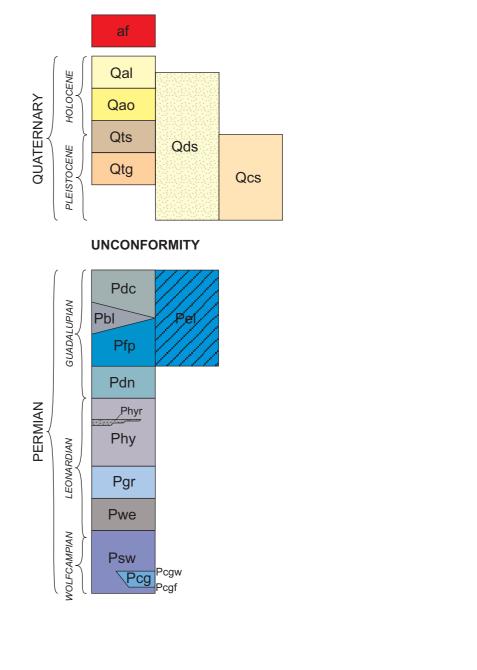


CANADIAN, KINGFISHER, LINCOLN, LOGAN, OKLAHOMA, AND PAYNE COUNTIES, OKLAHOMA Thomas M. Stanley 2021

CORRELATION OF MAP UNITS



DESCRIPTION OF UNITS

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.

ALLUVIUM (Holocene) - Unconsolidated deposits consisting of locally derived clay-, silt-, sand-, and rarely gravel-sized sedimentary material; found 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. Deposits occurring within major drainages, such as in the Canadian and North Canadian River systems, also represent areas of frequent flooding. Thickness: 0 to about 12

OLDER ALLUVIUM (Holocene) - Unconsolidated deposits consisting of locally derived clay-, silt-, sand-, and rarely gravel-sized sedimentary material; represent slightly older terrace deposits than those formed in modern flood plains; predominantly found adjacent to, or 1 to 3 meters above, modern alluvial deposits of major drainage systems. Areas rarely subject to flooding. Thickness: unknown,

DUNE SAND (Holocene and/or Pleistocene?) - Fine- to coarse-grained, moderately- to poorly-sorted, unconsolidated sand formed into definite dune and ridge structures. Consists mainly of rounded to subrounded guartz grains intermixed with silt- and clay-size material. Dune features best found on the north side of major east-west trending drainages; probably represents aeolian reworking of Pleistocene and younger fluvial terrace deposits. Thickness: 0 to 12 meters.

COVER SAND (Holocene and/or Pleistocene?) - Unconsolidated, very fine-grained sand to coarsegrained silt and clay, moderately to poorly sorted. Consists mainly of rounded to subrounded quartz grains, with abundant silt- and clay-size material. Forms extensive nearly flat topographic surfaces as much as 80 ft above modern alluvial valleys. Probably represents aeolian reworking of Pleistocene and younger fluvial terrace deposits. Thickness: from a thin veneer to as much as 9 meters, averages

OLDER TERRACE SANDS (Holocene and/or Pleistocene?) - Unconsolidated deposits consisting mostly of locally derived sand-, silt- and clay-sized sedimentary material, with minor amounts of distally derived sand- and gravel-sized material. Sand commonly medium- to fine-grained, subangular to subrounded, poorly sorted to very poorly sorted, and usually having a light brown to reddish-brown color. Deposits typically occur 0 to 15 meters above major drainages, particularly along the Cimarron and North Canadian drainage systems. Thickness: typically 0 to 11 meters, but some deposits may be as much as 30 meters thick.

OLDER TERRACE GRAVELS (Pleistocene) - Unconsolidated deposits consisting mostly of distally derived sand- and gravel-sized sedimentary material, with minor amounts of locally derived silt-sized and rarely clay-sized material. Sand commonly medium- to coarse-grained, subangular to subrounded, and very light colored; gravel consists of concentrations of rounded to well-rounded, oblate-shaped pebbles and cobbles of quartz, chert, and meta-quartzite; basalt and gneiss clasts rare. Deposits typically occur 0 to 12 meters principally above the North Canadian drainage system. Thickness: typically 0 to 11 meters, but some deposits may be as much as 30 meters thick.

