



MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY  
OFFICE OF GEOLOGY  
OPEN-FILE REPORT 106

**GEOLOGIC MAP**  
of the  
**OLIVE BRANCH QUADRANGLE**  
DeSoto County, Mississippi,  
and  
Shelby County, Tennessee

Geology by David E. Thompson, RPG, and D. Kenneth Davis



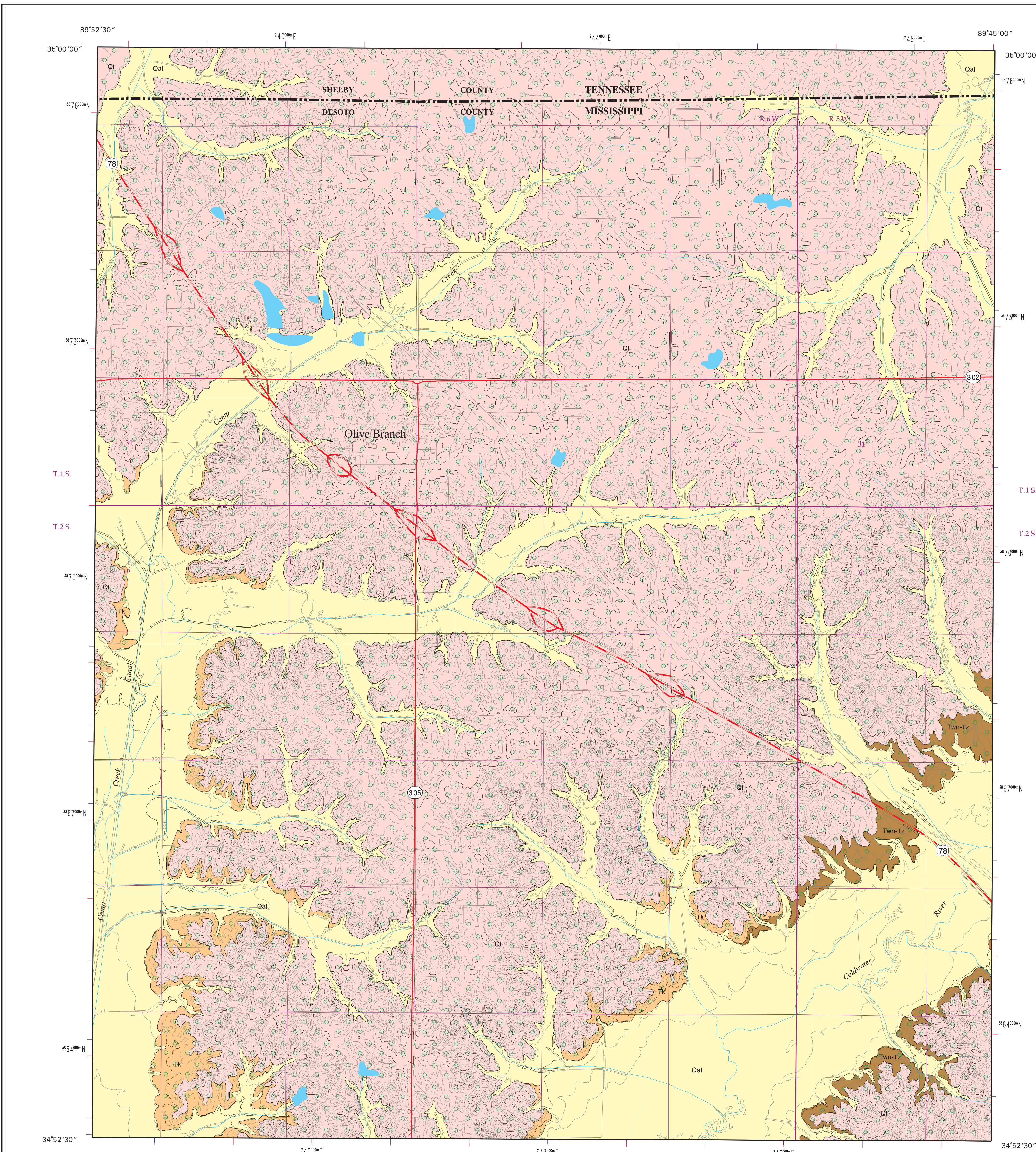
2003

**DESCRIPTION OF MAP UNITS**

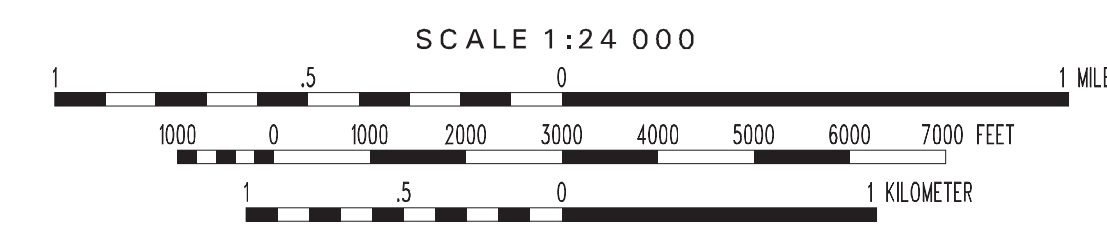
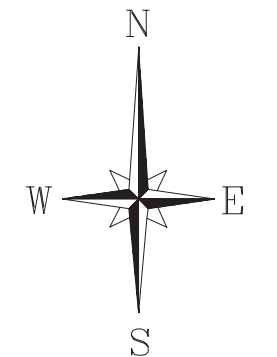
QUATERNARY	HOLOCENE	ALLUVIUM	Qal	Sand, flood plain sands, silts, and gravels.
	PLEISTOCENE	LOESS	Qt	Silt, buff to tan, pale yellow, red, or gray, sandy to clayey, quartzose, feldspathic. Unweathered loess is typically calcareous with dolomite and calcite; however, the upper portion of the loess is highly weathered, leached/noncalcareous, very clayey, and has been referred to as a brown or yellow loam. Loess is an eolian deposit derived from glacial outwash. Loess deposits blanket the pre-loess topography of the quadrangle area, with greater quantities developed along ridge crests than in valleys, creating substantial local variation in thickness. The thickness in the quadrangle is estimated at 7 to 15 feet. In places, weathered loess contains secondary deposits of small calcareous concretions (caliche, loess dolls). The basal few feet of loess grade into the sands and gravels of the underlying Pre-Loess Terrace Deposits.
TERTIARY	Eocene CLAIBORNE GROUP	PRE-LOESS TERRACE DEPOSITS	Tk	Sand, dark red, reddish orange, pink, bright yellowish brown, brown, and occasionally white, fine- to very coarse-grained, predominantly quartzose, locally micaceous, poorly sorted and massive to well sorted and cross-bedded; typically graveliferous with quartz and chert pebbles, especially at base. Commonly exhibits clay clast conglomerate with purplish red to white, kaolinitic, rip-up clasts. Locally interbedded with clay, light gray to purplish red to white, kaolinitic, plastic. Locally contains irregular layers of hematitic to limonitic sandstone. Unconformity at base, with an irregular, undulating surface. Roughly corresponds to the Lafayette Formation, Brown (1907); the Citronelle Formation, Priddy (1942); the Bentley Terrace, Fisk et al. (1949); and the Upland Complex, Saucier (1994). The thickness in the quadrangle is estimated at a few feet up to 80 feet. May be considered a recharge area for the Memphis Sand Aquifer where Pre-Loess Terrace sands and gravels overlie Tertiary aquifer sands.
