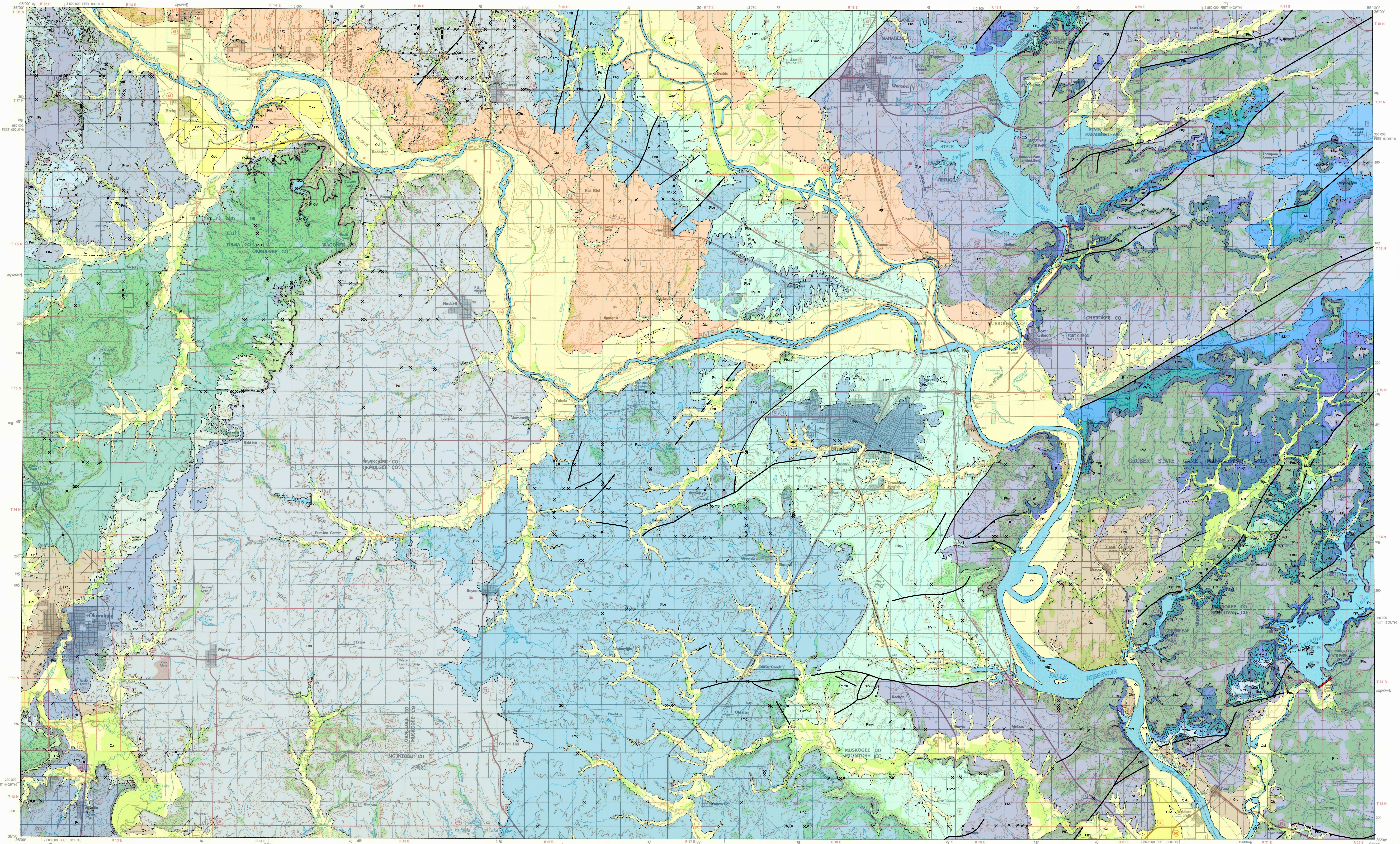
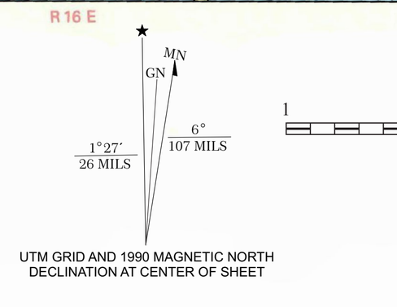
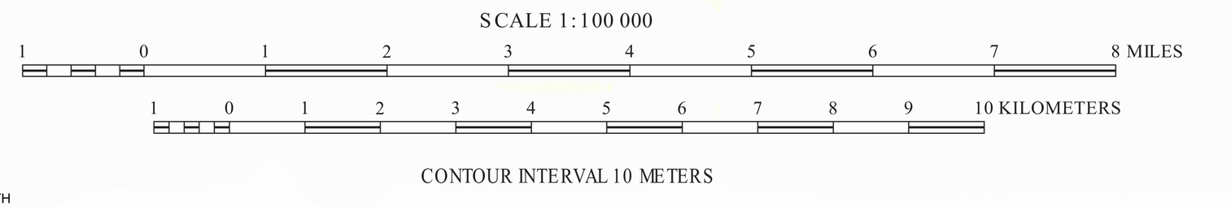
OKLAHOMA GEOLOGICAL SURVEY
Nicholas Hayman, *Director*

