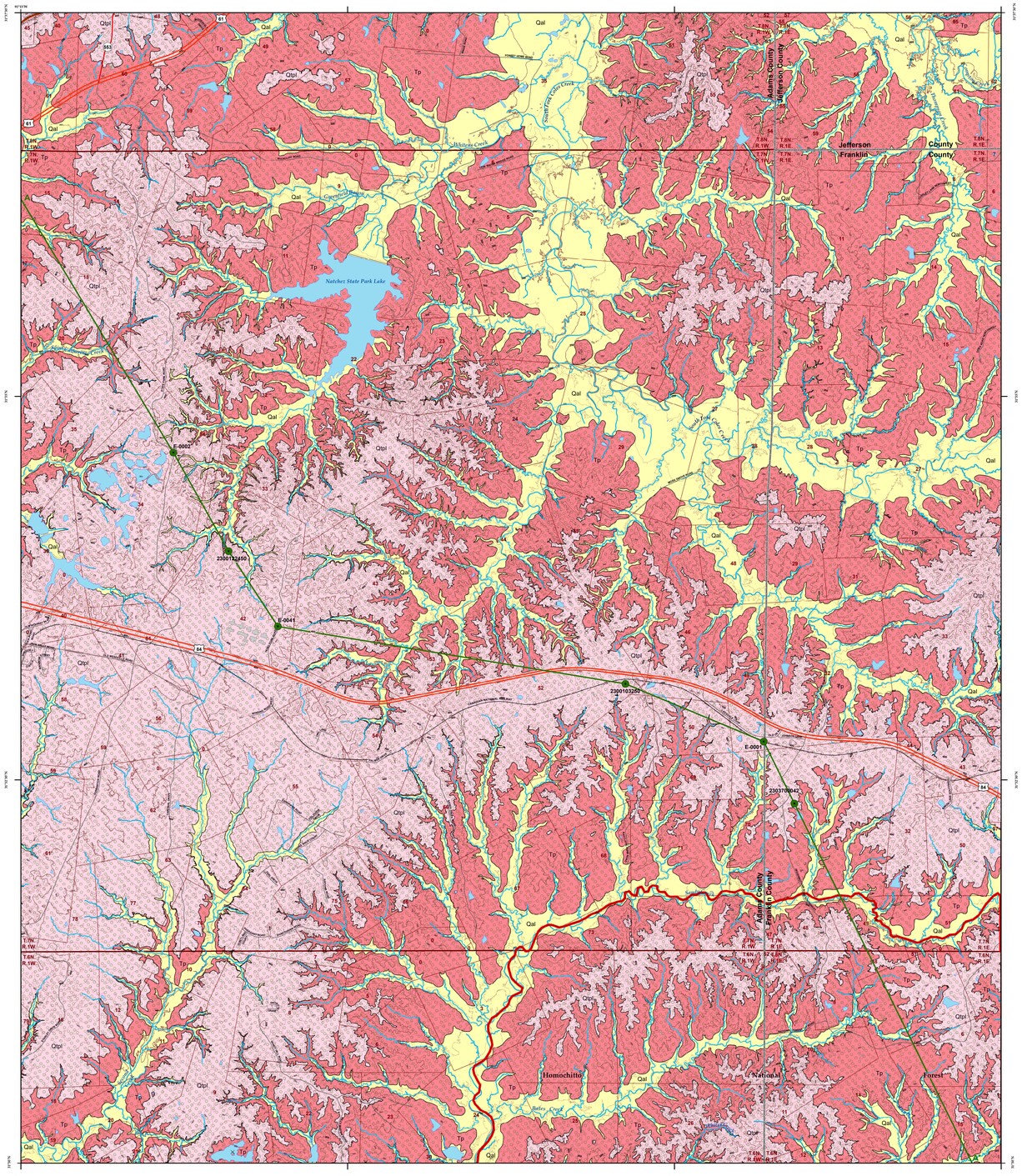
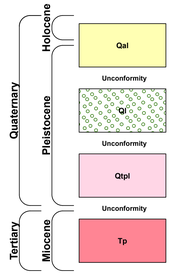
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF GEOLOGY SURFACE MAPPING DIVISION
MISSISSIPPI GEOLOGICAL SURVEY

Prepared in cooperation with
THE UNITED STATES GEOLOGICAL SURVEY
NATIONAL GEOLOGIC MAPPING PROGRAM

# GEOLOGIC MAP OF THE 7.5-MINUTE CRANFIELD QUADRANGLE OPEN-FILE REPORT 326




## Correlation of Map Units




Miles
1 0.5 0 1

Bare Earth LIDAR Hillshade for the Cranfield 7.5 Minute Quadrangle.

