

Base Map produced by the Mississippi Geological Survey  
Coordinate System: NAD 1983 UTM Zone 15N  
Projection: Transverse Mercator  
Datum: North American 1983  
Units: Meter  
Declination: World Magnetic Model, December 31, 2019, estimated Magnetic North declination to 7.5-Minute Redwood Quadrangle, (90°48'48.00"W, 32°26'20.04"N), center area is 1.15° west of True North ± 0.35°. Annual rate of declination change is approximately 0.08° west per year.  
Borehole Data sourced from <https://nri.ms.mississippi.edu/>.  
Contours are derived from LIDAR data.  
Borehole data from Mississippi Office of Geology.  
Vicksburg National Military Park Boundary sourced from the National Park Service.

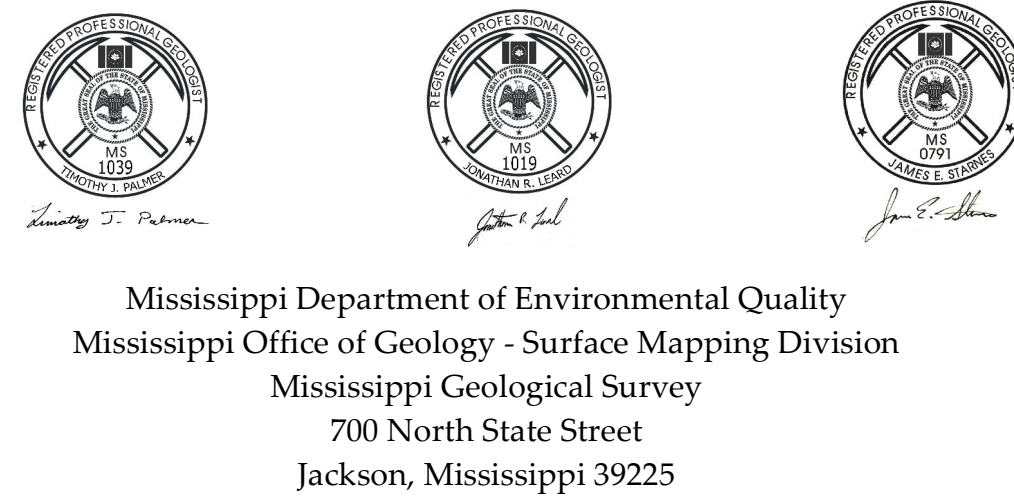
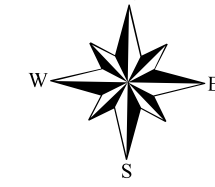
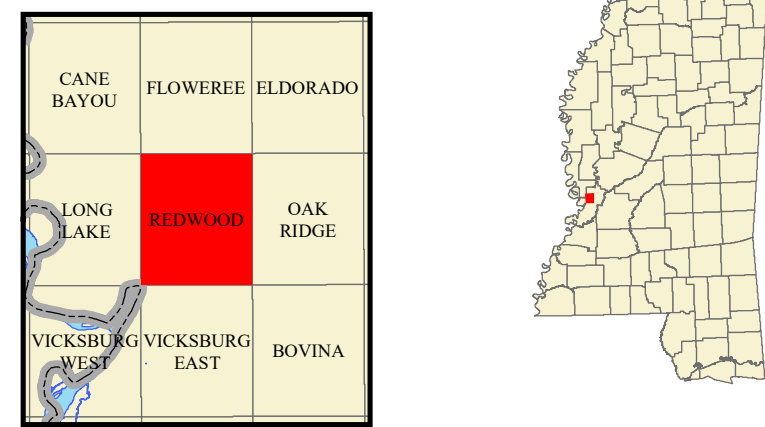
This geologic map was funded by the State of Mississippi and the United States Geological Survey, National Cooperative Geologic Mapping Program. Acknowledgments include: Dr. Darrel Schmitz and Mississippi State University.

