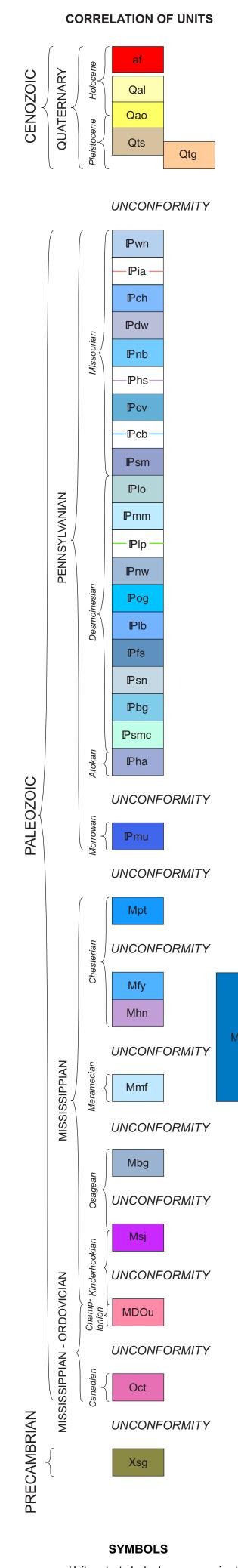


UTM GRID AND 1990 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

GEOLOGIC MAP OF THE TULSA 30X60-MINUTE QUADRANGLE, CHEROKEE, DELAWARE, MAYES, ROGERS, TULSA, WAGONER, AND WASHINGTON COUNTIES, OKLAHOMA

1 0 1 2 3 4 5 6 7 8 9 10 KILOMETERS CONTOUR INTERVAL 10 METERS

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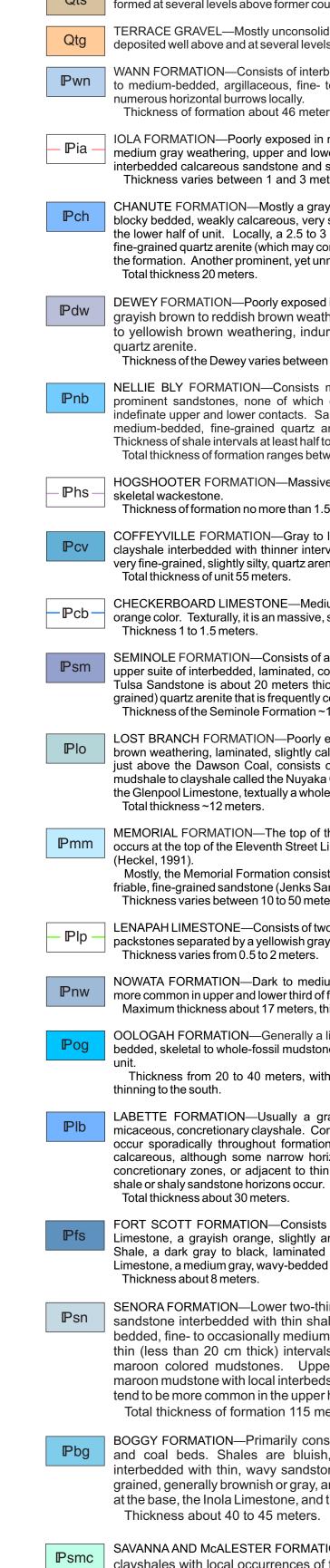


Fault; dotted where concealed; bar and ball on downthrown side × Outcrop; geologic observation

_____ Strike and dip of beds

Horizontal bed

| 03° | 102° | 101° | 100° 9 | 99° 9 | 98° 9 | 9° 9 | 6° 9 | 5° | ₇ 3' |
|------------|--------|--------|-------------------|---------------|------------------------|-----------------------------|--------------|--------------|-----------------|
| Boise City | Guymon | Beaver | Buffalo | Alva | Ponca City | Pawhuska | Bartlesville | Neosho | |
| | | | Woodward | Fairview | Enid | Keystone Lake | Tulsa | Fayetteville | 3 |
| | | | Foss Reservoir | Watonga | Oklahoma City North | Bristow | Muskogee | Stilwell | |
| | | | Elk City | Anadarko | Oklahoma City South | Shawnee | Eufaula | Fort Smith | |
| | | | Altus | Lawton | Pauls Valley | Ada | McAlester | Mena | |
| | | | Vernon | | Ardmore | Tishomingo | Antlers | De Queen | ı |
| | | | | Wichita Falls | Gainesville | Sherman | Paris | Idabel | |
| | | | | | | ne locations uadrangle r | | | |



Oklahoma Geologic Quadrangle OGQ-107 Geologic Map of the Tulsa 30X60-Minute Quadrangle

DESCRIPTION OF UNITS

RTIFICIAL FILL—Natural or artificial talus, slumps, and tailings covering formally exposed areas. Most deposits of this type found around man-made earthen dams and large-scale land-fills.

