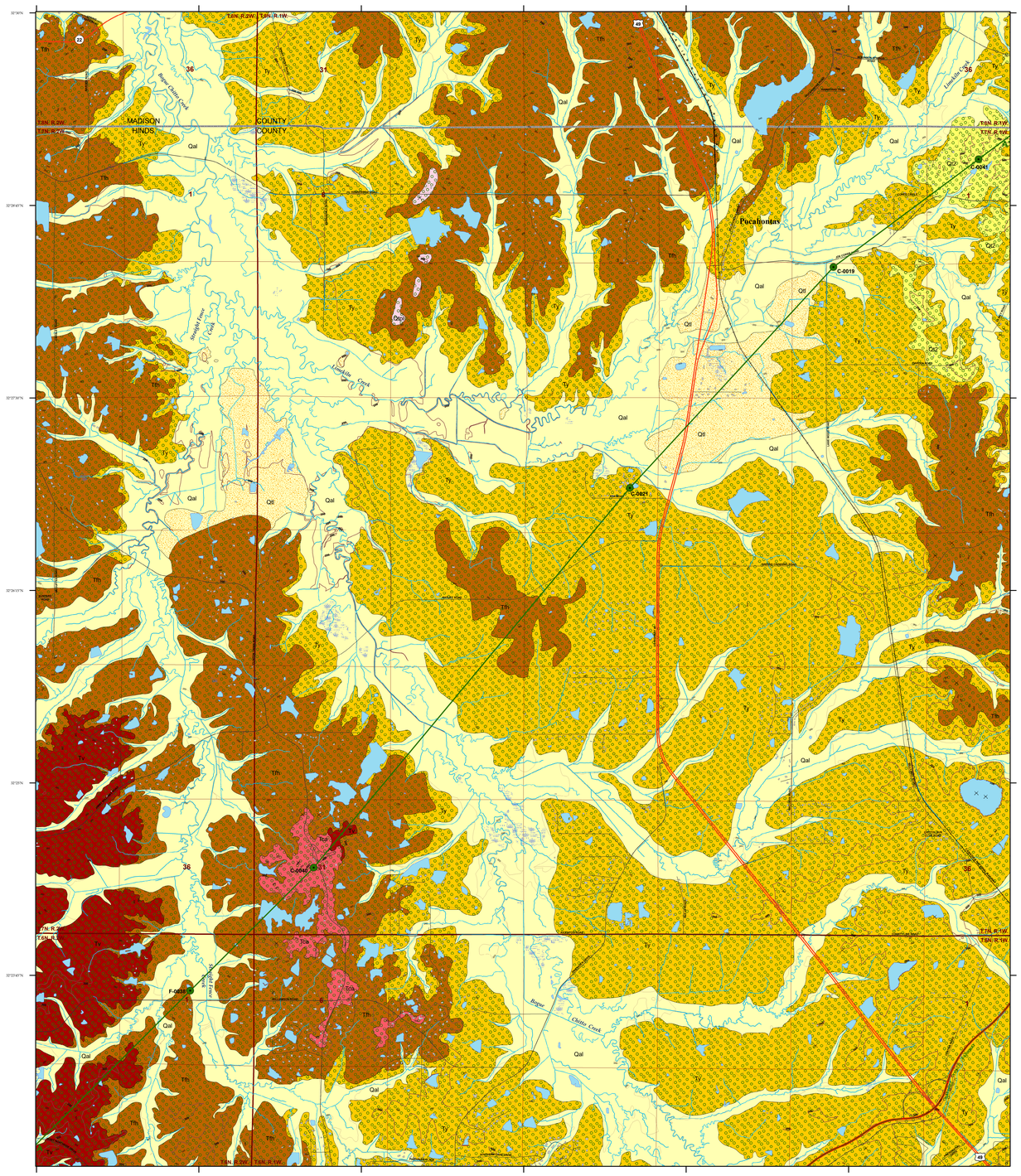
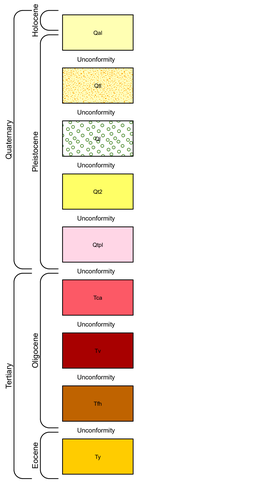
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF GEOLOGY SURFACE MAPPING DIVISION
MISSISSIPPI GEOLOGICAL SURVEY

