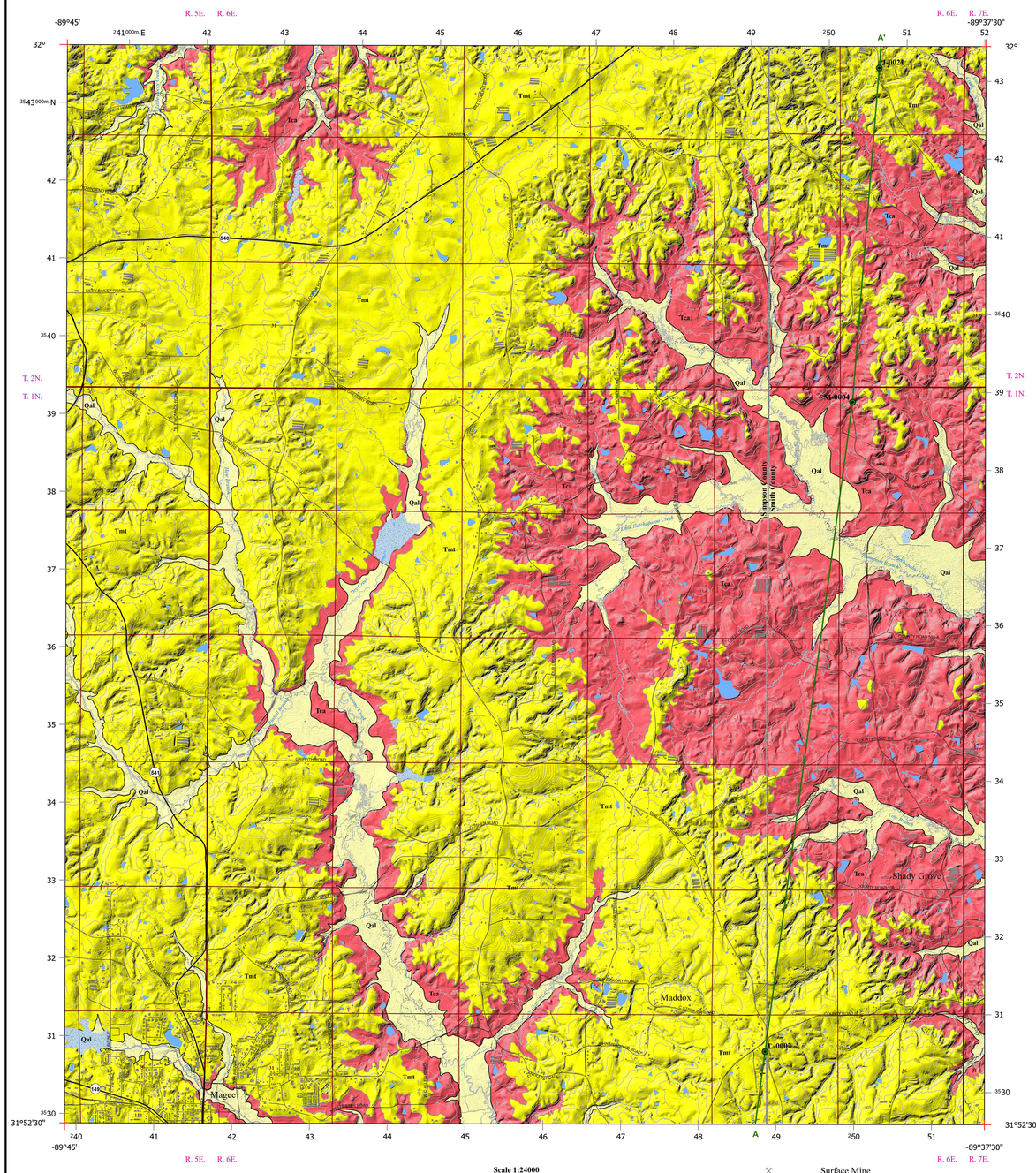
Prepared in cooperation with
UNITED STATES GEOLOGICAL SURVEY
NATIONAL COOPERATIVE GEOLOGIC MAPPING PROGRAM