		KOSCIUSKO FORMATION	Twn-Tz	Sand, gray to light olive gray, weathers reddish orange to pale yellowish brown, very fine- to very coarse-grained, quartzose, micaceous; interbedded to interlaminated with silt and clay, light olive gray to brownish gray, carbonaceous to lignitic. Especially argillaceous in upper third of the formation. Unconformity at base. The thickness is estimated to be 300 feet; however, only the lower 250 feet or so are exposed in the quadrangle. Constitutes the upper portion of the Memphis Sand Aquifer.
		ZILPHA and WINONA FORMATIONS	Twn-Tz	Zilpha - Clay, gray to brownish black, weathers light gray to reddish pink to white, massive and homogeneous or interbedded to interlaminated with silt and sand, gray to light olive gray, quartzose, micaceous, carbonaceous, locally glauconitic; lignite. The thickness is variable from a few feet to 60 feet.  Winona - Sand, gray to greenish gray, weathers very light gray to reddish orange, quartzose, micaceous, glauconitic, carbonaceous, silty. Approximately 60 feet thick.  The total thickness of the Zilpha/Winona interval is approximately 120 feet; however, only the upper 70 feet or so are exposed in the southeastern portion of the quadrangle. Sandy horizons of the interval constitute a portion of the Memphis Sand Aquifer.

References Cited  
Brown, C. S., 1907. The lignite of Mississippi. Mississippi State Geological Survey, Bulletin 3, p. 38-76.  
Fisk, H. N., et al., 1949. Geological investigation of gravel deposits in the lower Mississippi Valley and adjacent uplands. Mississippi River Commission, U.S. Army Corps of Engineers, Waterways Experiment Station, Tech. Memoir 3-273, 58 p.  
Priddy, R. P., 1942. Tallahatchie County mineral resources. Mississippi State Geological Survey, Bulletin 50, p. 42-45.  
Saucier, R. T., 1994. Geomorphology and Quaternary geologic history of the lower Mississippi Valley. U.S. Army Corps of Engineers, Waterways Experiment Station, v. 1, p. 169-190, 214-218.

Geology field checked in 2001 using the 1982 provisional edition U.S. Geological Survey 7.5-minute topographic quadrangle, 1927 North American datum, contour interval 10 feet, supplementary contour interval 5 feet.  
Mississippi Transverse Mercator projection, 1983 North American datum, GR580 spheroid, 1000-meter Universal Transverse Mercator grid ticks, zone 16; 1983 datum shown in red, 1927 datum shown in blue.  
Sources: Road and water features, USGS Digital Line Graph data, 1:100,000 scale. Public Land Survey System and contours, Mississippi Automated Resource Information System (MARIS), 1:24,000 scale.  
Geographic Information System by Daniel W. Morse.  
This map was produced by the Mississippi Office of Geology in cooperation with the U.S. Geological Survey, National Geologic Mapping Program, under STATEMAP grant #00HQAG0053.



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