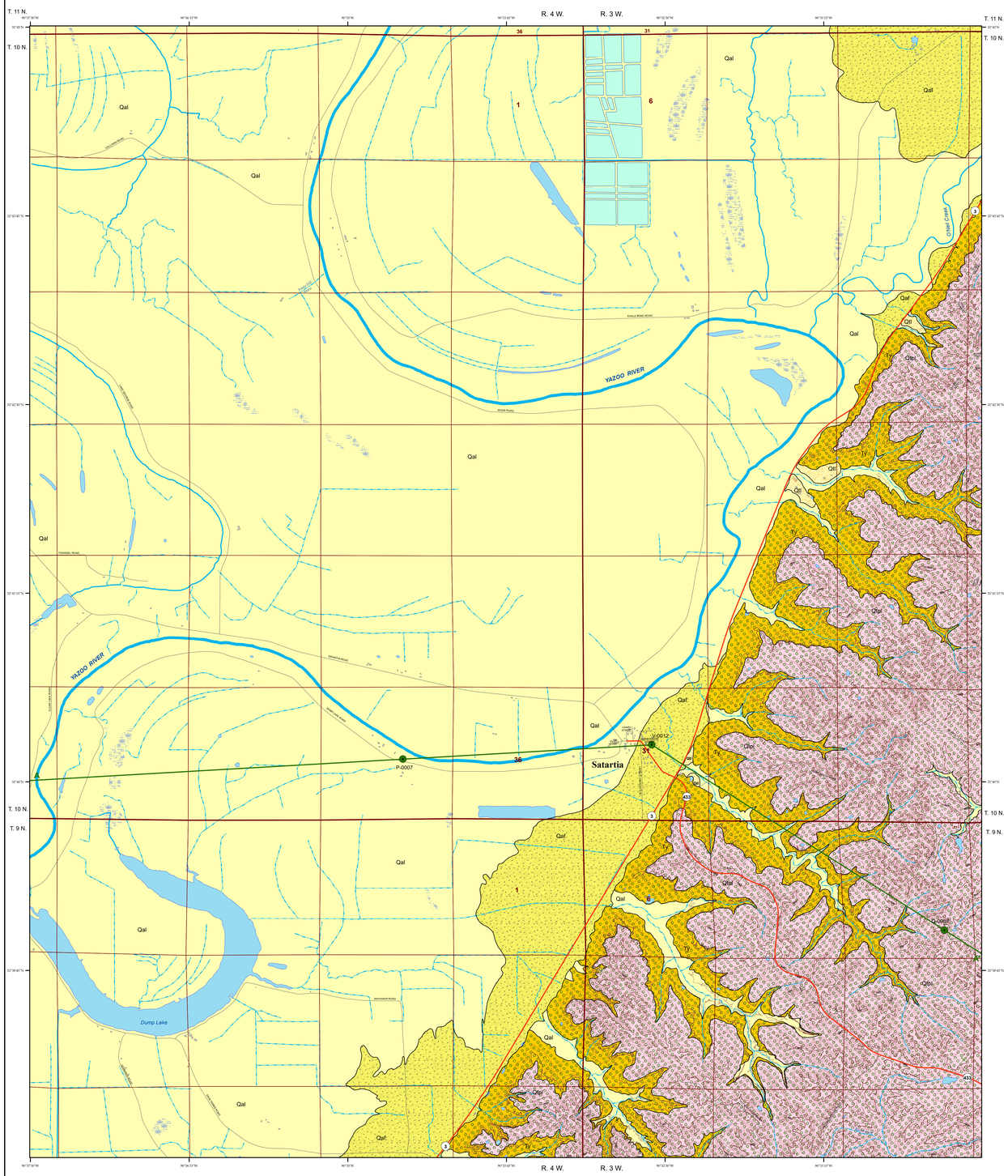
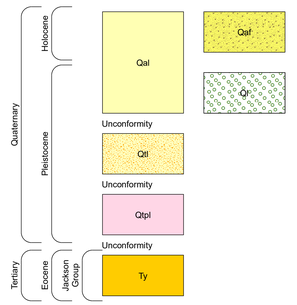
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF GEOLOGY SURFACE MAPPING DIVISION
MISSISSIPPI GEOLOGICAL SURVEY