ALLUVIUM—Clay, silt, sand, and some gravel composed of locally derived, unconsolidated sediment Qal deposited in channels and on flood plains of modern rivers and streams.

OLDER ALLUVIUM—Clay, silt, sand, and some gravel composed of locally derived, unconsolidated sediment located between 1.5 to 6 meters above, and adjacent to, modern flood plains and alluvial vallevs.

TERRACE SAND—Mostly unconsolidated sand and silt, with little clay- or gravel-sized material. Unit Qts formed at several levels above former courses of present-day rivers and streams.

TERRACE GRAVEL—Mostly unconsolidated gravel and sand, with minor silt- and clay-sized material; Qtg deposited well above and at several levels along the former courses of modern rivers and streams.

WANN FORMATION—Consists of interbedded red to reddish-brown weathering mudstones and thin-Pwn to medium-bedded, argillaceous, fine- to medium-grained quartz arenites. Sandstones may have numerous horizontal burrows locally. Thickness of formation about 46 meters, top not exposed in quad.

IOLA FORMATION—Poorly exposed in map area. Where observed, it is represented by a tan to Pia medium gray weathering, upper and lower sandy limestone units that, separated by an interval of interbedded calcareous sandstone and shale. Thickness varies between 1 and 3 meters

> CHANUTE FORMATION—Mostly a grayish-orange to pale yellowish-brown weathering, laminated to plocky bedded, weakly calcareous, very silty clayshale to mudshale. Shale tends to be more sandy in the lower half of unit. Locally, a 2.5 to 3 meter thick, indurated, laminated to thin-bedded, fine to very fine-grained quartz arenite (which may correlate to the Cottage Grove Sandstone) occurs near the top of the formation. Another prominent, yet unnamed, sandstone occurs at the base of the formation.

Total thickness 20 meters. DEWEY FORMATION—Poorly exposed in map area. Where observed, unit consists of an upper grayish brown to reddish brown weathering, calcareous clayshale, and a lower, reddish brown to yellowish brown weathering, indurated to moderately indurated, calcareous, fine-grained quartz arenite.

Thickness of the Dewey varies between 0 to 10 meters thick.

Total thickness of unit 55 meters.

NELLIE BLY FORMATION—Consists mostly of clayshale and mudstone interbedded with some prominent sandstones, none of which can be easily separated into mappable units due to their indefinate upper and lower contacts. Sandstones typically indurated to moderately indurated, fine- to medium-bedded, fine-grained quartz arenites that vary in thickness between 6 and 25 meters. Thickness of shale intervals at least half to a quarter of that observed for the sandstone intervals. Total thickness of formation ranges between 20 to 30 meters.

HOGSHOOTER FORMATION—Massive, red to reddish-brown weathering, whole fossil mudstone to Phs keletal wackestone. Thickness of formation no more than 1.5 meters.

COFFEYVILLE FORMATION—Gray to light brown weathering, well-laminated to fissile, slightly silty clayshale interbedded with thinner intervals of brown to yellow-brown weathering, indurated, fine- to very fine-grained, slightly silty, quartz arenites.

CHECKERBOARD LIMESTONE—Medium gray when fresh, but weathers to a distinct dark yellowishorange color. Texturally, it is an massive, skeletal to whole-fossil carbonate mudstone to wackestone.

Thickness 1 to 1.5 meters. SEMINOLE FORMATION—Consists of a lower sandstone interval, called the Tulsa Sandstone, and an

upper suite of interbedded, laminated, concretionary, silty clayshales, mudshales, and siltstones. The Tulsa Sandstone is about 20 meters thick, yellowish-brown, fine- to medium-grained (locally coarsegrained) quartz arenite that is frequently conglomeratic. Thickness of the Seminole Formation ~15 to 20 meters.

