-and to clayey silt to conglomerate, light yellowish brown (10YR 5/6) to yellowish red (5YR 5/6) to medium gray (N-5), quartz sand, silty quartz sand, and clayey silt; locally clayey, moderately sorted to locally poorly sorted, dominantly medium quartz sand to quartz granules; to quartz pebbles to 25 mm locally to commonly concentrated as pebble beds (gravel); and with scattered, white clay beds as much as a few inches thick; very lightly cohesive to well cohesive or plastic, white, cream, gray, pink, orange, yellow, ocher, and brown, quartz sand to sandy quartz conglomerate, mixed sand and clay, and minor clay matrix. Sandy beds are very well-sorted, very fine to fine quartz sand, to well-sorted, very fine to medium quartz sand, or poorly to well-sorted, very fine quartz sand, granules and pebbles; locally with scattered quartz granules to subrounded quartz pebbles to 25 mm and at base with quartz pebbles to 34 mm; with minor dark heavy minerals; with minor to locally very abundant interstitial clay; locally with minor muscovite; locally with distinct laminae and thin beds of clayey quartz sand. Gritty conglomerate with quartz granules and subrounded quartz pebbles to 39 mm occurs locally. Mixed quartz sand and clay includes well-sorted, very fine to medium quartz sand, lesser silt and mica, and minor dark heavy minerals. The mixed sediment locally includes quartz-pebble conglomerate with quartz pebbles to 18 mm, and it varies locally to clay matrix. Clay beds include fine to medium quartz sand, minor dark heavy minerals, and locally common silt or muscovite. Some silty or sandy laminae occur. Clay beds are as much as 15 cm thick. at the base of the Duplin. M. R. Campbell (1992) and M. R. Campbell and L. D. Campbell (1995) considered the Duplin Formation to be lower Pliocene, and Weems and Lewis (2002) considered the Duplin to be upper Pliocene. The inland limit of the Duplin on the interfluves is the base or toe of the Orangeburg Scarp. Maximum thickness is 50 feet.

NPdl **Duplin Formation (lower part, lower Pliocene) –** At base, clay and clayey, quartzose, in part shelly, sands. In remaining lower part, locally calcareous (with interstitial lime mud) to richly shelly or locally clayey, well-sorted, dominantly very fine- to fine-grained quartz sand, and with uncommon bluish gray clay beds to 2 feet thick. Contact with the immediately underlying beds of the lower Duplin Formation is gradational. Upper contact is abrupt. Transgressive to offshore marine facies. Maximum thickness is 12 feet.

NPdu **Duplin Formation (Pliocene):**

Upper
Sandy clay to clayey sand, yellowish brown (10YR 5/8), brownish yellow (10YR 6/8), to red (2.5YR 4/8), fine- to very coarse-grained quartz sandy clay to clayey quartz sand with rare very fine- to fine-grained opaques. Iron cemented nodules are common throughout this unit.

Middle
Sand, silty sand, light gray (2.5Y 7/1), yellowish brown (10YR 5/8), to red (2.5R 4/8), medium- to coarse-grained quartz sand with variable interstitial silt, scattered very fine- to fine-grained opaques, fine- to coarse-grained mica, and rare very fine- to fine-grained mica.

Lower
Sandy clay, fossiliferous sandy clay, gray (6/N, 5/N), dark gray (4/N, 3/N), to dark greenish gray (10GY 4/1), very fine- to medium-grained, subangular to subrounded, moderately sorted, quartz sandy clay with scattered broken and intact bivalve shells, medium- grained to pebble-sized phosphate nodules and rare phosphatized shark teeth.

NMal **Altamaha Formation (Middle to Upper Miocene) –** Sand, weak red (10R 5/3) to red (2.5YR 4/8) to yellowish red (5YR 5/8 to strong brown (7.5YR 4/6) to yellow (10YR 7/8) to white (10YR 8/1), poorly sorted, medium- to very coarse-grained, clast-supported, quartz sand and interstitial clay and few coarsely laminated beds of clay; with locally abundant, very fine- to medium-grained, sub-prismoidal, well rounded, quartz pebbles, white (N9), and well rounded, pebble-sized, clay balls. Very cohesive and difficult to drill in most localities. Maximum thickness is 14 feet.

