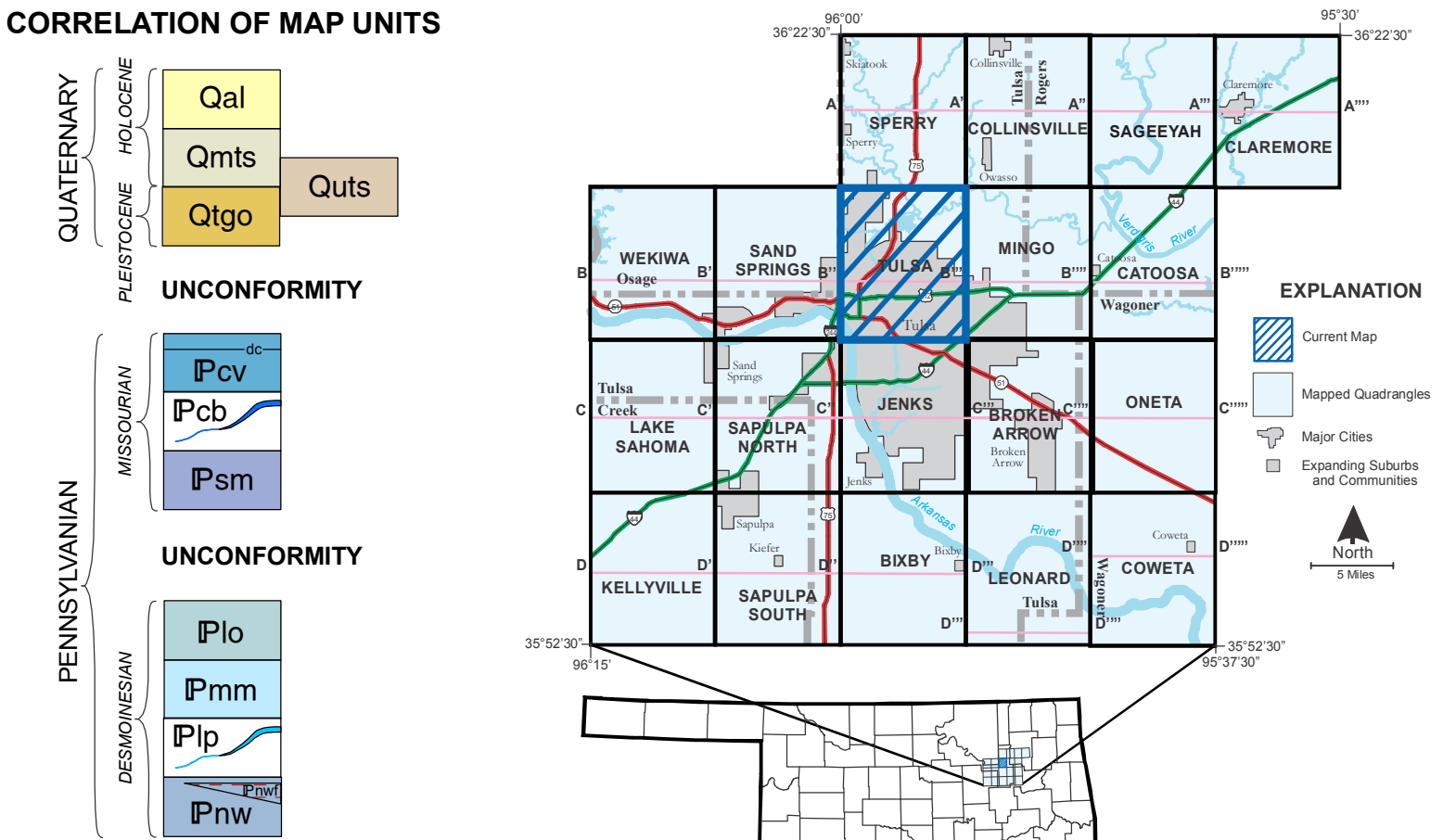




Oklahoma Geologic Quadrangle OGQ-87
Geologic Map of the Tulsa 7.5' Quadrangle



DESCRIPTON OF UNITS*

Qal	ALLUVIUM (Holocene)—Clay, silt, sand, and gravel in channels and on flood plains of modern streams. Includes terrace deposits of similar composition located directly above and adjacent to modern channels and flood plains. Thickness: 0 to about 30 ft.
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Qmts	<p>MIDDLE TERRACE SANDS (Holocene)—Unconsolidated unit composed of locally and distally(?) derived sediment; consisting exclusively of fine- to medium-grained quartz sand, clay, and some silt. Top of unit is about 40 ft to 60 ft above modern flood plain deposits; area rarely subject to flooding. Thickness: 0 ft to over 60 ft.</p>
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Quts UPPER TERRACE SANDS (Holocene / Pleistocene(?))—Unconsolidated unit composed of locally and distally derived sediment; consisting of fine- to medium-grained quartz sand, clay, silt, and with a lag conglomerate locally at base. Base of unit is anywhere between 50 ft to 150 ft above modern flood plains. Thickness: 0 ft to at least 40 ft.

Qtzgo	<p>REMNANTS OF OLDER TERRACE DEPOSITS (Pleistocene)—Clay, silt, sand, and gravel adjacent to the flood plain of the Arkansas River. Sand commonly is medium- to rarely coarse-grained and very light colored; when present, gravel locally consists of concentrations of local and distally derived subrounded pebble and cobble-sized clasts of limestone and dolomite composition. The upper third to half of the deposit exhibits signs of aeolian reworking and modification, suggesting a prevailing northeast wind direction throughout the Holocene. Thickness: 0 ft to as much as 140 ft.</p>
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Pcv COFFEYVILLE FORMATION (Pennsylvanian, Missourian)—Formation composed of a number of sandstone and shale intervals, the most prominent being the Dodds Creek Sandstone situated in the upper part of the unit. In ascending order these informal intervals include:


medium dark gray (N4), phosphatic clay shale; this dark gray shale grades upward into a wavy laminated, grayish orange (10YR7/4) to yellowish gray (5Y7/2), slightly silty, non-calcareous clay shale, with interlamination of very fine-grained sandstone and some siltstone. Overall, this first shale interval varies between 15 ft to 30 ft thick, averaging about 21 ft thick.