Prepared in cooperation with
UNITED STATES NATIONAL PARK SERVICE
GEOLOGIC RESOURCES DIVISION

GEOLOGIC MAP OF THE 7.5-MINUTE POCAHONTAS QUADRANGLE OPEN-FILE REPORT 311



Correlation of Map Units



Surface mine pit

C-0040 — Drill-hole locality and identification number

Unconformable Contact

A — A' Line of Section

Bare Earth LIDAR Hillshade for the Pocahontas 7.5 Minute Quadrangle.

Descriptions of Map Units

Alluvium — Qal
Sand, yellow- to brownish-white in color, fine- to coarse-grained, subrounded to rounded, predominately quartzose, silty, clayey; humus lenses common; deposits are heavily loess-derived. Silicified wood common. Streams on clays will have shallow, wide alluvial plains while streams on sands or soluble rock will incise creating steep, narrow alluvial plains. Can contain Pleistocene vertebrate fossils.

Low Terrace — Qtl
Stream Terrace. Sand, orange to tan colored, fine- to coarse-grained, predominately quartzose; Clay, loess or rip-up derived, kaolinitic, pink to white, generally discontinuous lenses. Rarely gravelliferous, pea-size, almost exclusively quartzose. Large confluence terraces associated with Lime Kiln Creek and Bogue Chitto Creek are mapped in Sections 12, 14, and 24 Township 7N. Range 2W. and in Sections 7 and 18 Township 7N. Range 1W.; in Sections 10, 11, 14, 15, and 16 Township 7N. Range 1W. Pocahontas Mounds were constructed on the Low Terrace in northern Section 10 Township 7N. Range 1W.

Loess — Ql
Silt, buff to tan, pale yellow, gray-green in anoxic conditions, weathers brown to red; quartzose to feldspathic. Loess is an eolian deposit derived from glacial outwash. Loess is typically calcareous with dolomite and calcite; the upper portion of the loess is deeply weathered, leached/noncalcareous, clayey, and is commonly referred to as "brown loam." Loess deposits unconformably blanket topography with substantial local variation in thickness. The loess weathering profile when in contact with the underlying calcium-rich montmorillonitic Yazoo Clay can produce quality, naturally-tempered kaolinitic clay mixture ideal for use in brick manufacturing. In places, weathered loess contains secondary deposits of calcareous concretions such as loess dolls, caliche, and caliche filled-root casts. Loess can be locally to sparingly fossiliferous, typically containing tests and steinkerns of pulmonate gastropods and less commonly containing fossils of Pleistocene vertebrates.

High Terrace (Qt2) — Qt2
Terrace Deposit underlying Loess but not apparently attributable to the ancestral Mississippi River; Sand, orange to tan colored, fine- to coarse-grained, predominately quartzose; Clay, loess or rip-up derived, kaolinitic, pink to white, generally discontinuous lenses.; Gravelliferous, pea-size, almost exclusively quartzose. Silicified wood common. Significant effort was spent delineating terrace deposits using past investigations by the Mississippi Geological Survey and field investigations for this project. Terraces attributed as Qt2 contain gravels less than an inch in diameter. Some terraces mapped in the past have since been utilized or have eroded. If the terrace was not verified during field work, it was not recycled from previous literature. A Second level terrace is discontinuously mapped in Section 36 Township 8N. Range 1W., Sections 1, 2, 11, and 12 Township 7N. Range 1W. The base unconformably overlies the Yazoo Fm. from 270 to 300 ft msl.