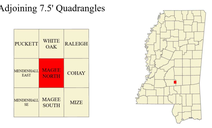
Base map produced by the Mississippi Office of Geology
PCS: NAD 1983 UTM Zone 16N
GCS: GCS North American 1983
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter
Declination: USGS MS Magee North 2024 Topographic Map
MDEM base map data from MARIS
Borehole data from Mississippi Office of Geology.

Scale 1:24000

Contour Interval 20 feet
North American Vertical Datum 1988 Geoid 12A

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program under STATEMAP award number #G25AC00474.

Adjoining 7.5' Quadrangles



UTM GRID AND 2023 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

GEOLOGIC MAP of the MAGEE NORTH 7.5-MINUTE QUADRANGLE

Simpson and Smith Counties, Mississippi

2026

Geology by
Jonathan R. Leard, PhD, RPG, James E. Starnes, RPG,
Timothy J. Palmer, RPG, and Natalya S. Usachenko, GIT

Mississippi Department of Environmental Quality
Mississippi Office of Geology - Surface Mapping Division
Mississippi Geological Survey
700 North State Street
Jackson, Mississippi 39225

Copyright © 2026 Mississippi Department of Environmental Quality, Office of Geology

Surface Mine

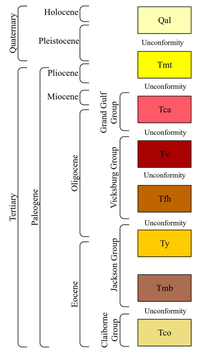
Drill Hole Locality and Identification Number

Formational Contact

Line of Section

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.

Correlation of Map Units



Descriptions of Map Units

Qal

Alluvium (Pleistocene to Holocene)
Sand, yellow- to brownish-white in color, fine- to coarse-grained, subrounded to rounded, predominately quartzose, silty, clayey; humus lenses common. Streams on clay subcrop will exhibit shallow, wide alluvial plains while streams on sand subcrop tend to incise creating steep valleys with narrow alluvial plains, silicified wood common. Thickness approximately 15 feet along larger streams, thinning up tributaries.

Tmt

Magee Terrace (Pliocene to Pleistocene)
Generally fining-upward sequence of fluvial siliciclastic deposits attributed to courses of the Plio–Pleistocene ancestral Tennessee–Ohio River system. Sand is yellow, orange, purple, red, and pink; fine to coarse grained; predominantly quartzose; cross bedded to massive. Graveliferous, containing pea to cobble size clasts typically not exceeding 3 in. in length; clasts composed chiefly of chert with lesser amounts of quartz. Chert gravel is deeply weathered and typically incompetent above the water table and can be leached to tripolitic clay. Clay is kaolinitic, pink to white and occurs as discontinuous lenses and as basal rip up clasts. Floodplain silts and clays are preserved above approximately 550 ft MSL. The base of the unit is unconformable at roughly 400 ft MSL. Conglomeritic ironstone is commonly developed at the contact with the underlying Catahoula Formation.

Grand Gulf Group

Tca

Catahoula Formation (Oligocene to Miocene)
Deltaic to marine gravels, sands, silts, clays, sandstone, ironstone, and limestone. Sand is gray, pale yellow to white; fine to coarse grained; cross bedded to massive. Contains rare thinly bedded pea gravel layers. Gravels consist of highly polished black chert and milky quartz, ranging from subangular to well rounded. Sand is commonly indurated near the surface to sandstone. Predominantly quartzose with lesser amounts of chert, metaquartzite, mica, and heavy minerals; slightly glauconitic in places. Silicified wood and fossil palm fragments are common. Clay is green, gray, and brown; weathers white to brown in color; silty to sandy. Lignite is common in basal clay intervals. Unit is fossiliferous in part. Limestone (Tatum Limestone Member) is characterized by the benthic foraminifera *Heterostegina texana*. Occurs in the subsurface within the Catahoula Formation. The Catahoula Formation unconformably overlies and locally incises into the underlying Bucatunna Formation. Estimated thickness is approximately 540 ft.