PEtr **Tobacco Road Sand (Upper Eocene)** – Sand to sandy clay, yellowish brown (10YR 5/8) to red (2.5YR 4/8) to reddish yellow (7.5YR 6/8) to pale yellow (5Y 7/4), fissile clay matrix supported, poorly sorted, angular to subrounded, prismoidal to spherical, fine- to very coarse-grained, quartz sand to sandy clay; with scattered white (7.5YR 8/2) clay lenses, very coarse quartz pebbles, coarse mica, and rare very fine- to fine-grained opaque minerals and well rounded, coarse-grained, blue quartz sand. Maximum thickness is 41 feet.

PEdb **Dry Branch Formation (upper Eocene) –** Sand to clay coated sand, red (2.5R 4/8) to yellowish brown (10YR 5/8) to weak red (10R 4/8) to white (10YR 8/1), medium- to coarse-grained, moderately to well-sorted, subangular to subrounded quartz sand with scattered very-fine to fine-grained heavy minerals. Thin clay lenses and scattered quartz pebbles are locally abundant. Maximum thickness is 15 feet.

PEodb **Orangeburg District beds (Upper Middle Eocene)** – Sand to clayey sand, slightly clayey quartz sand to stiff, mixed quartz sand and clay to stiff, locally laminated, clay matrix with interspersed quartz sand, strong brown (7.5YR 5/8) to brownish yellow (10YR 6/8) to yellow (7.5YR 7/8) to yellowish red (5YR 4/6) to red (2.5YR 4/6 and 10R 4/8) to weak red (10R 4/4), yellowish red (5YR 5/8) to red (10R 5/6 to 2.5Y 4/8), and white (2.5YR 8/1), moderately to well sorted, angular to well rounded, prismoidal to discoidal, very fine- to medium-grained, quartz sand; with variable amounts of interstitial clay, common medium mica, rare to scattered, very fine- to fine-grained opaque minerals, quartz granules, and pebbles (<2cm) scattered throughout while more common at the base of the unit; and sandy clay. Clay-poor sediment is loose or lightly cohesive. Mixed quartz sand with clay matrix and clay beds are stiff. Variously clayey, well-sorted, very fine to medium quartz sand is a common and characteristic lithology; quartz grains in other clayey sand beds are poorly sorted with common quartz granules and scattered quartz pebbles (to 15 mm). Very fine to fine dark heavy minerals are minor to common. Muscovite flakes impart a sheen to the smeared sediment. Quartz granules to quartz pebbles (to 20 mm) may occur at the base of the unit. Silica-replaced molluscan fossils occur locally in the Orangeburg District bed (Nystrom and others, 1990, 1992; Dockery and Nystrom, 1990, 1992a, 1992b). The last three references recognized the informal Orangeburg District bed, reported silica-replaced molluscan fossils from it locally, and reported its age as late middle Eocene. Maximum thickness is 80 feet.

PEs **Santee Limestone (Eocene) –** Sand to clayey silt, moderate yellow brown (10YR 5/4), very light gray (N-8) to white (N-10), yellow (5Y 7/6 - 9/4), to very light yellow gray (5GY 9/1), and olive gray (5GY 3.1). It is a calcareous mud matrix supported, poorly sorted, very angular, fine to very coarse, calcareous sand; moderately indurated, sectile, cream to light tan, microfossiliferous lime mudstone to slightly shelly wackestone and moderately to well indurated, shelly, lime wackestone to packstone, with a glauconite and phosphate rich sand at base. The fossil oyster Cubitostrea sellaeformis and associated fossils occur in the lime mudstone. These sediments are of marine origin and have discontinuous distribution resulting from erosion and are exposed a few feet above water level on the southwest shore of Lake Marion. Maximum thickness is 70 feet.

PEmcc **McBean Formation- Caw Caw Swamp member (Middle Eocene)** – Sandy clay to clayey sand, olive green (5GY 3/1 to 10YR 5/6 to 5Y 4/4), pale green (10Y 8/2) (fresh) to yellowish orange (10YR 8/6-6/6), pale green (10Y 8/2), brownish red to dark brown (10R-10YR 4/2) to dark red (10R 4/8) (weathered), stiff, clayey, poorly- to moderately sorted, angular to subangular, very fine- to medium-grained quartz sand to sandy clay and clayey sand, with minor angular to subangular, medium- to coarse-grained, quartz sand. Maximum thickness is 47 feet.