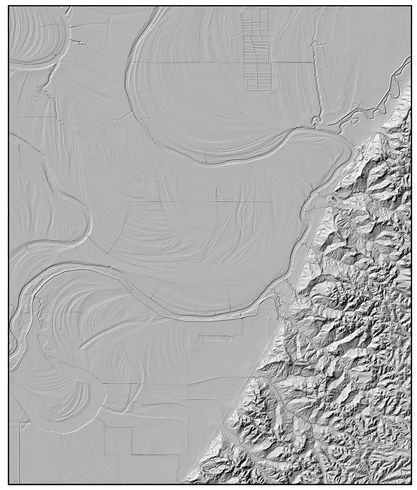
Prepared in cooperation with
THE UNITED STATES GEOLOGICAL SURVEY
NATIONAL GEOLOGIC MAPPING PROGRAM

GEOLOGIC MAP OF THE 7.5-MINUTE SATARTIA QUADRANGLE OPEN-FILE REPORT 322



Correlation of Map Units





Bare Earth LIDAR Hillshade for the Satartia 7.5 Minute Quadrangle.

1:70,000
1 inch = 5,833 feet
1 0.5 0 1 Miles

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; floodplain deposits are heavily loess-derived, channel deposits are predominantly graveliferous derived from terrace deposits. The sands and gravels of the Mississippi River Valley Alluvium contain a distinct suite of igneous and metamorphic constituents different than that of the stream alluvium derived from the adjacent bluffs.

Alluvial Fans Qaf
Alternating silts, sands, and gravels. Coarsest at the apex of the fan, fining laterally (radially) from the apex of the fan, interfingering with adjacent fans and the alluvium of the Mississippi River.

Low Terrace Deposits Qtl
Stream Terrace. Sand, orange to tan colored, fine- to coarse-grained, predominately quartzose, cross-bedded to massive; graveliferous, pea-to cobble-size, predominantly chert and milky quartz; silt, tan to brown, loess-derived; clay, kaolinitic, pink to white, generally occurring as discontinuous lenses.

Loess
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 the eroded pre-loess topography with substantial local variation in thickness. In places, weathered loess contains secondary deposits of calcareous concretions such as loess dolls and root casts. Loess can be locally and sparingly fossiliferous, commonly containing tests and steinkerns of pulmonate gastropods and less commonly containing fossils of Pleistocene Vertebrates.

Pre-loess Terrace Deposits Qtpl
Pleistocene 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 and chert 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 basal graveliferous sands of the deposits, which unconformably overlies the Hattiesburg Formation. The base of this heavily eroded terrace is perched approximately 260 feet above MSL in elevation.

Yazoo Formation (Yazoo Clay) Ty
Clay, calcareous, montmorillonitic, and blue-green color unweathered, marine shell hash common along partings; 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.

Shell hash lens (including mollusk fossils of *Dentalium, Turritella, Corbula,* and the coral *Flabellum*) in outcrop of fossiliferous Yazoo Clay, T.9N. R.3W. Section 18, photographed March 5, 2021.

James Starnes standing in active stream channel incising into alluvial fan near MS Hwy 3, T.9N. R.3W. Section 12, photographed March 5, 2021.

Loess derived alluvium exposed in the anoxic zone (exhibiting gley coloration) in the active stream channel incising into alluvial fan near MS Hwy 3, T.9N. R.3W. Section 12, photographed March 5, 2021.

Unconformable contact between loess and sand and gravels of Pre-loess Terrace Deposits in T.9N. R.3W. Section 7, photographed February 19, 2007.