Next is a 5-10 ft interval of moderate greenish yellow (10Y7/4) to dusky yellow (5Y6/4), weakly indurated, thin-bedded, slightly siliceous, very fine-grained sandstone; parting lineations and ripplemarked bedding surfaces common.

This is followed by a thick section (about 47 ft thick) of interbedded shale and sandstone, with shale as dominant lithology. Shales are pale yellowish orange (10YR8/6) to grayish orange (10YR7/4), friable, laminated, slightly silty and micaceous, non-calcareous clayshale, which becomes weakly indurated and well-laminated in the upper 10-13 ft of interval; interbedded sandstones are yellowish gray (5Y8/1) to grayish orange (10YR7/4), moderately indurated, siliceous, and very fine grained, typically 2"-3" thick with some internal shale partings, some thin siltstone beds occur, but are more common in upper third of interval. Wavy, ripple bedding common in sandstone and siltstone interbeds.

Dodds Creek Sandstone ('dc' marks base of interval): about 20 ft of grayish orange (10YR7/4), dark yellowish orange (10YR6/6), to a very pale orange (10YR8/2), but locally weathers to a distinct moderate yellowish brown (10YR5/4), weakly to moderately indurated, thin wavy-bedded to locally wavy-laminated, weakly calcareous, micaceous, fine-grained sandstone; bedding from 0.5"-4" thick but basal beds may be 12" thick; typically, tops of beds ripplemarked, while base of beds are planar with each bed separated by a shale parting.

Overall, the thickness of the Coffeyville Formation is about 120-130 ft thick, top is not exposed in quad.

 **CHECKERBOARD LIMESTONE** (Pennsylvanian, Missouri)–The Checkerboard Limestone is medium gray (N5), greenish gray (5GY6/1), to dark greenish gray (5GY4/1), but weathers to a distinct moderate yellowish brown (10YR5/4) to dark yellowish brown (10YR6/6) color. Texturally, it is a skeletal to whole-fossil carbonate mudstone to wackestone; bedding is commonly absent in the formation at most exposures, although thin, planar to wavy beds of about 2" to 3" thick have been observed locally, occurring above the main, basal beds. Fossils include crinoid stems, corals, and bivalves. Thin calcite veins (~1 cm wide), are present in some exposures.

Thickness a consistent 3 ft.