PEwh **Warley Hill Formation (middle Eocene) –** Sand to clayey sand, olive-green (5GY 3.1) (fresh), to yellowish orange (10YR 8/6 – 6/6), pale-green (10Y 8/2), brownish-red to dark-brown (10R - 10YR 4/2) (weathered), stiff, slightly clayey to clayey, fine to medium glauconite/phosphate sand and fine to coarse quartz sand, very dark olive-green (10G 2/1), subrounded, fine to coarse glauconite pellets; has subordinate, angular to subangular, medium to coarse quartz sand; includes minor to abundant interstitial clay; and includes some clay beds. The sandy to mixed beds are lightly to well cohesive, locally softly plastic to stiff, locally dry and powdery glauconite-pellet and quartz sand to mixed glauconite, quartz sand, and clay; with common to very abundant, elongate, rounded, fine to medium glauconite pellets; with mainly well-sorted fine to medium quartz sand to locally quartz granules; at base, with subrounded quartz pebbles to 15 mm; with minor interstitial to matrix-forming clay and with minor clay laminae; with slight to scattered muscovite flakes; with minor dark heavy minerals; with slight to scattered muscovite flakes; locally with shark teeth; and locally with black wood fragment to as much as 12 mm. Clay beds are very cohesive, include slight to abundant green silt (presumed to be glauconite); are slightly micaceous; include minor to common quartz sand that is dominantly very fine to fine or locally medium to coarse; include moderate to abundant very fine to fine, deep-olive glauconite pellets; and locally have minor cream to light green laminae. Sand-size glauconite grains are elongate, rounded pellets; much of the silt and clay is probably glauconite as well. Carbonate was not noted. Richly clayey beds and clay matrix adhere to metal and can be peeled off the auger rods in stiff, intact coils. Horizontal and vertical burrows were seen in 10 feet of section above the site of drill hole 9-147. The Warley Hill Formation is exposed and has its type section (Sloan, 1907a, 1907b, 1908) in the valley of Warley Creek in western Lone Star quadrangle. The Formation has been projected to the surface in areas near Warley Creek. Thickness is 6 to 30 feet.

PEc **Congaree Formation (Lower to Middle Eocene)** – In the St. Matthews, Cameron, Orangeburg North, Fort Motte, Elloree, and Lone Star quadrangles, the Congaree formation is composed of variegated sand deposits (pink, red, yellow, orange, tan, and brown), ranging from; very fine to medium moderately-sorted quartz sand, medium poorly to moderately sorted quartz sand to quartz granules, and some beds of coarse well-sorted quartz sand to quartz granules occur with scattered dark heavy minerals. Locally including minor, light-green, very fine glauconite and minor to moderate interstitial clay and clay laminae. Glauconite sand in the Congaree is scattered, inconspicuous, pale-green, and very fine, in contrast with the ubiquitous, abundant, olive-green, very fine to medium glauconite in the Warley Hill Formation. At or near the base, quartz granules and subrounded to rounded quartz pebbles (to 1 cm) and minor green clay granules occur. Kaolin granules to pebbles occur in outcrops in the steep valley west-southwest of Wiles Crossroads. Kaolin clasts resemble those in the correlative Huber Formation (Nystrom and others, 1991). Clay matrix in the Congaree Formation is stiff, green, tan, or gray and includes scattered muscovite flakes, minor quartz silt to fine quartz sand, and is locally laminated. Indurated, silica-cemented laminae to thick beds of dominantly very fine to fine well sorted quartz sand and clay, varying from clayey quartz sandstone to sandy claystone, form prominent outcrops in the southwest valley walls of Halfway Swamp and Lyons Creek. Horizontal burrows (to 5 cm thick or wide) are prominent. This lithology also occurs in the correlative Tallahatta Formation in southern Alabama, where it is called the Basic City Shale (Toulmin, 1977). The large molluscan bivalve Anodontia augustana occurs in the sandy claystone of the Congaree Formation elsewhere in Calhoun County, S. C. as well as in Alabama (Gardner, 1951; Toulmin, 1977). The Congaree Formation is early Lutetian, early middle Eocene in age (see Weems and others, 2004). Thickness is 40 to 60 feet. In the Lone Star quadrangle, the Congaree Formation was identified in drill holes 9-143, 9-144, and 9-147 in eastern Calhoun County. In the three auger holes, the Congaree overlies the Lang Syne Formation and underlies the Warley Hill Formation. Exposures outside of the quadrangle show that the contacts are unconformable. The formation in these holes is 4 to 9 feet thick. In the North, Wolfton, Staley Crossroads, and Swansea quadrangles, the unit is composed of sand, clayey sand, and clay, red (2.5YR 4/8) to yellowish red (5YR 5/8) to strong brown (7.5YR 5/8) to brownish yellow (10YR 6/8) to yellow (2.5Y 7/6) to olive yellow (2.5Y 6/8), loose to moderately cohesive, fine to medium and fine to coarse-grained, moderately to bimodal sorted, subangular to well rounded, quartz sand with rare to sparse fine opaques, medium- grained, well rounded, blue quartz, and lenses of medium to granular, poorly to moderately sorted, quartz sand and granules. Has pronounced depositional bedding; thinly bedded, pale green (10Y-8/2), very fine sand, glauconitic sand, with local zones of moderate to abundant interstitial clay, and poorly indurated, silica-cemented beds; rare to sparse, interstitial white (10YR 8/1) lenses. Subrounded to rounded quartz granules and pebbles (to 1 cm), and iron-oxide cement often occur at or near the base, as do kaolin rip-up clasts. Drilling refusal is common within the unit. Maximum thickness is 18 feet with the exception of the Swansea quadrangle, wherein it is 57.5 feet.

