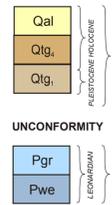


CORRELATION OF MAP UNITS



DESCRIPTION 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
- Qtg** TERRACE DEPOSITS (Holocene)—Clay, silt, sand, and gravel on terraces immediately above and adjacent to modern channels and flood plains. Consists entirely of locally derived sediment. Thickness: unknown, possibly as much as 20 ft
- Qtg** REMNANTS OF TERRACE DEPOSITS (Holocene and Pleistocene?)—Concentrations of distally derived sediment, mostly very light colored, subrounded quartz grains, with minor quartzite pebbles; sand may also exhibit re-working by aeolian processes into distinct dune structures; base of deposits more than 60 ft above modern flood plains. Thickness: 0 to about 30 ft
- Pgr** GARBER FORMATION (Permian)—Sandstone, mostly fine-grained to less commonly very fine to medium-fine-grained; appears to be very fine-grained near base; moderate reddish brown (10R4/6), moderate reddish orange (10YR6/6), sandstone- and siltstone-pebble conglomerate, siltstone, and shale are rare. Sandstone typically porous and friable. Commonly weathers to smooth, rounded outcrops; locally with platy to flaggy to rarely slabby appearance. Locally weathers to hard, dark-colored (grayish black [N2]) beds completely cemented with hematite, calcite, and/or silica. Dark-colored sandstone blocks locally form lag deposit over weathered outcrops. Large- and small-scale crossbeds, trough crossbeds common; many outcrops characterized by inclined beds and channelform deposits, although plane-parallel stratification also present. Sandstone locally color-banded (e.g., moderate reddish brown (10R4/6) and yellowish gray (5Y7/2)), stratified to unstratified, and with uncommon iron-reduction spots as large as 20 in. in diameter. Typically soft, weathers to "badlands"-type topography. Siltstone and shale common near base, less so in middle of formation. In places, siltstone and shale contain evidence of paleosol development such as blocky weathering, fractures and fracture surfaces marked by small slickensides, and through-going curved fractures. Thickness: about 520 ft, top not exposed
- Pwe** WELLINGTON FORMATION (Permian)—Interbedded shale, sandstone, and minor siltstone. Shale is moderately to very silty and sandy; moderate reddish brown (10R4/6), moderate red (5R5/4), with local light greenish gray (5GY8/1) streaks; concentrations and septarian nodules rare in Wellington outcrops south of the North Canadian River. Sandstone mostly fine- to very fine-grained, moderate orange pink (10R7/4) to moderate reddish brown (10R4/6), moderate reddish orange (10R6/6) to pale red (5R6/2), mostly porous and friable, locally with variable amounts of hematite and calcite cement. Siltstone typically color-banded consisting of pale reddish brown (10R5/4) and light greenish gray (5GY8/1) streaks. Sedimentary structures include large- and small-scale crossbeds, trough crossbeds, locally steeply inclined stratification, and less common channelform features. In places, weathers to "slickrock" appearance.

The Garber-Wellington contact becomes increasingly subjective south of North Canadian River due to the increase in shale intervals at the base of the Garber, coupled with the increase in sandstone intervals toward the top of the Wellington. Also, the concretionary shales, common in upper Wellington outcrops north of the North Canadian River, are uncommon in exposures south of the river. As a consequence, the top of Wellington is based on the first occurrence of a thick (greater than 10 ft) Garber-like sandstone interval in conjunction with the last occurrence of a thick shale interval. Thickness: about 660 ft, based on cross section, but only 100 ft exposed in quadrangle

SYMBOLS

- Unit contact; dashed where approximate
- x Outcrop, geologic observation
- Petroleum well. Includes oil, gas, oil and gas, dry service (water supply or injection), junked and abandoned, unknown. Modified from Natural Resources Information System database
- o Municipal water well