DOG CREEK SHALE (Permian, Guadalupian) - Mostly reddish-brown, silty claystones with local occurances of fine-grained sandstones. Thin stringers of dolostone and gypsum may occur near the

BLAINE FORMATION (Permian, Guadalupian) - In the map area, unit consists of 2 to 3 beds of white, massive gypsum; each gypsum bed typically underlain by a thin bed of dolostone that overlay intervals of reddish-brown clayshale. Poorly exposed along the far southwestern edge of map, and quickly pinches out to the east.

FLOWERPOT SHALE (Permian, Guadalupian) - Reddish-brown, silty clayshale, with locally occurring thin interbeds of greenish-gray shale and several thin stringers of gypsum in the upper

RENO GROUP, undifferentiated (Permian, Guadalupian) - Consists of various elements of the Dog Creek and Flowerpot shales east and south of the Blaine Formation pinch-out. Mostly a reddish brown to orange-brown, silty clayshale with minor interbeds of very fine-grained sandstone. Stringers of gypsum and very thin limestone beds may occur in upper half of unit.

Unit is poorly exposed, and only about the basal 60 meters occurs in the map area.

DUNCAN FORMATION (Permian, Guadalupian) - Mostly friable to weakly indurated sandstone, fineto very fine-grained, rarely medium-grained, with mudstone- and siltstone-pebble conglomerates, and thin siltstone interbeds locally. Lower half of section consisting of moderate reddish orange to light red, thin- to medium-bedded, fine-grained sandstone, siltstone, and siltstone-pebble conglomerates that locally fine upward into moderate reddish brown to moderate reddish orange very fine-grained sandstone. Trough cross-laminations, parting lineations and oscillation ripple marks common in sandstones. Conglomerates are indurated to well indurated, consisting of slightly imbricated siltstone and mudstone clasts, set within a fine-grained, quartz-rich sandstone matrix that is usually cemented with calcite; although, barite cement may occur locally. Upper half of unit consisting of interbedded friable to weakly indurated sandstones and moderately indurated mudstone- and siltstone-pebble conglomerates, and local occurrences of thin intervals of siltstone and mudstone. Sandstones are fine- to very fine-grained, massive, rarely exhibiting internal bedding; are moderate reddish brown, moderate reddish orange to pale brown in color; iron oxide and/or clay is predominant cement, although calcite cement does occur in patches. Sandstones may laterally grade into moderately indurated siltstone- and/or mudstone-pebble conglomerates that are similar in composition to those in lower half of formation. Interbedded siltstone and mudstone intervals lenticular shaped, average only 1 meter in thickness and extend only tens of feet along strike; mudstones blocky bedded, slickenside bedding and shrinkage cracks common; siltstone normally occurs as thin partings separating mudstone and sandstone intervals. Locally, greenish gray colored bands, beds, and irregular splotches occur in sandstones, siltstones and shales; burrows and root

The Duncan Formation now includes parts of what was previously mapped as the Chickasha Formation of Canadian, Grady, and McClain Counties (see Davis, 1955; Bingham and Moore, 1975). Where observed, contact with the underlying Hennessey Formation is sharp and planar, and placed at base of lowest mappable fine-grained sandstone bed of the Duncan. Thickness: about 100 meters in the southern-central part of sheet and thinning to 15 meters along the northern boundary of map.