PPls **Lang Syne Formation (Paleocene)** – Clay to silty clay, gray to black (N-5 to N-1-5YR 2.5/1), extremely cohesive (stiff) to less cohesive (malleable), waxy, locally silty, lignitic, and micaceous clay, with light gray (5YR 7/1) to brownish yellow (10YR 6/8) laminae of subangular to subrounded, prismoidal to spherical, well sorted, fine to medium, quartz sand and the fine mica imparts a sheen to the smeared sediment; silty, micaceous, clay matrix, very fine to fine quartz sand and silty clay. Clay matrix locally includes interspersed, very fine to fine quartz sand; and it contains numerous laminae of white, very well sorted, very fine to medium quartz sand that are devoid of interstitial clay. Quartz granules to quartz pebbles (up to 20 mm) may occur at the base of the unit; silty, micaceous, locally quartzose clay matrix and very fine to fine quartz sand to clayey, glauconitic, pebbly quartz sand and quartz granules; and lime mud sediment. Clay matrix locally includes interspersed, very fine to fine quartz sand; and it contains numerous laminae of white, very well sorted, very fine to medium quartz sand that are devoid of interstitial clay. Quartz sand beds are loose to lightly cohesive, yellowish-brown or yellowish-orange, subangular to subrounded, medium to coarse quartz sand to subrounded to rounded quartz granules; include moderate interstitial clay; and include glauconite pellets, especially near the base. Crumbly, black lignite occurs locally in both clay matrix and clayey sand beds. White to cream lime mud (micrite) beds, at least 4 feet thick and with rare to scattered impressions of turritellid gastropods, crop out on the walls of a deeply incised tributary of Congaree River in northwestern Fort Motte quadrangle. This outcrop probably is the farthest inland exposure of lime sediment in the Lang Syne. The Lang Syne correlates downdip with the Williamsburg Formation (Willoughby and others, 1999), which is Selandian and Thanetian (middle to upper Paleocene) in age (Weems and others, 2004). Maximum thickness is 80 feet.