## Descriptions of Map Units

**Alluvium** Qal
Sand, medium- to brownish-white, very fine- to very coarse-grained, subrounded to rounded, predominately quartzose, silty, clayey; commonly containing organic matter; heavily loess derived with occurrences of gravels eroded from terrace deposits.

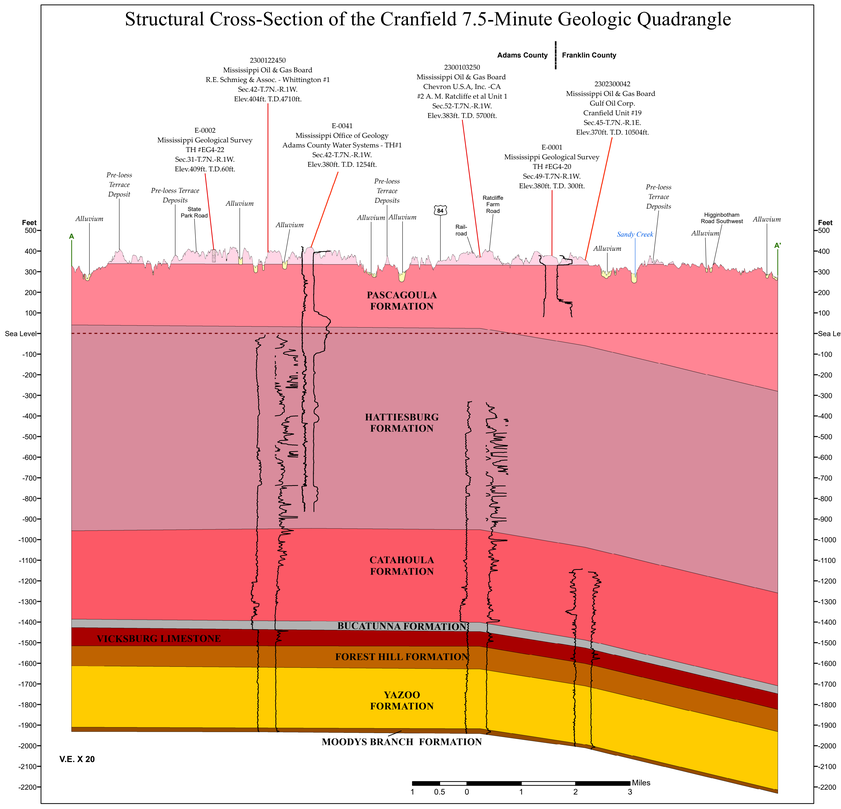
**Loess** Ql
Silty, buff to tan, pale yellow, red, gray-green where in anoxic conditions; quartzose to feldspathic. Loess is an eolian deposit derived from glacial outwash. Loess is typically calcareous with dolomite and calcite; however, the upper portion of the loess is highly weathered, leached/non-calcareous, clayey, and has been referred to as "brown loam." Loess deposits unconformably blanket the Pre-loess topography with substantial local variation in thickness. In places, weathered loess contains secondary deposits of small calcareous concretions of caliche locally referred to as loess dolls. Loess can be locally and sparingly fossiliferous, commonly containing tests of steinkerms of pulmonate gastropods and less commonly containing fossils of Pleistocene Vertebrates.

**Pre-loess Terrace Deposits** Qtpl
Ancestral Mississippi River terrace deposit. Sand, yellow, orange, purple, red, pink, fine- to coarse-grained, predominantly quartzose, cross-bedded to massive; graveliferous, pea to large cobble sized clasts; clasts of sandstone up to boulder size not uncommon. Gravels are predominately chert with lesser amounts of vein quartz, metaquartzite, agate, sandstone, and rare rhyolite clasts; clay, pink to white, generally occurring as discontinuous lenses and as rip-up clasts up to boulder size. Conglomeratic ironstone ledges are common in the graveliferous sands at the baes of the deposits, which overlies the Pascagoula Formation unconformably. The heavily eroded terrace is perched above approximately 340 feet MSL in elevation.