Psm SEMINOLE FORMATION (Pennsylvanian, Missourian)—Formation consists of a lower sandstone interval, called the Tulsa Sandstone, and a basal and upper suite of interbedded, laminated concretionary, silty clayshales, mudshales and siltstones.

The pale to the tawny sandstone occurs between 1 to 15 m above the base of the formation. The sandstone consists of medium to coarse grained, subangular to subrounded grains of quartz and feldspar. The color varies from yellowish orange (10YR8/2), to yellowish gray (5Y7/2), with dark yellowish orange (10YR6/6) weathering spots, is weakly to moderately indurated, thin- to medium-bedded, very fine- to fine-grained and argillaceous. The bedding is horizontal to slightly wavy, and is cemented by a calcite cement within some bedding intervals. Unit appears as a series of stacked channel sequences, where an individual sequence may vary between 2 ft to 4 ft thick, separated by a 6"–12" interval of interbedded siltstone and claystone. The channel sequence is 10–15 ft thick, the sequence is thicker (varying from 12"–24") and has channel-form lower surfaces, which grade up into thinner (3"–5" thick), planar bedded sandstone sequences. Horizontal burrows and tool marks common along the top of the channel sequence. The bedding evidence within the channel appears pitted due to the weathering out of burrow filling.

Dark yellowish orange (10YR6/6), pale yellowish orange (10YR6/8), to light olive gray (5Y 6/1) laminated, slightly silty, concretionary clayshales interlaminated with mudshales and siltstones occur above and below the Tulsa Sandstone; concretionary material occurring as discontinuous lenses and beds within clayshales that vary from 1"-6" thick. Siltstone intervals are ripple-marked, and also have abundant horizontal trace fossils.

Total thickness of the Seminole Formation about 130 ft.

Plo	<p>LOST BRANCH FORMATION (Pennsylvanian, Desmoinesian)—Poorly exposed, except for the Gropen Limestone bed. Overall, a light brown (5YR6/4) to pale yellowish brown (10YR6/2), locally medium light gray (N6), laminated, slightly calcareous, micaceous, silty claystone. Basal 3 ft of formation, just above the Dawson coal, consists of a medium dark gray (N4) to dark gray (N3), well-sorted to fissile, phragmitic mudstone to claystone called the "black chalk bed". The top of the formation is marked at the top the Gropen Limestone, which is a dusky yellow (5Y6/4) to pale olive (10Y6/2), 1 ft to 1.5 ft thick, laminated, wavy-bedded packstone, grading upward into a whole fossil, carbonate mudstone wackestone; brachiopods, gastropods, and crinoid debris the most common fossils.</p>
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IPmm MEMORIAL FORMATION (Pennsylvanian, Desmoinesian)—May consist of four members, these are in descending order: 1, the uppermost Dawson coal; 2, an unnamed upper shale interval; 3, the Jenks Sandstone; and 4, an unnamed lower shale interval of variable thickness. Thickness of the formation about 70 ft.

Dawson Coal: unbedded in map area, but has been reported in the area by Benison and others (1972), and Oakes (1952). Extensive workings into the Dawson occur throughout the center of the county. It represents the top of the formation.

Shinarump sandstone: thin, shaly, micaceous, composed of a light olive brown (5Y5/6), grayish orange pink (5YR7/2), to grayish yellow (5Y8/4), interbedded sandstone, weakly calcareous mudstone, and friable, fine-grained sandstone. Sandstones may have light brown (5YR6/4) oxide spots. Mudstone blocky bedded, with numerous concave fractures and slickensides that are indicative of paleosol development. Sandstones generally laminated, occurring as discontinuous beds and lenses within mudstones; sandstone cement most likely clay or a weak iron-oxide. Thickness of interval about 50 ft.

Jenks Sandstone: yellowish gray (5Y7/2), pale yellowish brown (10YR6/2), dark yellowish orange (10YR6/2), locally light brown (5YR5/6) to pale brown (5YR5/2), friable to weakly indurated, thin- to medium-bedded, fine-grained, locally medium-grained at base, micaceous sandstone. Lower third of sandstone thin- to medium-through-cross-bedded, with bedding varying from 3'-16" thick, rest of interval thinner bedded (with beds ranging from 0.5" to 4" thick, averaging closer to 2" thick), and having numerous shale partings and interbeds (flaser bedding). Clay-ball clasts, and flute casts common throughout member; some tabular cross-bedding in middle of unit. Thickness of the Jenks

unnaamed lower shale interval: consists of a light olive gray (5Y6/1) to greenish gray (5GY6/1), poorly laminated, calcareous slightly silty clayshale; poorly exposed. Thickness of interval varies from 2 to 3 ft, depending on thickness of overlying Jenks Sandstone.

