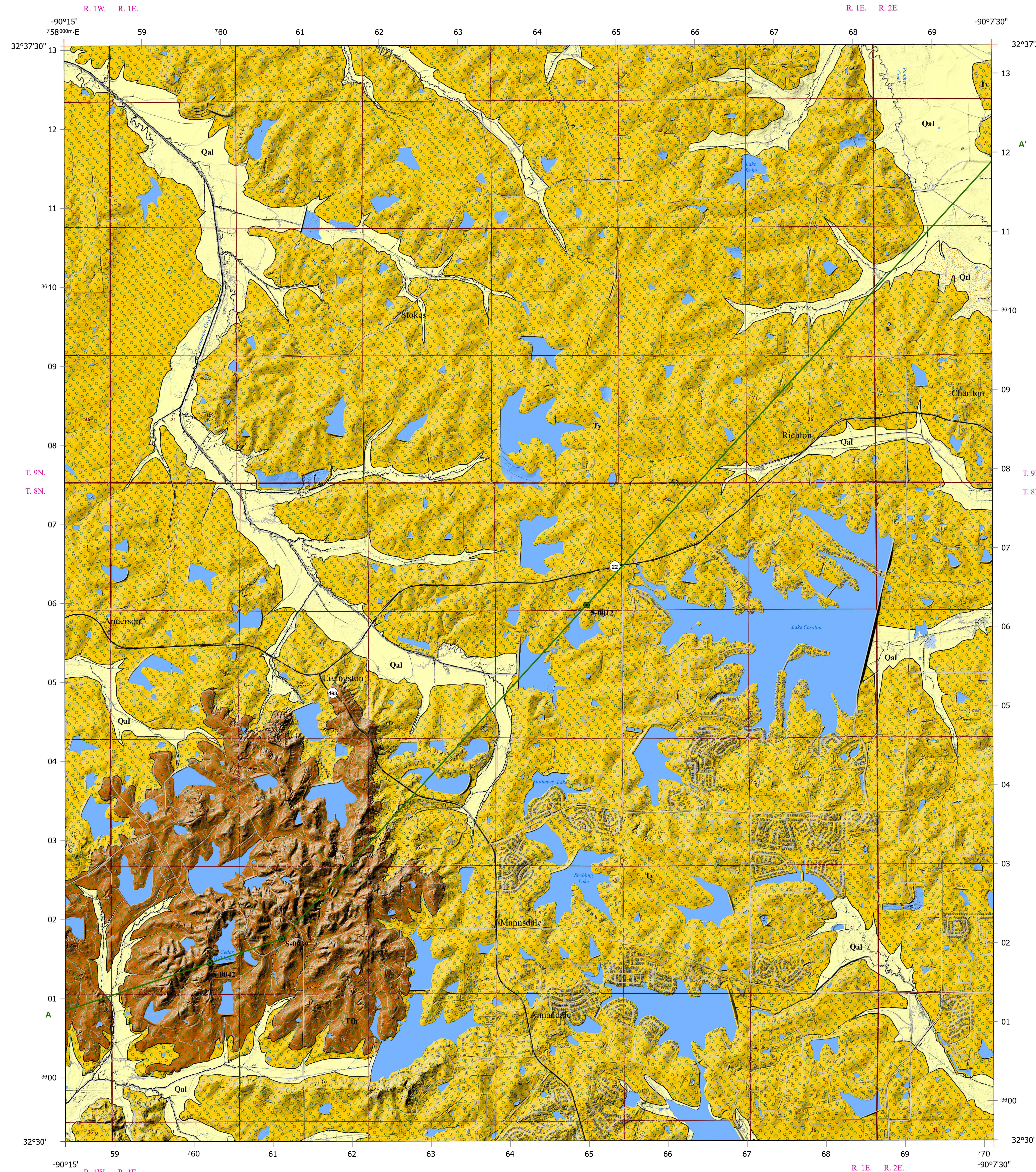
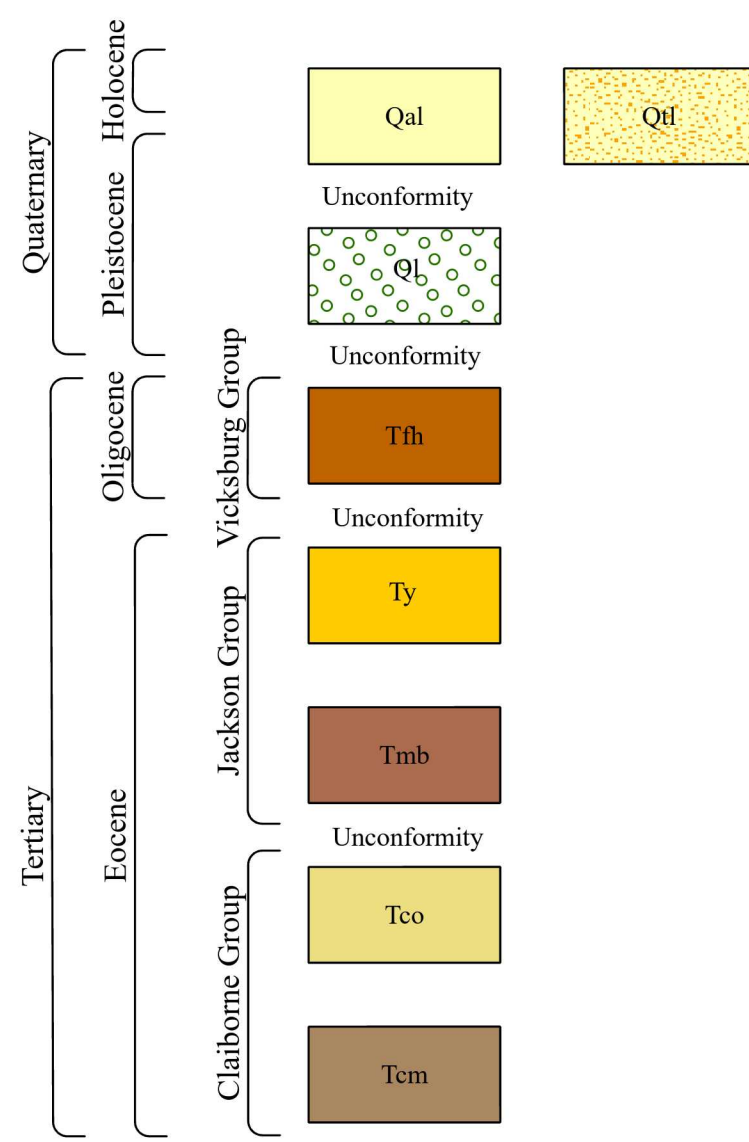