## GEOLOGIC MAP of the REDWOOD 7.5-MINUTE QUADRANGLE Warren and Issaquena Counties, Mississippi 2025

Geology by

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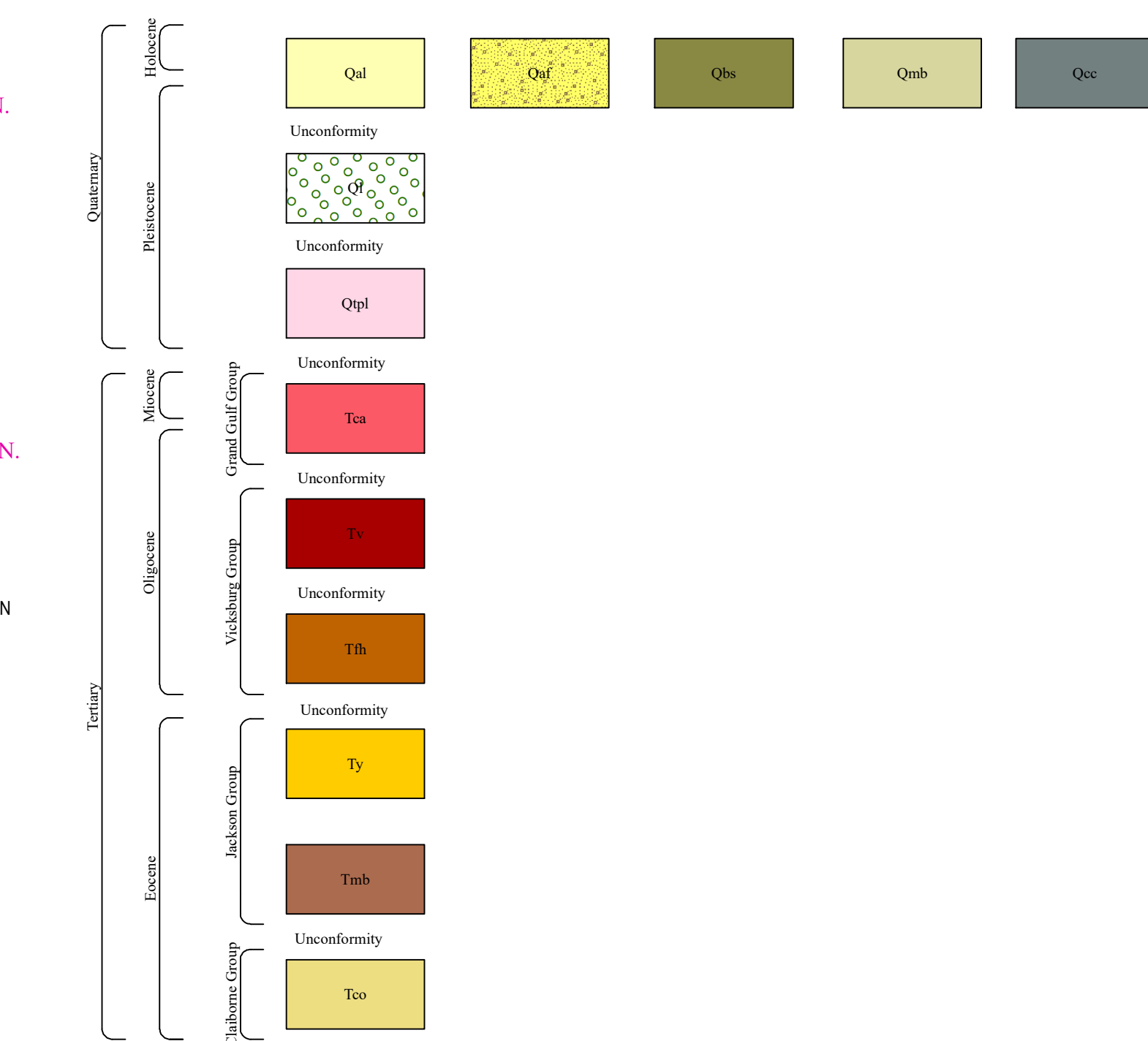
Adjoining 7.5' Quadrangles



Mississippi Department of Environmental Quality  
Mississippi Office of Geology - Surface Mapping Division  
Mississippi Geological Survey  
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### Correlation of Map Units