 **LENAPATH Limestone** (Pennsylvanian, Desmoinesian)—Represented by the Eleventh Street interval, a limestone of a dark yellowish brown (10YR4/2) to dark yellowish tan range (10YR5/2) to whole fossil wackestone to crinoid stems, locally a crinoid stem texture. Crinoid columns and plates are the most dominant fossils, bryozoans, brachiopods, and bivalves also occur.

Thickness of the Eleventh Street Limestone is more than 3 ft. and is usually less than a foot thick.

Pnw NOWATAFORMATION (Pennsylvanian, Desmoinesian)—Can be segregated into two informal units: a lower shale interval, and an upper, interbedded limestone and shale interval termed the Nowata flagstones (Pnwf).

Lower shale interval consists of medium gray (N5), light gray (N7), and light brown (5YR5/6), well laminated to locally fissile, slightly silty concretionary clayshales, with rare siltstone and very fine grained sandstone; nodular, hematite concretions common.

The Novata Flagstone interval is less than 55 ft of interbedded shale and limestone, and pinches out completely to the north; the top of which stratigraphically occurs between 5 ft and 15 ft below the top of the Novata Formation. The Novata Formation is composed of 10 to 15 ft of thin-bedded, argillaceous, carbonate mudstones; bedding is even and planar with most beds having uniform thickness of between 0.5–3.0"; some limestones beds exhibit internal parallel lamination that is usually a very low-angle, wavy, or irregular. The Novata Formation is characterized by a prominent rectangular fracture pattern, with fracture surfaces sometimes being concoidal. The interbedded shales are usually a light olive gray (5Y5/2), laminated to well-laminated, calcareous clayshale; shale intervals range between 4–12" thick, except toward the base of the unit where shales may attain thicknesses of up to 10" and may contain thin, irregularly bedded lime beds. Only the uppermost 150 ft of the formation is exposed in the Jenks quad.

OOLOGAH FORMATION (Pennsylvanian, Desmoinesian)—A thin- to medium-bedded, skeletal carbonate mudstone to wackestone; found only in the subsurface.

LABETTE FORMATION (Pennsylvanian, Desmoinesian)—A laminated, very silty to sandy micaceous, concretionary clayshales, interbedded with fine-grained sandstones near top; found only in the subsurface.

FORT SCOTT FORMATION (Pennsylvanian, Desmoinesian)—Thin to medium, wavy bedded whole fossil wackestones and mudstones, interbedded with fissile, phosphatic clayshale; found only in the subsurface.

SENORA FORMATION (Pennsylvanian, Desmoinesian)—Complex sequence of silty and concretionary clayshale, interbedded with very fine-grained sandstones and siltstones; includes the Verdigris and Tiawah Limestones; found only in the subsurface.

BOGGY FORMATION (Pennsylvanian, Desmoinesian)—Usually a laminated clayshale, with two prominent sandstone members, the Taft Sandstone and the Bluejacket Sandstone at the base. Formation also includes the Inola Limestone; found only in the subsurface.