Cross Section Units Not Exposed at the Surface

Vicksburg Group

Tv

Vicksburg Limestone Undifferentiated (Oligocene)
Includes the undifferentiated associated marine units, listed in descending stratigraphic order: Bucatunna Formation, Byram Formation, Glendon Formation, Marianna Formation; and Mint Springs Formation. The Bucatunna Formation consists of carbonaceous clays dark brown to gray in color, silty to fine sandy, averaging about 45 ft in thickness but reaching up to 60 ft within the mapping area. The Byram Formation is composed of sandy to clayey marl, glauconitic and fossiliferous, with a thickness of up to approximately 12 ft. The Glendon Formation consists of semi crystalline limestone interbedded with softer clayey marls and represents the marine highstand of the early Oligocene Vicksburg sequence. The underlying Marianna consists of soft clay marls. Collectively the Glendon-Marianna section reaches a maximum thickness of about 30 ft in the mapping area; The Mint Springs Formation consists of gray to green colored glauconitic and fossiliferous quartz sand. The Vicksburg Group is biostratigraphically characterized by the presence of *Pecten byramensis* and the larger benthic foraminifera *Lepidocyclina* sp. The Vicksburg Group unconformably overlies the Forest Hill Formation.

Tfh

Forest Hill Formation (Oligocene)
Deltaic sands, silts, and clays. Sand is fine-grained, silty, and quartzose; clay is carbonaceous and laminated, with lignite and silicified wood common. Carbonized plant fossils occur along fissile partings in clay intervals. The Forest Hill Formation unconformably overlies and commonly incises into the Yazoo Formation and represents the lowermost unit of the Vicksburg Group, distinguished from overlying units by its terrestrial to deltaic depositional setting. Approximate thickness is 80 ft in the mapping area.

Jackson Group

Ty

Yazoo Formation (Eocene to Oligocene)
Outer neritic to bathyal marine clay. Clay is calcareous and montmorillonitic, blue green when in color unweathered, sparingly fossiliferous marine mollusk shell hash common along partings and bentonite seams present. Limestone ledges occur in places. The Yazoo Clay reaches a thickness of approximately 515 ft. The Yazoo Formation is marked by the planktonic foraminifera *Hantkenina alabamensis*. The Yazoo Formation conformably overlies the Moodys Branch Formation.

Tmb

Moodys Branch Formation (Eocene)
The Moodys Branch Formation represents the basal member of a marine transgression towards the close of the Eocene epoch, situated unconformably above the deltaic to estuarine Cockfield Formation and conformably below the outer neritic to bathyal clays of the Yazoo Formation. It consists of sandy, fossiliferous marl containing abundant marine mollusk shells of the genera *Glycymeris* and *Venericardia*. The unit unconformably overlies the Cockfield Formation, reflecting the delta destructional phase and subsequent marine transgression, and it conformably grades upward into the Yazoo Formation. Total thickness is approximately 15 ft.

Claiborne Group

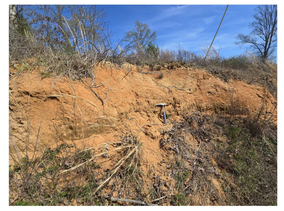
Tco

Cockfield Formation (Eocene)
Deltaic deposits dominated by clays in the upper portions of the formation and sands in the lower portion. Clays are gray to brown in color, silty to fine sandy, plastic, strongly carbonaceous with thin beds of lignite common, slightly micaceous, and locally pyritic. Sands are quartzose and are cross bedded to massive, locally lignitic, and can be silty to clayey.