### Correlation of Map Units



### Descriptions of Map Units

- 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.
- Stream Terrace (Pleistocene to Holocene)**  
Sand, yellow- to brownish-white in color, fine- to coarse-grained, subrounded to rounded, predominately quartzose, locally graveliferous containing aggregate derived from the Pre-loess Terrace deposits, silty to clayey; humus lenses common; floodplain deposits are heavily loess-derived. Silicified wood common. Can contain pre-historic archeological deposits.
- Loess (Pleistocene)**  
Commonly referred to as "brown loam." Eolian deposit derived from glacial outwash. Silt, buff to tan, pale yellow, red, grey to grey-green where in anoxic conditions, quartzose to feldspathic; typically calcareous with dolomite and calcite; upper portion can be deeply weathered and noncalcareous. In places, weathered loess contains secondary deposits of small calcareous concretions. Locally contains tests or stinkerns of pinnulate gastropods and less commonly contains fossils of Pleistocene vertebrates. Loess deposits unconformably blanket underlying formations with substantial local variations in thickness but generally thickens westwardly.
- Vicksburg Group**
- 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 110 ft in the mapping area.
- Jackson Group**
- Yazoo Formation (Oligocene to Eocene)**  
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 355 ft in the mapping area. The Yazoo Formation is marked by the planktonic foraminifera *Hankina ulabumensis*. The Yazoo Formation conformably overlies the Moody's Branch Formation.
- Moody's Branch Formation (Eocene)**  
The Moody's 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 *Ivenercardia*. 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 30 ft.
- Chickasaw Group**
- Cockfield Formation (Eocene)**  
Deltaic deposits dominated by clays in the upper portions of the formation and sands in the lower portion. Clay, brown, reddish-brown to grey in color; silty to fine sandy; strongly carbonaceous to lignitic, slightly micaceous, pyritic. Carbonized and silicified plant fossils common. Underlies the Moody's Branch Formation unconformably. Total thickness is approximately 330 feet in the mapping area. Overlies the Cook Mountain Formation unconformably.
- Cook Mountain Formation (Eocene)**  
Marine clays, silts, and sands. Clay, chocolate brown in color. Silt, dark yellowish-brown, carbonaceous, clayey, glauconitic, micaceous, sandy. Sand, light gray to grayish-brown, fine- to coarse-grained, quartzose, fossiliferous, silty, clayey, micaceous, carbonaceous; shaley in upper portions, cross bedded in lower portions. Unconformably overlies the Kosiuko Formation. Thickness is approximately 100 ft.