SYMBOLS

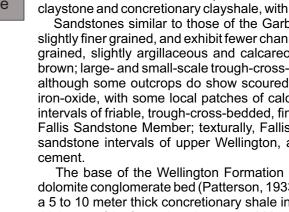
HENNESSEY FORMATION (Permian, Leonardian) - Mostly a silty claystone or clayshale depending on whether bedding is laminated (<=1cm thick: clayshale), or thin (>1cm thick: claystone), with local ntervals of fine- to very fine-grained sandstone and coarse siltstone. The Reeding Sandstone is the only mappable bed that can be traced with any certainty in the area. Overall, the thickness of the Hennessey Formation varies between 100 and 450 meters; unit thins to the south. Claystones and clayshales are silty, to rarely sandy, non-calcareous, typically unstratified to fissile laminated; unstratified claystones commonly have small-scale slickensides and shrinkage cracks that are evidence of paleosol development. Color a moderate reddish brown to light brown, locally banded with yellowish gray and light greenish gray shale beds. Iron-reduction spots and bands commonly found in more indurated clayshale lithologies, less so in claystones; color of spots light greenish gray to pale green, while size of spots usually less than 5 millimeters in diameter. Interbedded siltstones moderately indurated to indurated, sandy, and non-calcareous; usually occur as thin laminated intervals of no more than 1 meter thick, or as thin partings separating predominantly shale intervals from sandstones. Sandstones are friable, silty to argillaceous, non-calcareous, usually found in thin, lenticular intervals of no more than a meter in thickness; locally contain lowangle, tabular cross-bedding with associated ripple marks along bedding surfaces, rarely find troughcross-bedding except in the thickest intervals; the thin, lenticular geometry exhibiting little basal scouring of most sandstone intervals suggests that sand was deposited within shallow tidal channels, probably as a late depositional plug; trace fossils and shale rip-up clasts present but very rare; color same as shale intervals. Sandstone and siltstone intervals more common in middle third of formation; base of formation mapped at the stratigraphically highest occurring fine-grained, trough-crossbedded sandstone of the Garber Formation. Reeding Sandstone Bed (Phyr): Sandstone, very fine-grained, light brown to moderate reddish brown. Contains conspicuous light greenish gray circular iron-reduction spots and bands similar to

the Hennessey proper. Low-angle, tabular cross-bedding common. Thickness of the Reeding Sandstone Bed varies from 0 to 11 meters, thickening to the northwest. Various investigators (see Bingham and Moore, 1975; Carr and Bergman, 1976; Bingham and Bergman, 1980; Morton, 1980) have attempted to elevate the Hennessey Formation to Group status, while breaking out a number of different "mappable" formations extending from the Kansas-Oklahoma border, southward. It is the current opinion that these "formations" should only be considered as members having very limited, and local, stratigraphic significance. The term "Hennessey Group" should be abandoned, while the interval that traditionally encompasses lithostratigraphic units falling between the Garber and Duncan Formations, north of the Wichita Mountain uplift, should be considered the Hennessey Formation.

GARBER FORMATION (Permian, Leonardian) - Predominantly a friable to locally a moderately indurated sandstone, fine-grained to less commonly very fine-grained, with varying proportions of claystone, siltstone, and sandstone- and siltstone-pebble conglomerates and breccias. Overall, color is a moderate reddish brown, moderate reddish orange, to light brown; large- and small-scale trough-cross-bedding abundant, producing numerous outcrops characterized by inclined bedding that truncate along channel-form lower contacts; tabular cross-bedded and associated asymmetrical ripple marks, and planar lamination less common; sandstone, siltstone, and shale ripup clasts, along with vertebrate bone-beds commonly occur as lag deposits at the base of channelform contacts. Cement mostly an iron-oxide and clay, although a calcite, barite, and rarely silica cement, may occur locally; barite roses are also common on weathered Garber outcrops in areas south of Edmond and west of the Lake Thunderbird dam. Thickness of individual sandstone intervals vary from as little as 1 meter to as much as 20 meters thick; although most intervals average about 6 meters thick. Silty and sandy claystones and sandy siltstones more common near base and top of formation; color