Oklahoma Geologic Quadrangle OGQ-103
Geologic Map of the Muskogee 30X60-Minute Quadrangle



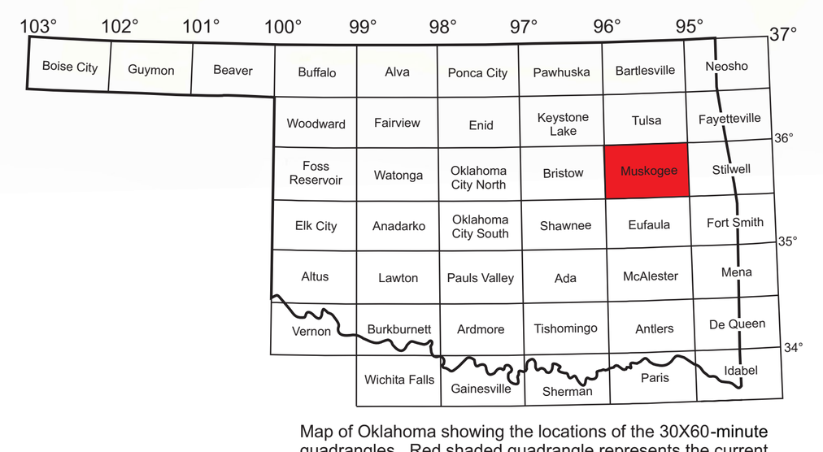




Produced by the Oklahoma Geological Survey. Geology by Calra M. Eichler, Carter Lewis, and Thomas M. Stanley, 2023-2024. Base map from USGS topographic map of the Muskogee quadrangle, dated 1978. Universal Transverse Mercator projection, zone 15. 1927 North American Datum. Research supported by the USGS, National Cooperative Geologic Mapping Program, under G22AC00581. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. Cartography prepared Thomas M. Stanley and G. Russell Standridge, 2024.