Pre-loess Terrace Deposits — Qtpl
Pleistocene ancestral Mississippi River terraces deposited prior to Pleistocene loessification. Sand, yellow, orange, red, pink, fine to coarse-grained, predominately quartzose, cross-bedded to massive; Gravelliferous, pea to large cobble size with local occurrences of ice-rafted, faceted sandstone and chert boulders possible, gravels are predominantly chert; Clay, pink to white, occurring as discontinuous lenses and as rip-up clasts up to boulder size. A Pre-loess Terrace Deposit is mapped with an unconformable base approximately 280 ft msl in Sections 5 and 8 Township 7N. Range 1W. The deposit has been utilized where exposed in Section 8.

Catahoula Formation — Tca
Deltaic; Sand, red to khaki, medium-to coarse grained, predominately quartzose with polished black chert grains. Ironstone common where sands overlie clays. Sands indurate where exposed elsewhere; However, induration was not encountered on this map except as ironstone. Represented as a channel incised through the Vicksburg Group and slightly the Forest Hill Formation in Section 31 Township 7N. Range 1W. and Sections 5 and 6 Township 6N. Range 1 W. at Kickapoo Hill. Total thickness up to 80 feet. This Catahoula Channel sand is in the stratigraphic position of the Glendon Limestone. Where the sand was mined in a sand pit at the top of Kickapoo Hill, Glendon Limestone was encountered in the wall of the pit. It must be noted that this massive sand has been previously mapped as a terrace and falls at the 320-foot elevation, similar to a Pre-loess Terrace Deposit mapped in Clinton and Raymond.

Vicksburg Group — Ty
Includes the undifferentiated associated marine units: Bucatunna Formation, Byram Formation, Glendon Formation, and underlying Mint Springs Formation. Bucatunna Formation – dark-gray calcareous clays, up to 60 feet thick; Byram Formation – clayey marl, glauconitic, fossiliferous, up to 12 feet thick; Glendon Formation– Semi-Crystalline Limestone interbedded with softer clayey marls reaching a maximum thickness of about 30 feet. Represents the highstand of the Oligocene Vicksburg Seas. Glendon Limestone is present where Vicksburg Group is mapped. Mint Springs Formation – Sandy marl to a limy sand, very fossiliferous in the subsurface, lesser so where weathered, up to 15 feet thick in subsurface. Upper most Glendon ledges are typically karstic with voids are infilled with soil or overlying Bucatunna Formation. Fossiliferous: *Bryozoa, foraminifera*, bivalves, *Ostrea vicksburgensis*, and *Pecten poulsoni*. Glendon Limestone notably outcrops in Section 31 Township 7N. Range 1W. on the north-western face of Kickapoo Hill.

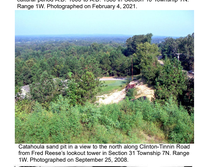
Forest Hill Formation — Tfh
Sand, fine-grained, silty, quartzose; Clay, carbonaceous, laminated, lignite and silicified wood common. Lignitic plant fossils common along fissile partings in clays. The unconformable contact between the Forest Hill Formation and the underlying Yazoo Clay is a clay-on-clay contact with a distinct 2-foot-thick lignite seam in the Forest Hill Formation Section 28 Township 6N. Range 1E. at Society Ridge Church, and demonstrated as 1-foot carbonaceous clay layer above the contact Section 20 Township 7N. Range 1 E. at Rocky Hill Church. The Forest Hill Formation is the lowermost unit of the Vicksburg Group and is differentiated because it is a terrestrial deltaic deposit.