LOST BRANCH FORMATION—Poorly exposed, except for the Glenpool Limestone. Overall, a light Plo brown weathering, laminated, slightly calcareous, micaceous, silty clayshale. Basal 3 ft of formation, just above the Dawson Coal, consists of a medium dark gray, well-laminated to fissile, phosphatic mudshale to clayshale called the Nuyaka Creek shale bed. The top of the formation is marked at the top the Glenpool Limestone, textually a whole-fossil mudstone to skeletal wackestone. Total thickness ~12 meters.

MEMORIAL FORMATION—The top of the formation is represented by the Dawson Coal. The base Pmm occurs at the top of the Eleventh Street Limestone, which roughly correlates to the Lenepah Limestone (Heckel, 1991). Mostly, the Memorial Formation consists of interbedded sandy, weakly calcareous mudstones, and a

friable, fine-grained sandstone (Jenks Sandstone) that occurs in the middle of the formation. Thickness varies between 10 to 50 meters.

LENAPAH LIMESTONE—Consists of two dark yellowish brown, skeletal to whole fossil wackestones to Plp packstones separated by a yellowish gray clayshale interval.

NOWATA FORMATION—Dark to medium gray, slightly silty concretionary clayshale. Concretions more common in upper and lower third of formation, Formation poorly exposed throughout map area. Maximum thickness about 17 meters, thinning to as little as 5 meters in northern half of quad.

OOLOGAH FORMATION—Generally a light to medium gray, thin- to medium- (locally massive), wavy bedded, skeletal to whole-fossil mudstone to wackestone with local packstone textures in upper half of

Thickness from 20 to 40 meters, with maxiumum thickness in the northern half of the map area, thinning to the south.

LABETTE FORMATION—Usually a grayish brown to dark gray, laminated, very silty to sandy, micaceous, concretionary clayshale. Concretions composed of hematite and/or siderite(?), and usually occur sporadically throughout formation as 1-3" diameter discoid-shaped clasts. Clayshale noncalcareous, although some narrow horizons are weakly calcareous (particularly those adjacent to concretionary zones, or adjacent to thin limestone beds). Locally, various non-descript very sandy shale or shaly sandstone horizons occur. Total thickness about 30 meters.

FORT SCOTT FORMATION—Consists of three members in descending order: 1) the Higginsville Limestone, a grayish orange, slightly argillaceous cherty carbonate mudstone; 2) the Little Osage Shale, a dark gray to black, laminated to fissle phosphatic clayshale; and 3) the Blackjack Creek Limestone, a medium gray, wavy-bedded whole-fossil wackestone to mudstone. Thickness about 8 meters.

SENORA FORMATION—Lower two-thirds of formation is a light to moderate brown weathering sandstone interbedded with thin shale intervals. Sandstones are typically thin- to mediumbedded, fine- to occasionally medium-grained, argillaceous, quartz arenites. Shales occur in thin (less than 20 cm thick) intervals within sandstones, and are consistently light gray to maroon colored mudstones. Upper third of formation predominantly a brownish-red to maroon mudstone with local interbeds of fine- to very fine-grained quartz arenite. Sandstones tend to be more common in the upper half of this interval. Total thickness of formation 115 meters.

BOGGY FORMATION—Primarily consists of shale and sandstone, with some thin limestone and coal beds. Shales are bluish, fissile clayshales containing ironstone concretions interbedded with thin, wavy sandstone plates and shaley sandstone. Sandstones are finegrained, generally brownish or gray, and ferruginous. Members include Bluejacket Sandstone at the base, the Inola Limestone, and the Taft Sandstone at the top.

Thickness about 40 to 45 meters.

SAVANNA AND McALESTER FORMATIONS undifferentiated—Brown to gravish-brown clayshales with local occurrences of fine-grained, argillaceous sandstones and thin coal seams. Sandstones more common in upper half of package, while coals are more common in lower half. The Warner Sandstone, a weakly indurated fine-grained quartz arenite traditionally occurs at the base of the McAlester interval.

Thickness ranges between 40 to 60 meters, with thicker parts of the section more common in southern half of the quad.