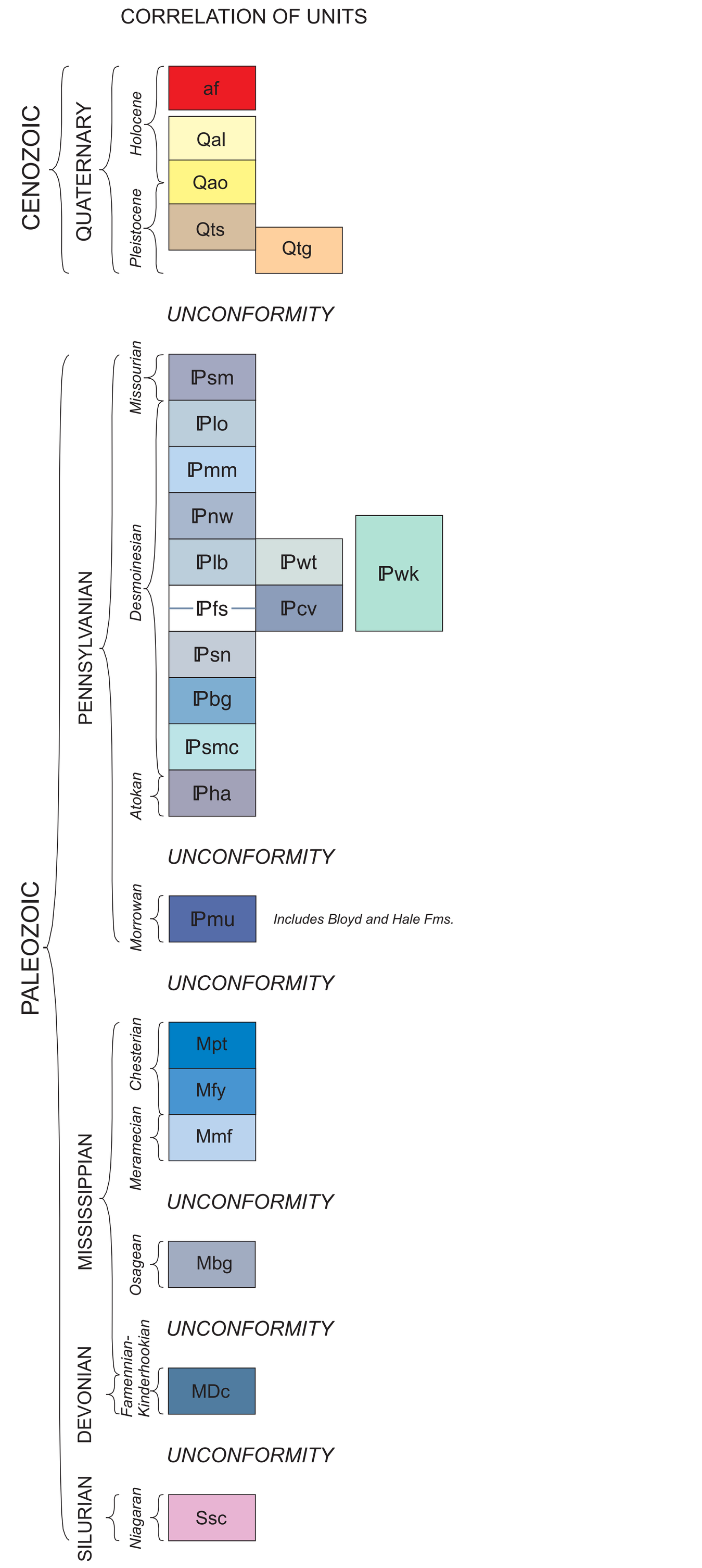
GEOLOGIC MAP OF THE MUSKOGEE 30X60-MINUTE QUADRANGLE, CHEROKEE, CREEK, MCINTOSH, MUSKOGEE, OKMULGEE, SEQUOYAH, TULSA, AND WAGONER COUNTIES, OKLAHOMA

Carla M. Eichler, Carter Lewis, and Thomas M. Stanley
2024



Map of Oklahoma showing the locations of the 30X60-minute quadrangles. Red shaded quadrangle represents the current map.

CORRELATION OF UNITS



DESCRIPTION OF UNITS

af ARTIFICIAL 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

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

Qao 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 valleys.

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

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

IPsm 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 5 meters thick, yellowish-brown, fine- to medium-grained (locally coarse-grained) quartz arenite that is frequently conglomeratic.
Thickness of the Seminole Formation ~15 to 20 meters.

IPlo LOST BRANCH FORMATION — Poorly exposed, except for the Glenpool Limestone. Overall, a light brown weathering, laminated, slightly calcareous, micaceous, silty clayshale. Basal 1 meter 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.

IPmm MEMORIAL FORMATION — The top of the formation is represented by the Dawson Coal. The base 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

IPnw NOWATA SHALE — In the Muskogee sheet, the Nowata Shale is primarily a grayish green to yellow-brown weathering, locally fossiliferous, slightly silty claystone to clayshale interbedded with thin intervals of fine- to very fine-grained quartz arenite and thin beds of whole-fossil carbonate mudstone. Mudstones more common in the middle of the unit.
Only the basal 25 meters exposed in quad.

IPwk WEWOKA FORMATION — Consists of alternating intervals of shale and sandstone in approximate equal numbers. Sandstones tend to be weakly indurated, yellowish-brown to reddish-brown weathering, fine-grained, argillaceous quartz arenites. A prominent sandstone interval forming distinct cuestas and escarpments (compared to the flat featureless planes formed on the Wetumka Shale) occurs at the top of the formation, and is correlatable to the Jenks Sandstone of the Memorial Formation to the north. Shales are slightly calcareous clayshales and mudshales that are highly fossiliferous locally,
Thickness ranges between 120-230 meters.