Bob Merrill examining a bentonite in the Yazoo Clay along the bluff line at Satartia in Yazoo County, Mississippi. taken May 13, 1986. From *The Geology of Mississippi (2016).*

Outcrop of calcareous, gypsiferous Yazoo clay at Satartia (Sec. 31, T. 10N. , R.3W.) showing slumped position of bedding and gypsum lined joints. October 10, 1938. From *Bulletin 39: Yazoo County Mineral Resources.*

Looking west from MS Hwy 3 across O'Neil Creek alluvial fan and Mississippi River Valley Alluvium, T.9N. R.3W. Section 6, photographed March 5, 2021.

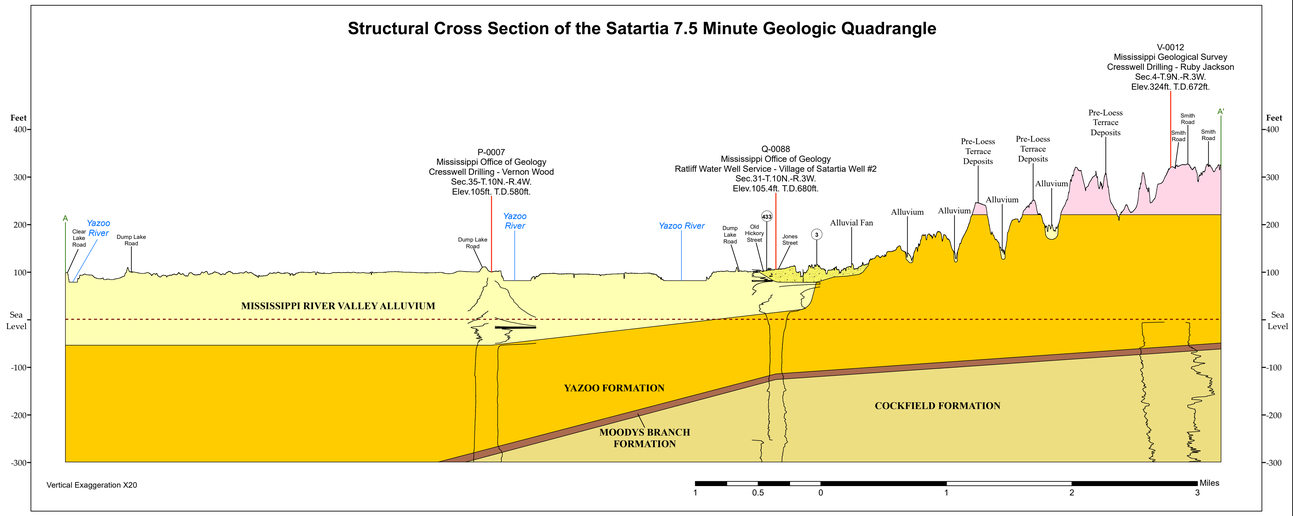
Glacially-derived oversize gravels in Pre-loess Terrace Deposits in a gravel pit in T.9N. R.3W. Section 7, photographed February 19, 2007.

Outcrop of fossiliferous Yazoo Clay, T.9N. R.3W. Section 18, photographed March 5, 2021.

Bentonite bed in the Yazoo Clay along the bluff line at Satartia in Yazoo County, with a radiometric age of 34.28 million years old (Obradovich and Dockery, 1996) taken May 13, 1986. From *The Geology of Mississippi (2016).*

Mollusk fossil shell hash lens in outcrop of fossiliferous Yazoo Clay, T.9N. R.3W. Section 18, photographed March 5, 2021.

Structural Cross Section of the Satartia 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: January 01, 2021, magnetic north declination in quadrangle center is 0°59' west of true north, changing by 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 SATARTIA QUADRANGLE

Yazoo County, Mississippi

2021

Geology by

James E. Starnes, RPG and

Jonathan R. Leard, GIT

This geologic map was funded in part by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under STATEMAP award number G20AS00006.

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

Special Thank You to Barbara and A.J. Rug for their assistance in this mapping project.

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

Holly Bluff	Bayland SE	Yazoo City
Lucre	Satartia	Tinsley
Eldorado	Phoenix	Coss Ferry