HARTSHORN AND ATOKA FORMATIONS undifferentiated—A sequence of dark gray, well laminated to fissile, siderite-bearing concretionary clayshales interbedded with medium- to coarsegrained sandstones. A few thin-bedded limestones occur locally in the lower half of the interval. Coal and sandstones tend to be concentrated in upper half of sequence. Thickness varies from less than 5 to as much as 200 meters.

| Pmu | MORROWAN undifferentiated—Interval includes, in descending order: the Bloyd and Hale Formations. The Bloyd is a medium blue gray, thin bedded fossiliferous limestones interbedded with dark gray fissile, fossiliferous clayshales. The Hale consists of a medium gray, medium- to thick- (locally massive) bedded, argillaceous and fossiliferous limestone, which becomes increasingly sandy toward the base of interval. Tear-pants weathering very distinct. A thin conglomerate may occur locally at base. Thickness of interval varies wildly, from 0 to 105 meters, due to post-Morrowan erosion across the northern half of the quad. |
|------|--|
| Mpt | PITKIN LIMESTONE—Consists of a gray to blueish gray, thin-bedded, whole-fossil to skeletal wackestones and packstones; oolitic and skeletal grainstones occur locally. Dark gray fissile clayshale partings common in lower part of formation. As with the overlying Morrowan units, the Pitkin varies in thickness from 0 to 25 meters, due to post-Mississippian erosion in the northern part of the map area. |
| Mfy | FAYETTEVILLE SHALE—Mostly a black to dark gray, well-laminated to fissile, fossiliferous and calcareous clayshale. Interbeds of medium gray, laminated, whole fossil carbonate mudstones common throughout. Large septarian concretions may occur in the lower two-thirds of formation. Thickness ranges from 5 to 56 meters. |
| Mhn | HINDSVILLE FORMATION—Medium gray, thin- to medium-bedded, locally massive, skeletal packstones and grainstones. Oolitic cross-bedded grainstones common in middle third of formation. Thickness from 10 to 15 meters. |
| Mmf | MOOREFIELD FORMATION—Upper half of unit consists of medium to dark gray, thin, planar bedded, whole-fossil carbonate mudstones; minor chert nodules occur locally along base of interval. The lower half is a light gray, thin- to medium-cross-bedded, medium-crystalline limestone; oolitic textures locally. Chert conglomerates common near lower contact with the Boone Group. Thickness of unit ranges from 0 to as much as 30 meters. |
| Mun | MISSISSIPPIAN undifferentiated—Isolated outcrops occur along the Mayes-Deleware County line just south of Rose, Oklahoma, consisting of all, or parts of the Fayetteville Shale, Hindsville Formation, and Moorefield Formation. Thickness about 10 to 15 meters. |
| Mbg | BOONE GROUP—Where original depositional texture is preserved, the upper part (sometimes mapped as the Keokuk Limestone in older reports) is a light gray, thick-bedded to massive, fine-crystalline limestone to a skeletal mudstone; tripolitic weatherd chert nodules common throughout. The lower part of unit (mapped as the Reeds Spring Formation in older reports) is a light gray, thin- to medium bedded, fine-crystalline limestone with bedded chert. Thickness varies from 55 to 75 meters. |
| Msj | ST. JOE LIMESTONE—Consists of a light gray, fine- to medium-crystalline limestone with an olive green, calcareous clayshale interval in the middle. Limestones tend to weather into a distinct nodular texture. Thickness a uniform 8 meters; shown slightly thicker on map for representation. |
| MDOu | MISSISSIPPIAN-DEVONIAN, ORDOVICIAN undifferentiated—In the Tulsa sheet, unit mostly represented by the Mississippian-Devonian Chattanooga Shale, a dark gray to black, well-laminated to fissile, fossiliferous clayshale. Exposures around Spavinaw Lake may also include the Ordovician Tyner Formation, a green sandy claystone with sandy dolomite interbeds overlying the Burgen Formation a buff to vellow brown friable fine- to medium-grained quartz arenite |

Formation, a buff to yellow brown, friable, fine- to medium-grained quartz arenite. Where exposed, thickness no more than 30 meters, averaging closer to 10 meters. COTTER FORMATION—Light gray, thick-bedded, fine-crystalline dolostone. Thickness ~ 25 meters, base not exposed.

SPAVINAW GRANITE-Red, coarse-grained granite, with orthoclase being the main mineral omponent; quartz crystals are present but near microscopic. Small, isolated exposures occur just west of the Spavinaw dam. Thickness unknown.

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