Ksl **Sawdust Landing Formation (Upper Cretaceous)** – Locally variable sand to clay-white (10YR 8/1), light-gray (N8), or light-tan (10YR8/2), sandy clay, with fine to coarse quartz sand, locally with sparse pyrite or traces of carbonaceous material, to grayish-green (5G 6/1), stiff to hard, silty clay, stiff, cohesive, light-gray to light greenish-gray (N7-5G 7/1), thick-bedded, massive to weakly cross-bedded, feldspathic, micaceous, clayey, quartzose sand with common quartz granules and quartz pebbles; light-gray (N7) sandy clay, micaceous clay, and cross-bedded, fine to very coarse quartz sand with white (N9-10) clay sand grains to pebbles and with laminae of heavy minerals (Nystrom and Willoughby, 1992); moderately cohesive to stiff, white, light- to medium-gray, bluish-gray to purplish-gray, light-orange, or medium-brown, medium quartz sand to quartz granules; with scattered, weathered, white feldspar grains; with scattered muscovite flakes; locally with very fine to fine dark heavy minerals; commonly with abundant interstitial to matrix-forming white clay and where clay is minor, the sediment is loose and incohesive; sandy clay, bluish gray (GLEY2B 6/10) to light brownish gray (2.5Y 6/2) to white (10YR 8/1), extremely stiff, cohesive clay, with abundant angular to subangular, medium to very coarse-grained, clear quart, smokey quartz, rose quartz, and feldspar sand, minor very fine-grained opaque sand, fine mica, lignite, and scattered, very fine to medium-grained quartz and feldspar pebbles. The Sawdust Landing in core MAN-1A is characteristically dense, hard, massive to weakly cross-bedded, thick beds of clayey, feldspathic, poorly sorted, angular, fine to coarse quartz sand to granules, and a variety of heavy minerals (Prowell, 1990). Christopher and Prowell (2003) considered the basal boundary of the Sawdust Landing Formation to be an unconformity. Fredriksen and others (2000) and (Christopher and Prowell, 2003) assigned a Maastrichtian, Late Cretaceous age to the Sawdust Landing Formation on the basis of sparse, included pollen grains. Previously the Sawdust Landing was interpreted to be of early Paleocene age. Maximum thickness is 52.5 feet.

UKs **Upper Cretaceous deposits, undifferentiated (Upper Cretaceous)** – Sand to clay, range from white to purple to red in color, include a wide range of highly weathered clay, sandy clay, clayey sand, and sand deposits. Exceptions are common, but lithologies are often biased towards poorly sorted, angular to subangular, coarse to very coarse sand with abundant mica, interstitial kaolin, and kaolin rip-ups. Maximum thickness is 50.5 feet.

NOTES

Part of the geomorphic interpretation was derived from Aiken County Elevation 2012, 10x10 ft DEM [File Geodatabase], Calhoun County Elevation 2012, 10x10 ft DEM [File Geodatabase], Lexington County Elevation 2010, 10x10 ft DEM [File Geodatabase], Orangeburg County Elevation 2008, 10x10 ft DEM [File Geodatabase], and South Carolina Imagery - 2020 - NIR [Tile Layer].

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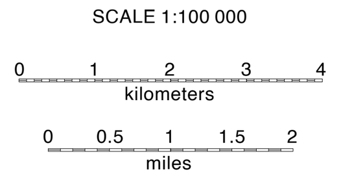

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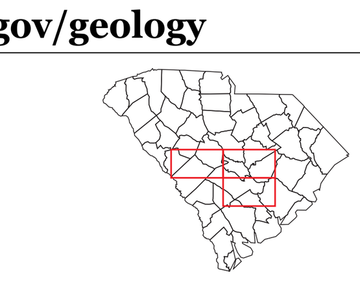

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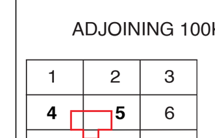

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2 Camden
3 Florence
4 Aiken
5 Sumter
6 Kingstree
7 Barnwell
8 Saint George
9 Georgetown

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Cartography	2024	1.0

Geology mapped 1996 - 2024
Digital cartography by Gerald Krieger, 2024
For publications contact:
South Carolina Geological Survey
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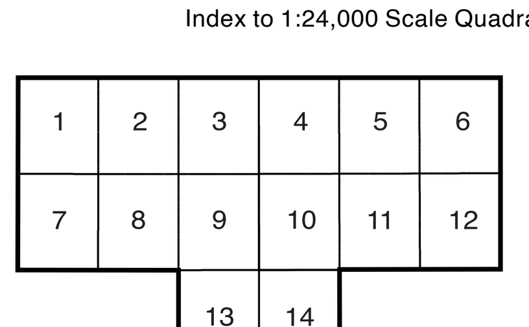

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2 Swansea
3 Staley Crossroads
4 Saint Matthews
5 Fort Motte
6 Lone Star
7 Harleys Millpond
8 North
9 Wolfton
10 Orangeburg North
11 Cameron
12 Elloree
13 Cordova
14 Orangeburg South