IPwt WETUMKA SHALE — Consists of grayish-yellow to yellow-brown weathering, slightly silty clayshale; very thin beds of friable, argilaceous quartz arenite occur locally in the middle and base of unit.
Thickness 0 to no more than 6 meters.

IPlb LABETTE SHALE — Lithostratigraphically and texturally similar to the Wetumka Shale. Where the Fort Scott Formation is present, the Labette is the main shale interval that extends to the north from the Arkansas River. Where the Fort Scott pinches out south of the Arkansas River, the Labette interval becomes the Wetumka Shale.

IPfs FORT SCOTT FORMATION — Consists of a thin bed of skeletal mudstone called the Blackjack Creek Member resting conformably below a well-laminated phosphatic shale called the Little Osage Member. Where the Blackjack Creek pinches out south of the Arkansas River, the Little Osage becomes stratigraphically into the Labette/Wetumka sequence.
Thickness 0 to no more than 1 meter.

IPcv CALVIN SANDSTONE — Regionlly, composed of three, informal memebers, but only the upper sandstone member is exposed in mapping area. Here, the sandstone is a brown weathering, moderate to weakly indurated, fine-grained quartz arenite.
Thickness varies from 12 to 135 meters.

IPsn 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 medium-bedded, 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 varies from 150-245 meters.

IPbg 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 and shaley sandstone. Sandstones are fine-grained, generally brownish or gray, and ferruginous. Members include Bluejacket Sandstone at the base, the Inola Limestone, and locally the Taft Sandstone at the top.
Thickness about 250 meters.

IPsmc SAVANNA AND McALESTER FORMATIONS undifferentiated — Brown to grayish-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 350 to 400 meters.

IPha HARTSHORN AND ATOKA FORMATIONS undifferentiated — A sequence of dark gray, well laminated to fissile, siderite-bearing concretionary clayshales interbedded with medium- to coarse-grained 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 about 200 meters

IPmu 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 ranges from 15-110 meters.

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 0 to 56 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 about 30 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 about 130 meters.

MDc CHATTANOOGA SHALE — Dark gray to black, well laminated to fissile, fossiliferous, slightly silty clayshale.
Thickness no more than 30 meters.

Ssc ST. CLAIR FORMATION — Pale red to very ligh gray, coarsely crystalline, slightly dolomitic limestone.
Thickness no more than 5 meters.

SYMBOLS

- Unit contact; dashed were approximate
- Fault; dashed where concealed; bar and ball on downthrown side
- × Outcrop; geologic observation
- Change in stratigraphic nomenclature

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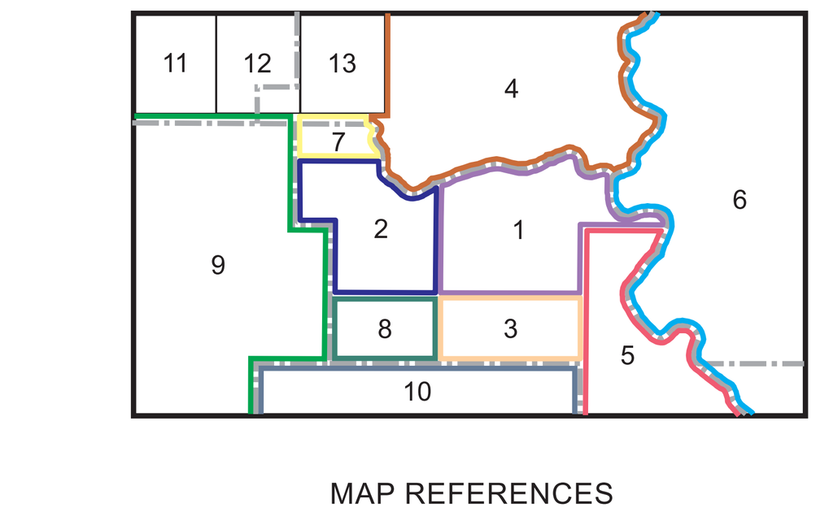

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