**Pascagoula Formation** Tp
Clay, green, gray, brown, weathers pink to off-white, silty to sandy, locally lignitic; sand, gray, pale yellow to white, fine-to coarse-grained ,cross-bedded to massive with bedded pea gravels (gravels consist of black, grey, brown chert, and milky quartz, are highly polished, sub-angular to well rounded), often indurated to sandstones and siltstones at surface, predominantly quartzose with lesser amounts of chert, metaquartzite, mica, and heavy minerals, slightly glauconitic in places, silicified and coalified wood common. No other place was seen in the mapping area which shows such extensive development of ferruginous sandstone than a prominent set of erosional features along South Fork Coles Creek and Mill Creek. Previously mapped as the "citronelle formation", these up to indurated ledges and precipices of cross-bedded and locally graveliferous ironstones, cemented with limonite and goethite, were created by the differential erosion of a thick bed of Pascagoula sand.

Surface mine pit
E-0041 Drill-hole locality and identification number
Unconformable Contact
A — A' Line of Section
National Forest Boundary

## Structural Cross-Section of the Cranfield 7.5-Minute Geologic Quadrangle




**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 CRANFIELD quadrangle center area, (31° 37' 45" N. 91° 11' 15" W), is 0° 36' 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; MS Oil and Gas Board

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

**This geologic map was funded in part by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under STATEMAP award number G21AC10822. Geology field checked in 2021 and 2022 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



Adjoining 7.5' Quadrangles

| | | |
|---|---|---|
| Pine Ridge | Church Hill | Fayette |
| Washington | Cranfield | Roxie |
| Kingston | Jeannette | Knoxville |

# GEOLOGIC MAP of the CRANFIELD QUADRANGLE

**Adams, Franklin, and Jefferson Counties, Mississippi**

**2022**

Geology by

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



Looking west down a sand and gravel choked tributary of South Fork Coles Creek with an outcrop of loess and loess-derived stream alluvium exposed along the stream channel wall. Section 25 Township 7N. Range 1W. Photographed on March 14, 2022.

Loess and loess-derived stream alluvium with sparse gravel. Rock hammer held by Jonathan Leard indicating a paleo-channel exposed along the stream channel wall of South Fork Coles Creek. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

James Starnes in front of an outcrop along a stream channel of a tributary of South Fork Coles Creek exposing valley-fill loess deposits over stream alluvium and contact with clays of the Pascagoula Formation. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

Jonathan Leard sitting along a vertical outcrop of massive loess exposed at a road cut of an oilfield service road. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

Pulmonate gastropod fossils eroding from a loess outcrop along a stream channel along a tributary of South Fork Coles Creek. Section 24 Township 7N. Range 1W. Photographed on March 14, 2022.

Highwall of a gravel mining operation exposing the contact of the overburden of loess of extensively developed resources of the rich economic deposits of the Pre-loess Terrace Deposits. Section 39 Township 7N. Range 1W. Photographed on March 14, 2022.

Gravel washing and sorting operations of extensively developed resources of the rich economic deposits of sand and gravel in the Pre-loess Terrace Deposits. Section 34 Township 7N Range 1W. Photographed on March 14, 2022.

Pre-Cambrian Sioux Quartzite gravel clast in Pre-loess Terrace derived stream gravels photographed along a tributary of South Fork Coles Creek. Section 24 Township 7N. Range 1W. Photographed on March 14, 2022.

Silicified *Palmoxylon sp.* fossil from the Pascagoula Formation exposed as float along a tributary of South Fork Coles Creek. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

Jonathan Leard standing in front of an outcrop along a stream channel along a tributary of South Fork Coles Creek exposing stream alluvium over Pascagoula clay. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

Pascagoula clay outcrop along a stream channel along a tributary of South Fork Coles Creek. Section 26 Township 7N. Range 1W. Photographed on March 14, 2022.

Indurated ferruginous sandstone boulder block talus and outcrop of the Pascagoula Formation exposed along the valley wall along a tributary of South Fork Coles Creek. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

James Starnes standing next to an outcrop of ledge-forming, indurated ferruginous sandstone of the Pascagoula Formation exposed along the valley wall along a tributary of South Fork Coles Creek. Section 46 Township 7N. Range 1W. Photographed on March 14, 2022.

Jonathan Leard standing next to an outcrop of ledge-forming, indurated ferruginous cross-bedded sandstone of the Pascagoula Formation exposed along the valley wall along a tributary of South Fork Coles Creek. Section Township Range. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

Locally graveliferous outcrop of ledge-forming, indurated ferruginous cross-bedded sandstone of the Pascagoula Formation demonstrating differential weathering of liesegang limonite and goethite cementation. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.

Pea gravel conglomerate from the ironstone of the Pascagoula Formation exposed as float along a tributary of South Fork Coles Creek. Section 29 Township 7N. Range 1W. Photographed on March 14, 2022.