### Field Photographs



Loess derived stream alluvium exposed along a cutbank unconformably overlying upper Eocene montmorillonitic clays of the Yazoo Formation exposed along the active channel of Persimmon Creek in Section 31, Township 9 North, Range 1 East.



Bauxitic clay formed as a diagenetic lag at the base of stream alluvium exposed along the active channel of Persimmon Creek in Section 31, Township 9 North, Range 1 East.



Well rounded, pea- to small cobble-sized quartz dominated gravel exposed along a sand bar in the alluvium of the Big Black River in Section 10, Township 9 North, Range 1 West.



Survey geologist James Starnes examining a freshly exposed tusk of the late Pleistocene proboscidean *Mammuthus columbi* in the cutbank of active channel in Persimmon Creek in Section 31, Township 9 North, Range 1 East.



Survey geologist Dr. Jonathan Leard and civil engineer Eddie Templeton excavating a freshly exposed tusk of the late Pleistocene proboscidean *Mammuthus columbi* in the cutbank of active channel in Persimmon Creek in Section 31, Township 9 North, Range 1 East.



Survey geologist Dr. Jonathan Leard applying a plaster jacket for the extraction of a freshly exposed tusk of the late Pleistocene proboscidean *Mammuthus columbi* in the cutbank of active channel in Persimmon Creek in Section 31, Township 9 North, Range 1 East.



Survey geologist Dr. Jonathan Leard examining the contact between late Pleistocene Peorian loess and loess-derived stream alluvium in the cutbank of Persimmon Creek in Section 31, Township 9 North, Range 1 East.



Loess deposits freshly exposed in excavation along western edge of the Jackson Prairie region. The loess overlies the Yazoo Formation in Section 31, Township 9 North, Range 2 East.



Deeply weathered sandy clays of the lower Forest Hill Formation exhibiting a high susceptibility exposed in the Petrified Forest in Section 29, Township 8 North, Range 1 West.



A large Lower Oligocene silicified fossil log eroding from sandy clays of the basal Forest Hill Formation in Section 29 Township 8 North, Range 1 West.