Field Photographs

The alluvial plain of Dry Creek ponded by a beaver dam in Section 8, Township 1 North, Range 6 East.

Carbonaceous to lignitic stream alluvium of Hatchapaloo Creek in Section 27, Township 2 North, Range 6 East.


Limonite stained quartz gravel and sand of the Magee Terrace with the chert fraction leached and weathered to tripolitic clay, exposed along a road cut in Section 26, Township 2 North, Range 6 East.

Limonite stained quartz sands of the Magee Terrace cropping along a roadcut in Section 27, Township 2 North, Range 6 East.

Pedogenic iron and manganese nodules (buckshot) formed as a lateritic soil pan upon the Magee Terrace, exposed in a road cut along MS HWY 540 in Section 29, Township 2 North, Range 6 East.

Quartz sand gravel of the Magee Terrace with limonite-cemented ironstone in the valley of Rocky Creek, exposed along a road cut in the Section 19, Township 2 North, Range 6 East.

Ironstone ledge marking the base of the Magee Terrace exposed along a road ditch in the valley of Little Rocky Creek in Section 24, Township 2 North, Range 5 East.

Basal ironstone of the Magee Terrace exposed along a road ditch near the confluence of Okatoma Creek and Haw Branch in Section 1, Township 1 North, Range 5 East.

Quartz sand and ironstone of the Catahoula Formation exposed along a roadcut in the eastern valley of Hatchapaloo Creek in Section 34, Township 2 North, Range 6 East.

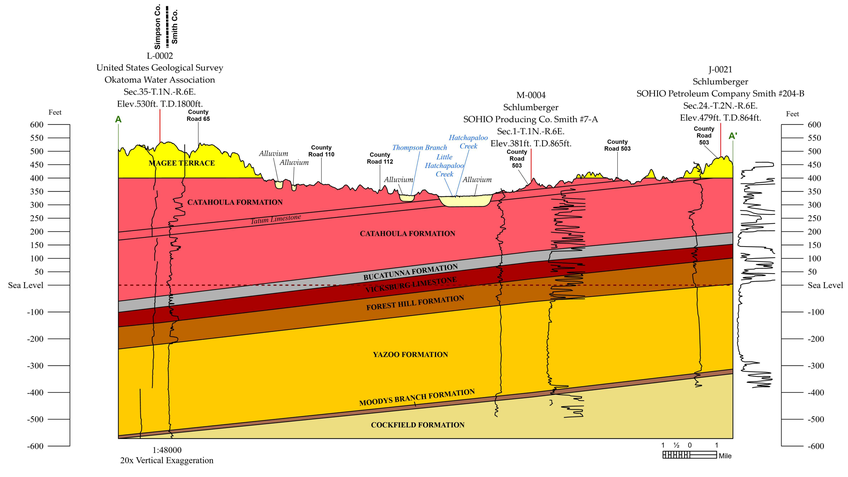
Alternating beds of quartz sand, clay, and ironstone of the Catahoula Formation exposed along a hillside near Rocky Hill Church in Section 35, Township 2 North, Range 6 East.

Indurated quartz sandstone of the Catahoula Formation exposed along the valley of Hatchapaloo Creek in Section 27, Township 2 North, Range 6 East.

Indurated quartz sandstone of the Catahoula Formation exposed along eastern valley of Hatchapaloo Creek in Section 27, Township 2 North, Range 6 East.

Indurated quartz sandstone of the Catahoula Formation exposed in a road cut in Section 1, Township 1 North, Range 6 East.

Clay of the Catahoula Formation exposed along the channel of Hatchapaloo Creek in Section 27, Township 2 North, Range 6 East.

Clay of the Catahoula Formation exposed along the road ditch near the confluence of Okatoma Creek and Haw Branch in Section 1, Township 1 North, Range 5 East.

Structural Cross-Section of the Magee North 7.5-Minute Geologic Quadrangle