### Descriptions of Map Units

- Qal (Holocene to Pleistocene)**  
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. Tributaries have narrow alluvial valleys and are deeply incised through the loess terrain. Stream Alluvium thickness is interpreted to be approximately 10 feet. The Mississippi River Alluvium thickness can be greater than 100 feet.
- Qaf (Holocene to Pleistocene)**  
Alternating silt, sand, and gravel. Coarsest at the apex of the fan, fining laterally and radially from the apex of the fan, interfingering with adjacent fans and coalescing with the alluvium of the Mississippi River.
- Qbs (Holocene to Pleistocene)**  
Gray to black, silty to fine sandy clay. Weathers tan to brown with red mottles, caliche common. Grades laterally with adjacent meander systems and alluvial fans. Anastomosing incised drainage features and partially buried abandoned channels at the surface.
- Qmb (Pleistocene)**  
Tan to brown, fine-grained sand, silt, and clay, older soil horizons such as Pearson soil series weathered to distinctive orange color. Surface features are dominated by migrating point bar ridge and swale topography, natural levee deposits, and abandoned course channels. Cut-off channels are mapped separately. In many cases, these features have been reoccupied by younger streams.
- Qcc (Holocene to Pleistocene)**  
Brown to black, silty to lignitic carbonaceous clay. Oxbow lakes and clay plugs of abandoned meander courses.
- Qpl (Pleistocene)**  
Silt, buff to tan, pale yellow, red, gray to gray-green where in anoxic conditions, quartzose to feldspathic. Loess is considered an eolian deposit derived from glacial outwash. Loess is typically calcareous with dolomite and calcite; however, the upper portion of the loess can be deeply weathered, leached / noncalcareous, and has been commonly referred to as "brown loam." Loess deposits unconformably blanket the pre-loess topography with substantial local variations in thickness but generally thickening towards the west. In places, weathered loess contains secondary deposits of small calcareous concretions such as caliche and loess dolls. Loess can be locally and sparingly fossiliferous, commonly containing tests or steinkerns of pulmonate gastropods and less commonly containing fossils of Pleistocene vertebrates.
- Qpl (Pleistocene)**  
Pleistocene ancestral Mississippi River terraces deposited prior to Pleistocene loessification. Sand, yellow, orange, purple, red, pink, fine- to coarse-grained, predominantly quartzose, cross-bedded to massive; graveliferous, pea to large cobble size clasts, boulder size ice-rafted clasts of sandstone and chert. Economically significant gravels are predominantly 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 base of the deposits. The base of this terrace occurs at approximately 220 ft MSL and is masked by about 40 ft of loess overburden.
- Tca (Grand Gulf Group)**  
**Catahoula Formation (Miocene to Oligocene)**  
Delatic sands, silts, and clays; Sand, gray, pale yellow to white, fine- to coarse-grained, cross-bedded to massive, predominantly quartzose with lesser amounts of chert, metaquartzite, mica, and heavy minerals, slightly glauconitic in places with rare thinly-bedded pea gravels. Gravels, black chert and milky quartz, highly polished, immature, subangular to well rounded; Clay, green, gray, brown, kaolinitic, weathers white to brown exhibiting a "popcorn" appearance, silty to sandy, lignite common in basal clays. Often indurates to opaline-cemented sandstones and rarer orthoquartzites where exposed, silicified wood and fossil palm common. Ironstone common where sands overlie clays. The Catahoula Formation unconformably overlies the Bucatunna Formation. Total thickness is not represented on this map.