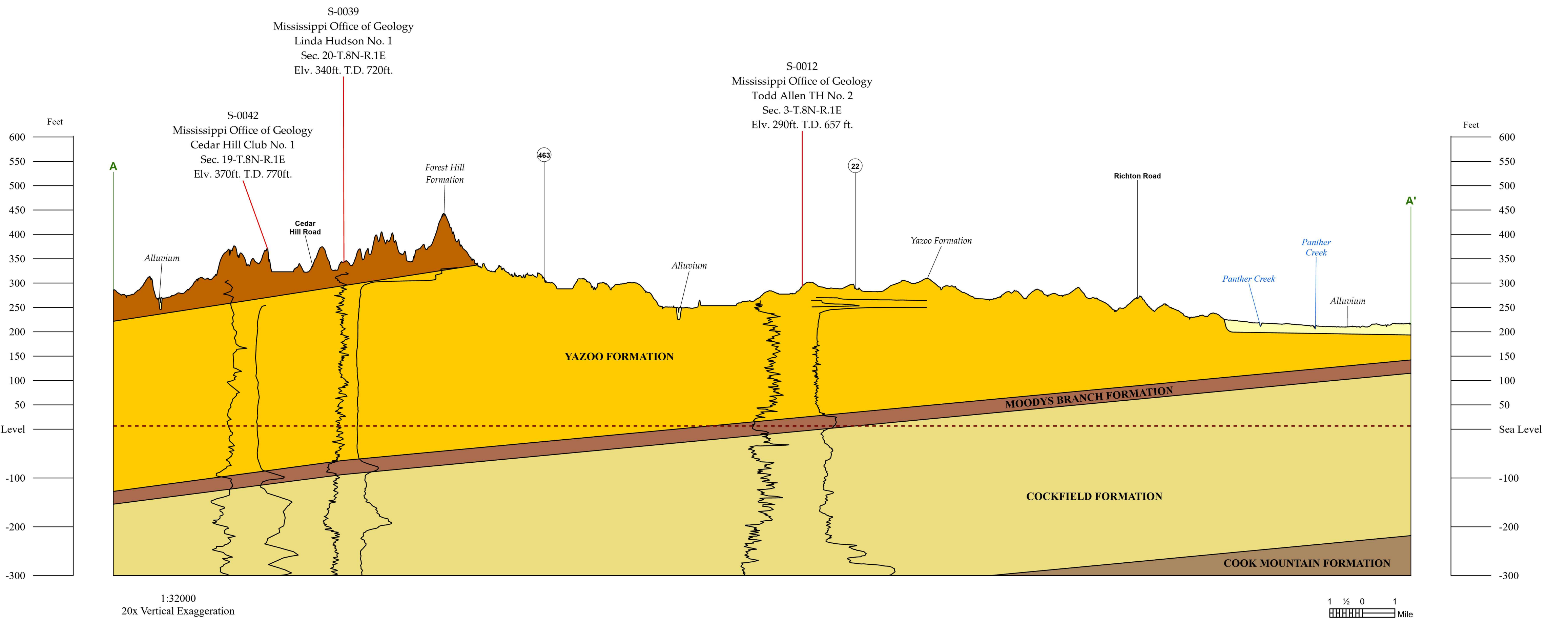


Late Eocene montmorillonitic marine clays of the Yazoo Formation exposed along the active channel of Persimmon Creek in Section 31, Township 9 North, Range 1 East.

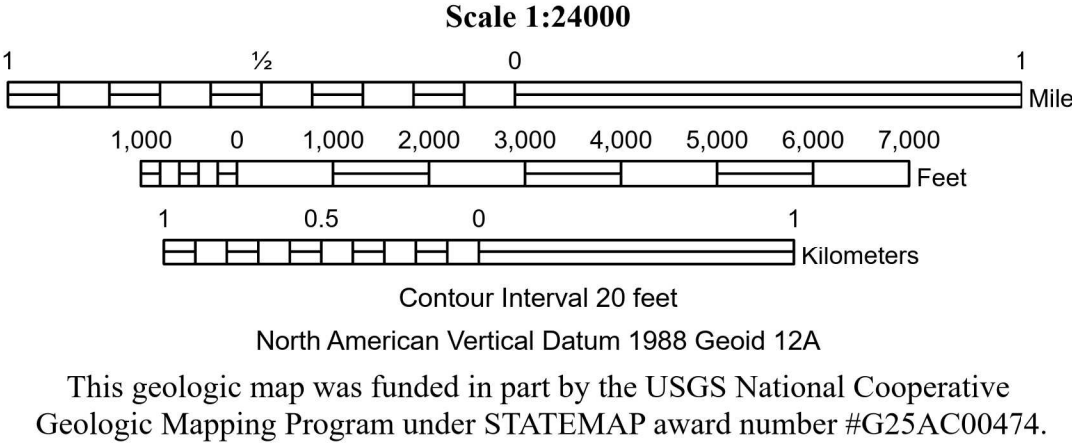


A large fossil lumbar vertebra from the archaic whale, *Basilosaurus cetoides* erode from the Eocene marine clays of the Yazoo Formation found along the active channel of Persimmon Creek in Section 31, Township 9 North, Range 1 East.