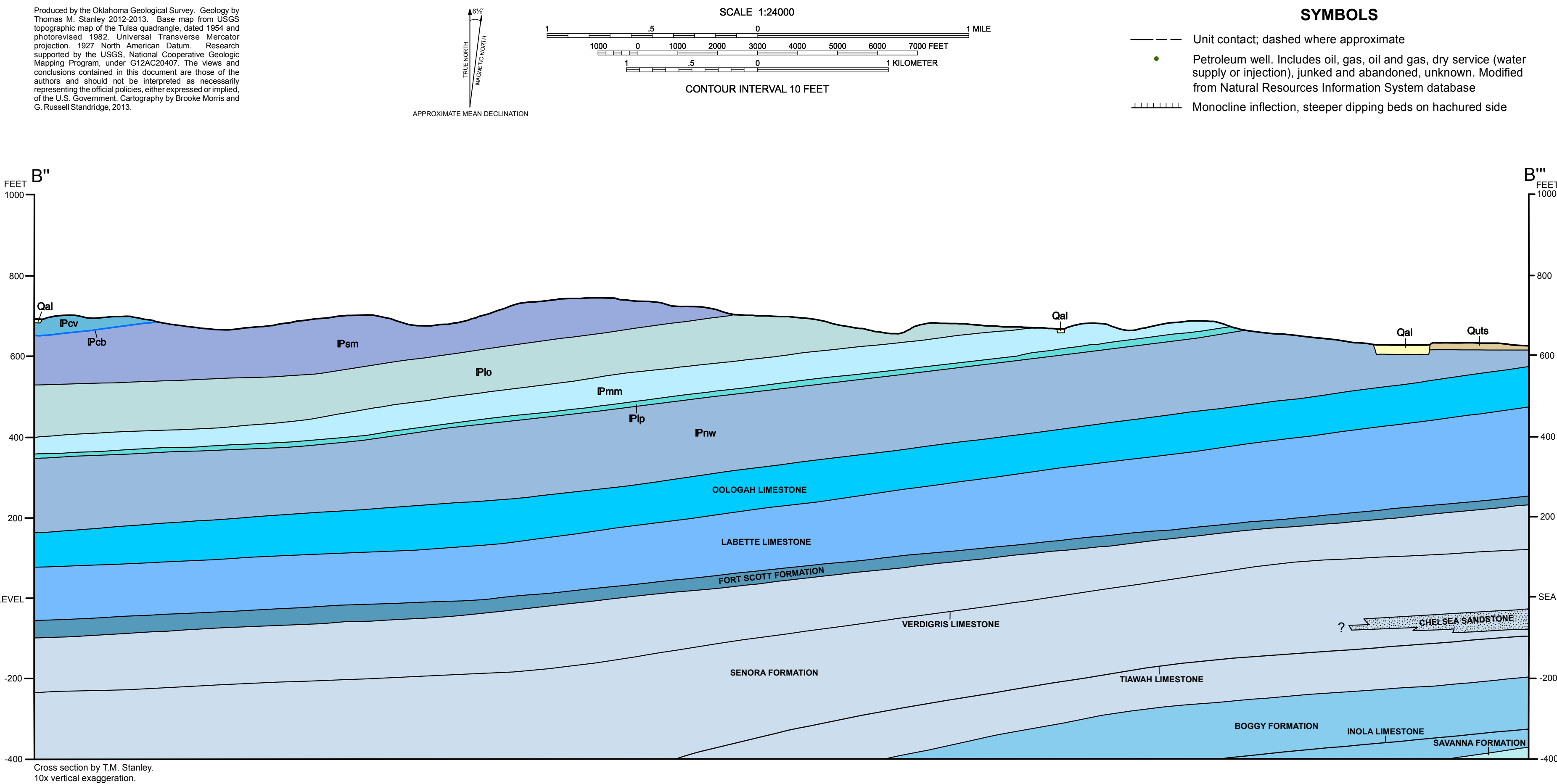
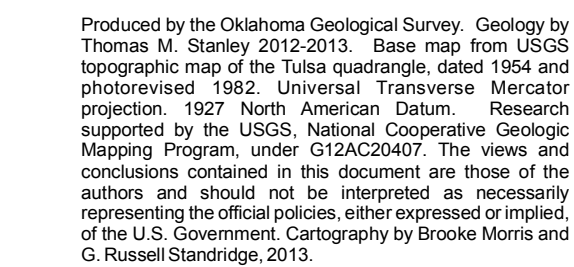
SAVANANA FORMATION (Pennsylvanian, Desmoinesian)—Interbedded sandstones and mudstones; found only in the subsurface.

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Oakes, M.C., 1952, Geology and mineral resources of Tulsa County, Oklahoma (includes parts of adjacent counties): Oklahoma Geological Survey Bulletin, 69, 234 p.

*Detailed descriptions only include mappable units observed in the field. Formal member and bed names are indicated by capitalization (i.e., Glenpool Limestone), while informal names are given in lowercase (i.e., Nowata flagstone). Color of units based on fresh surfaces, unless stated otherwise.



GEOLOGIC MAP OF THE TULSA 7.5' QUADRANGLE, TULSA COUNTY, OKLAHOMA

Thomas M. Stanley
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