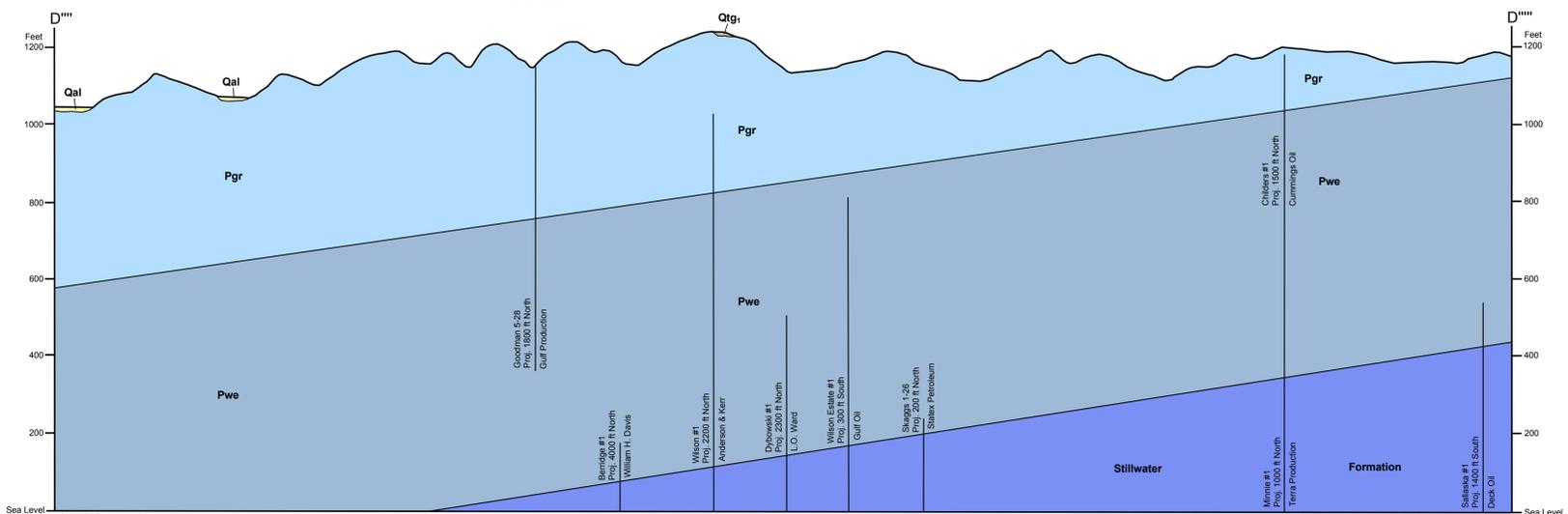
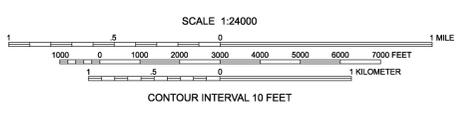


EXPLANATION

- Current Map
- Mapped Quadrangles
- Major Cities
- Counting Subunits and Communities

Base Map Credits
The base map was compiled by the U.S. Geological Survey. Topography from aerial photographs by photogrammetric methods since 1954. First checked 1956. Revised from aerial photographs taken 1969 and 1975. Universal Transverse Mercator (UTM) projection, 1627 North American Datum, 10,000-foot grid, zone 14, based on Oklahoma coordinate system, south zone, 1,000-meter UTM grid, zone 14.

Geologic Map Credits
Geology by Thomas M. Stanley and Galen W. Miller, 2003-2002. Assisted by Nicole Baylor and Lon Bryan. Research supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, Assistance Award Number 02HQAG0002. The views and conclusions contained in this document are those of the authors and do not necessarily represent those of the U.S. Geological Survey, either expressed or implied, of the U.S. Government. Originally published as Open-File Report OF4-2003. Map revised and published as OGQ-34. Cartography and layout prepared by G. Russell Stanbridge, 2003.



GEOLOGIC MAP OF THE STELLA 7.5' QUADRANGLE, CLEVELAND AND POTTAWATOMIE COUNTIES, OKLAHOMA

Thomas M. Stanley and Galen W. Miller
2003