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



Base map produced by the Mississippi Office of Geology  
PCS: NAD 1983 UTM Zone 15N  
GCS: GCS North American 1983  
Projection: Transverse Mercator  
Datum: North American 1983  
Units: Meter  
Declination: USGS MS Charlton 2024 Topographic Map  
MDEM base map data from MARIS  
Borehole data from Mississippi Office of Geology.



Mississippi Office of Geology  
Open-File Report 364

## GEOLOGIC MAP of the CHARLTON 7.5-MINUTE QUADRANGLE

Madison County, Mississippi

2026

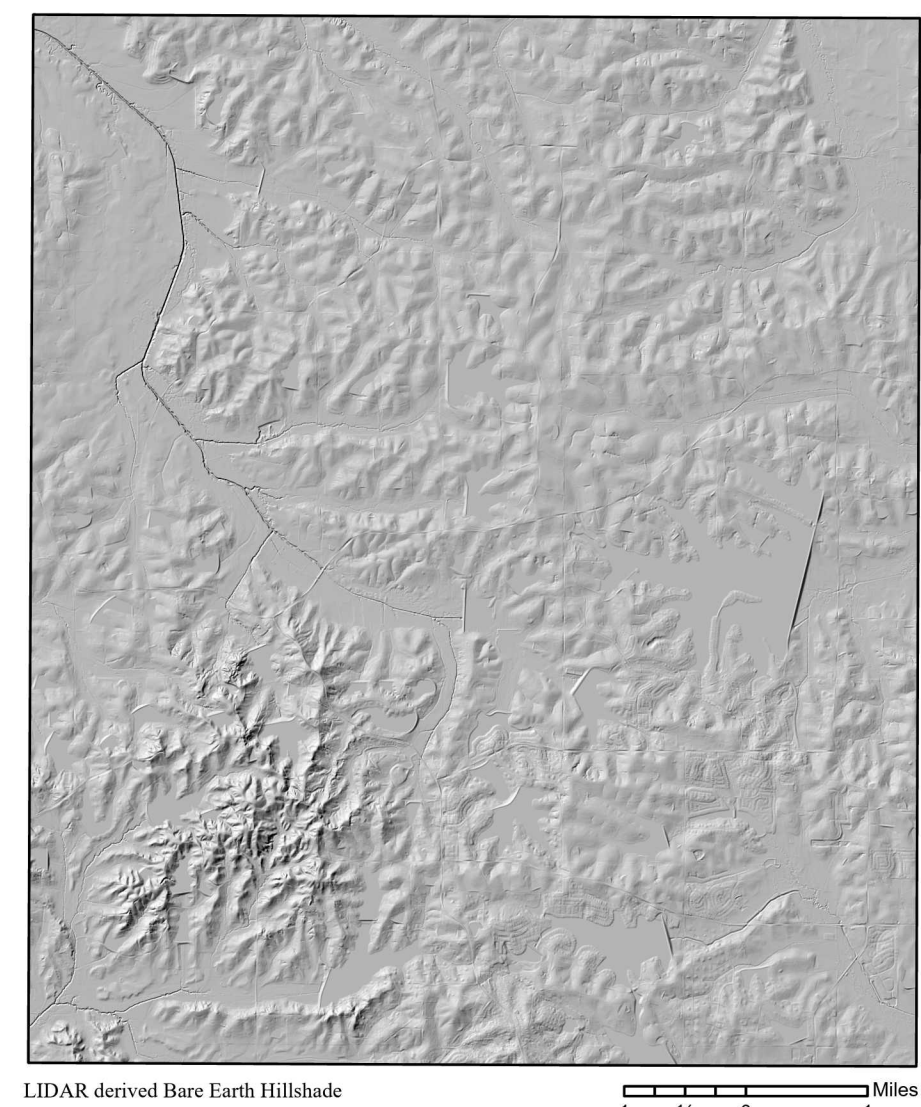
Geology by  
Timothy J. Palmer, RPG, Jonathan R. Leard, PhD, RPG,  
James E. Starnes, RPG, and Natalya S. Usachenko, GIT



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.