Yazoo Formation (Yazoo Clay) — Ty
Clay, calcareous, montmorillonitic, and blue-green color unweathered, marine shell hash common along partings, locally containing bentonite seams; weathers tan to yellowish-brown with caliche common. Locally fossiliferous: containing beds of the oyster *Pycnodonte trigonalis* and vertebrate remains of the archaeocete whales *Zygorhiza kochii* and *Basilosaurus cetoides*. Selenite locally along joints where clay is framboidally pyritiferous. Limestone ledges. The Yazoo Clay reaches a variable thickness of approximately 420 feet. The best exposure of Yazoo Clay can be found at a clay pit in Sections 25 and 36 Township 7N Range 1W. near Cynthia, with limestones, fossiliferous and gypsiferous clays. Weathering at outcrop, the Yazoo Clay can pose a high-risk for slope stability, engineering, and construction projects due to its high shrink-swell potential.


Alluvium exposed along the active channel of a tributary of Limekiln Creek in Section 35 Township 8N. Range 1W. Photographed on February 4, 2021.


Prehistoric Native American earthworks at Pocahontas Mounds Archaeological Park. Occupying and once utilizing the natural resources of a terrace of Lime Kiln Creek during the Mississippian cultural period A.D. 1000 to A.D. 1300 in Section 10 Township 7N. Range 1W. Photographed on February 4, 2021.


Loess capping Catahoula sand exposed in a high wall of a sandpit at Kickapoo Hill in Section 31 Township 7N. Range 1W. Photographed on April 28, 2021.


Catahoula sand pit in a view to the north along Clinton-Tinnin Road from Fred Reese's lookout tower in Section 31 Township 7N. Range 1W. Photographed on September 25, 2008.


Glendon Limestone locally utilized as foundation pillars for The Old Lee House featured in the movie *Roll of Thunder, Hear My Cry* in Section 31 Township 7N. Range 1W. Photographed in 1993.

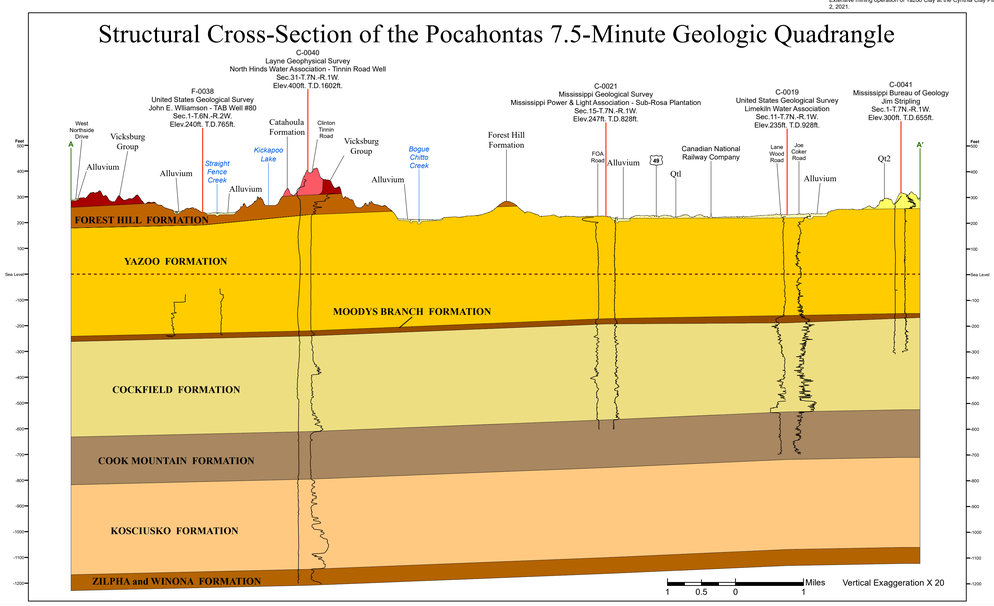

Panoramic composite of the Glendon Limestone exposed in an incised Catahoula channel sand in the Reese Mine in Section 31 Township 7N. Range 1W. Photographed in 1993.