similar to sandstones; typically unstratified, blocky bedded, with slickenside fracture surfaces, curved shrinkage fractures and calcareous nodules (calcrete) suggesting paleosol development common. Conglomerates and breccias occur as well defined beds more commonly found in the lower parts of the formation. Both textures are predominantly cemented by calcite, or rarely by a weak silica cement. Breccias are usually moderately indurated, consist of angular sandstone clasts set within a sandstone matrix; they are most likely formed by incipient paleosol development on an exposed sand or sandstone surface. Conglomerates are sedimentary in origin, indurated, consisting of fine- to medium-pebble sized, rounded, sandstone, siltstone, shale, limestone, and dolomite clasts set within a medium- to coarse-grained sandstone matrix; color usually a distinct moderate red to pale red. Thickness of conglomerate and breccia beds from 0.1 to 1.0 meter thick. Base of the Garber mapped at the stratigraphically lowest occurring conglomerate of definite

sedimentary origin, or the lowest Garber sandstone that occurs in conjunction with the stratigraphically highest occurrence of a Wellington concretionary shale. Thickness of the Garber Formation varies from 140 meters in the north to 320 meters in the south part of the map area. WELLINGTON FORMATION (Permian, Leonardian) - Formation mostly an interbedded sandstone.



claystone and concretionary clayshale, with minor siltstone and sandstone breccias locally. Sandstones similar to those of the Garber Formation, except Wellington sandstones tend to be slightly finer grained, and exhibit fewer channel-form lower contacts; most are friable, fine- to very finegrained, slightly argillaceous and calcareous; color a moderate orange pink to moderate reddish brown; large- and small-scale trough-cross-bedding common; most basal sandstone contacts planar, although some outcrops do show scoured and channel-form lower contacts; cement generally an iron-oxide, with some local patches of calcite cement. Basal third of formation consists of thicker intervals of friable, trough-cross-bedded, fine- to locally medium-grained sandstone belonging to the Fallis Sandstone Member; texturally, Fallis sandstones are somewhat coarser grained than those sandstone intervals of upper Wellington, and they are slightly more friable due to lack of calcite

The base of the Wellington Formation coincides in most places with a 5 to 7 centimeter thick dolomite conglomerate bed (Patterson, 1933). Often the top of the Wellington Formation is marked by a 5 to 10 meter thick concretionary shale interval that has a well-developed paleosol horizon. Total thickness of the formation about 75 to 260 meters, and generally thins to the south.

STILLWATER FORMATION (Permian, Leonardian and Wolfcampian?) - Consists of a series of noderate red to moderate reddish brown silty, non-calcareous claystones interbedded with orangish rown to moderate reddish brown, fine- to medium-grained sandstones and very thin discontinuous beds of fine-crystalline limestones and nodular dolostones. Claystones non-laminated, massive to blocky in appearance; sandstones commonly trough-cross-bedded.

The Stillwater Formation, as named and defined with type section by Patterson (1933), takes stratigraphic preference over nearly the same lithologic interval named as the Oscar Group by Shelton and others (1985). As per Patterson (1933), the top of the Stillwater Formation is defined as the base of the Fallis Member of the Wellington Formation. Originally, the base of the Stillwater was defined at the top of the Pennsylvanian (Gould, 1926; Patterson, 1933), which, over the years, has varied considerably. Currently, the top of the Pennsylvanian in the Midcontinent is placed at the top of the Glenrock Limestone of the Red Eagle Formation (Nestell and Netell, 1998). Due to the absence of the Glenrock Limestone in Oklahoma, the base of Red Eagle Formation proper constitutes the top of the Pennsylvanian in the state; consequently, the base of the Red Eagle represents the base of the Stillwater Formation in this map area. Only the upper 60 meters is present.



CHASE GROUP (Permian, Wolfcampian) - In the current map area, the Chase Group is represented nly by the Fort Riley Member at the base of the unit, and probably the lower part of the Doyle Shale. ne Fort Riley is a very thin (less than 1/2 meter thick) light gray, fine-crystalline, dolomitic limestone. The group pinches out just north of the Cimarron River where it interfingers with lithologic elements of the Stillwater Formation.

Only the basal 12 meters of the Chase Group is present in the far northeast corner of the map area

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