### Vicksburg Group

**Vicksburg Limestone Undifferentiated (Oligocene)**  
Includes the Bucatunna Formation, Byram Formation, Glendon Limestone, Marianna Limestone, and Mint Spring Formation. The Bucatunna is predominantly dark brown carbonaceous clay with thinly interbedded fine sands. It contains sparse estuarine mollusks towards its base and carbonized palaeobotanical fossil remains are common throughout. The Glendon Limestone is white to grey, commonly indurated to semi-crystalline bioelastic limestone, either massive or with alternating ledges separated by thinly-bedded glauconitic marl. The Glendon Limestone commonly contains solution cavities at or near outcrop. Larger cavities usually form at the contact with the underlying Marianna Limestone. The Marianna Limestone is white to pale-yellow, soft to indurated, glauconitic marl, containing an admixture of fine-grained sands and clays in places. There is an abundance of the large Foraminifera *Lepidocyclina muntzei* in the Marianna Limestone and *Lepidocyclina supera* in the Glendon Limestone and the echinoid *Chpeaster rogersi*. Mint Springs Formation is a fossiliferous, fine-grained quartz marly sand containing the cassidulid echinoid *Rhyncholampus gouldi*. The Vicksburg Limestone unconformably overlies the Forest Hill Formation. Thickness is approximately 150 feet.

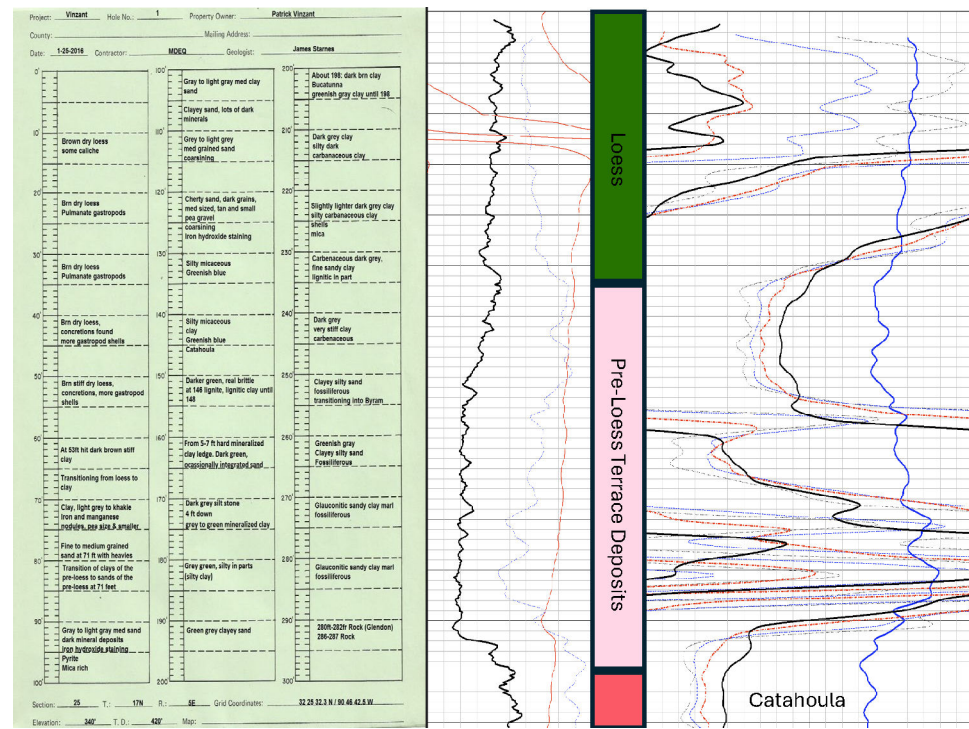
### Cross Section Units Not Exposed at the Surface

- Forest Hill Formation (Oligocene)**  
Delatic sands, silts, and clays. Sand, fine-grained, silty, quartzose; Clay, carbonaceous, laminated, lignite and silicified wood common, including *Palmonylon*. Lignite with palaeobotanical fossil remains common along fissile partings in clays. The Forest Hill Formation unconformably overlies the Yazoo Formation. Total thickness is approximately 120 feet.
- Jackson Group**  
**Yazoo Formation (Eocene)**  
Locally referred to as the Yazoo Clay. Clay, bluish-green to bluish grey, weathers yellowish brown to tan, montmorillonitic, calcareous, silty, locally fossiliferous, locally contains framboidal pyrite. The fossil oyster *Pycnodonte trigonalis* are common throughout along with fossil vertebrate remains of Archæocete whales, sharks and fish. The Yazoo Formation conformably overlies the Moodys Branch Formation. Total thickness is approximately 500 feet.
- Moodys Branch Formation (Eocene)**  
Sandy fossiliferous marl containing an abundance of marine invertebrates, particularly shells of *Glycymeris idones* and *Tenericardia apodensata*. Conformably grades into the overlying Yazoo Formation. Total thickness is approximately 15 feet.
- Cockfield Formation (Eocene)**  
Clay, brown, reddish-brown to grey in color; silty to fine sandy; strongly carbonaceous to lignitic, slightly micaceous, pyritic, carbonized and silicified palaeobotanical fossil remains common. Dominated by delatic sands towards the base. Underlies the Moodys Branch Formation unconformably.