Bentonitic clay just below the 87-foot mark; the upper Yazoo Clay in the Mossy Grove core drilled by MDEQ's Mississippi Office of Geology in northwest Hinds County with a radiometric age of 33.7 million years old (Obradovich and Dockery, 1996) in Section 31 Township 7N. Range 1W. Photographed on February of 1996 from *Mississippi Geology Volume 7 Number 1*.


Cheek tooth of the Type Specimen (MMNS VP 445) of the Basilosaurid early whale, *Cynthiacetus maxwelli*, excavated from the Yazoo Clay in the Cynthia Clay Pit in Sections 25 and 36 Township 7N. Range 1W. Photographed on April 20, 2019.


Extensive mining operation of Yazoo Clay at the Cynthia Clay Pit reclaimed as a lake in Sections 25 and 36 Township 7N. Range 1W. Photographed on March 2, 2021.

Structural Cross-Section of the Pocahontas 7.5-Minute Geologic Quadrangle




Yazoo Formation limestone and clay exhibiting deep desiccation cracks and white sulfosalts mineral growth on the outcrop surface from the weathering of framboidal marcasite along a relic high wall at the Cynthia Clay Pit Section 36 Township 7N. Range 1W. Photographed on March 2, 2021.

Selenite growth from the weathering of framboidal marcasite in an outcrop of gypsiferous Yazoo Clay along a relic high wall at the Cynthia Clay Pit in Section 36 Township 7N. Range 1W. Photographed on March 2, 2021.

Base Map produced by the Mississippi Geological Survey

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere; **Datum:** WGS 1984; **Units:** Meter
Declination: World Magnetic Model, January 1, 2022, estimated Magnetic North declination in quadrangle center (32°26'15" -90°18'45") area is 1°14' west of True North ± 0°21'. Annual rate of declination change is approximately 0°6' west per year.
Lidar: Mississippi Department of Environmental Quality (MDEQ), U.S. Army Corps of Engineers (USACE), United States Geological Survey (USGS), Natural Resources Conservation Service(NRCS), Federal Emergency Management Agency(FEMA), National Oceanic and Atmospheric Administration(NOAA), National Park Service (NPS), and Tennessee Valley Authority (TVA). Project span 2005-2017.
Hydrography: Lidar derived; National Hydrography Dataset (NHD) 2020
Contours: Lidar derived
Roads: Mississippi Department of Transportation (MDOT) 2018
PLSS Boundaries: Mississippi Automated Resource Information System (MARIS) 2020
Building Footprints: Microsoft 2019
Surface Mines: MDEQ Office of Geology - Mining and Reclamation Division
Boreholes: MDEQ Office of Geology - Environmental Geology Division

Reference Scale: 1:24,000
1 0.5 0 1 Miles
1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet
1 0.5 0 1 Kilometers
Contour Interval: 20 Feet

GEOLOGIC MAP of the POCAHONTAS QUADRANGLE
Hinds and Madison Counties, Mississippi

2021

Geology by

Jonathan R. Leard, RPG and James E. Starnes, RPG

This geologic map was funded by the United States National Park Service, Geologic Resources Division. Geology field checked in 2020 and 2021 using LiDAR. Projection: Mercator Auxiliary Sphere; Datum: WGS 1984, Horizontal Units: Meter, Contour interval 20 feet.

MDEQ-GEOLOGY State Geologist: David T. Dockery, III
MDEQ-GEOLOGY Geographic Information Systems: Daniel W. Morse
MDEQ-GEOLOGY Drillers: Archie Mckenzie and Trey Magee
MDEQ-GEOLOGY Geophysical Logging: Andrew Newcomb and Paul Parrish

Geologic maps are only a guide to current understanding and do not eliminate the need for detailed investigations of specific sites for specific purposes. The views and conclusions contained in this Open-File Report are those of the geologists and should not be interpreted as representing the official policies, either expressed or implied, of the State of Mississippi or of the United States Government.

Adjoining 7.5' Quadrangles

Coxs Ferry	Flora	Charlton
Brownsville	Pocahontas	Ridgeland
Raymond	Clinton	Jackson