### Field Photographs



Exposure of an escarpment of a slump block between Pleistocene loess and the underlying coarse grained quartz sand and gravel of ancestral Mississippi River Pre-loess Terrace Deposits in an excavation at the Keyes recycling facility on the east side of Washington Street. Section 37, Township 17 North, Range 4 East. Photographed August 24, 2011. Survey Geologist James Starnes for Scale.



Geophysical log and drill notes from test hole F-0053 drilled by the Mississippi Office of Geology in Section 25, Township 17 North, Range 4 East penetrating 48 feet of Pleistocene loess; 74 feet of complete section of the Pleistocene Rawhide Pre-loess Terrace alluvium; 88 feet of Upper Oligocene clay with interbedded sands of the Catahoula Formation.



Carbonized estuarine macroflora preserved along fissile bedding planes in the clays of the Lower Oligocene Bucatunna Formation member of the Vicksburg Group exposed in an excavation at the Keyes recycling facility in Section 37, Township 17 North, Range 4 East.



Fossil mollusk shells and the cherry coral *Archæolites sp.* preserved in the near shore marine sandy marl of the Lower Oligocene Byram Formation member of the Vicksburg Group exposed in an excavation at the Keyes recycling facility in Section 37, Township 17 North, Range 4 East.



Sandstone boulder erratic in an exposure of Pleistocene ancestral Mississippi River Pre-loess Terrace Deposits consisting of coarse grained quartz sand with chert pebbles and interbedded clay in an excavation at the Keyes recycling facility on Washington Street in Section 37, Township 17 North, Range 4 East.



Exposure of an escarpment of slump block between Pleistocene loess and the underlying coarse grained quartz sand and gravel of ancestral Mississippi River Pre-loess Terrace Deposits in an excavation at the Keyes recycling facility on Washington Street. Section 37, Township 17 North, Range 4 East. Survey Geologist James Starnes for Scale.



Articulated fossil mollusk shell of *Penoplia oblongata* - preserved in living position in the near shore marine sandy marl of the Lower Oligocene Byram Formation member of the Vicksburg Group exposed in an excavation at the Keyes recycling facility in Section 37, Township 17 North, Range 4 East.



Jointing in an indurated ledge of the Byram Marl member of the Vicksburg Group above a waterfall along Skilkalia Bayou near Redwood, MS. Photo taken in Section 2, Township 17 North, Range 4 East.



Sandstone boulder erratic in an exposure of Pleistocene ancestral Mississippi River Pre-loess Terrace Deposits consisting of coarse grained quartz sand with chert pebbles and interbedded clay in an excavation at the Keyes recycling facility on Washington Street in Section 37, Township 17 North, Range 4 East.



Tilted bedding in interbedded carbonaceous clays and fine sand in the toe of the escarpment of the of a slump block in the Lower Oligocene Bucatunna Formation member of the Vicksburg Group exposed in an excavation at the Keyes recycling facility on Washington Street in Section 37, Township 17 North, Range 4 East.



A specimen of the large fossil gastropod *Turbinella wilsoni* from the Lower Oligocene Byram Formation member of the Vicksburg Group collected April 7, 2013 in an excavation at the Keyes recycling facility in Section 37, Township 17 North, Range 4 East.



Waterfall over the Byram Marl member of the Vicksburg Group in a series of waterfalls along Skilkalia Bayou near Redwood, MS. Photo taken in Section 2, Township 17 North, Range 4 East.

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

