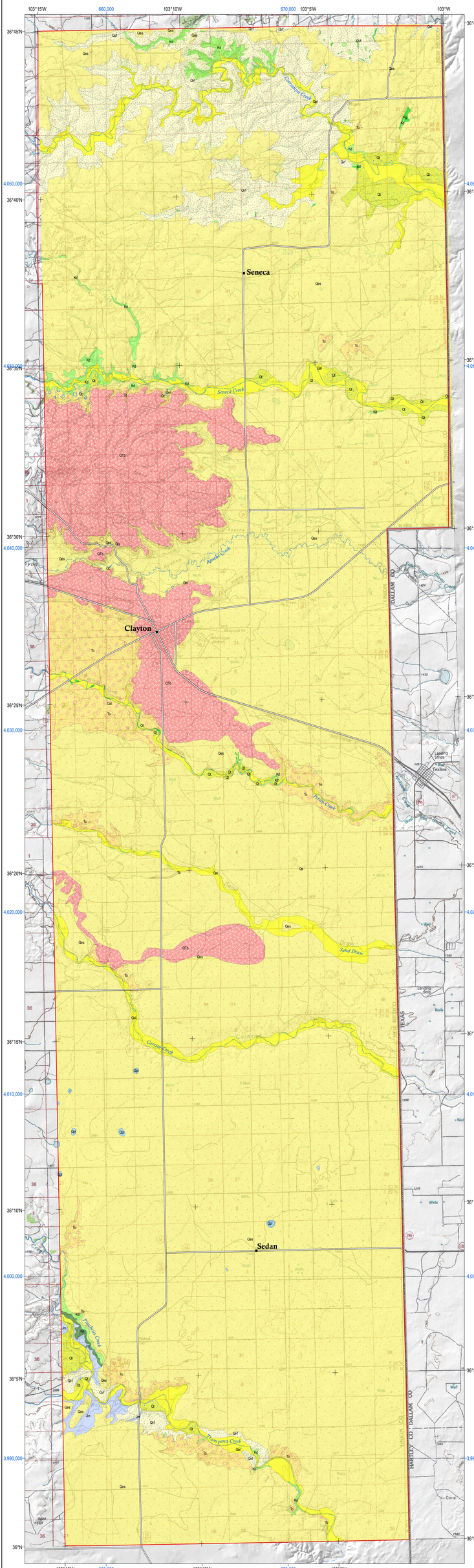


DESCRIPTION OF UNITS

Qpl **Playa lake basin deposits (Quaternary to recent)** - Shallow ephemeral lake basins floored with clay and silt, partly to completely covered by recent soil and windblown sand. Thickness: 0 – 5 (?) meters.

Qal **Alluvium in stream valleys (Quaternary)** – Unlithified sediment composed of gravel and poorly to moderately sorted clay, silt, and sand in active stream channels and ephemeral arroyos. Thickness: 0 – 4 meters.

Qes **Eolian sand sheets (Quaternary)** - Sand sheets composed of fine to very fine-grained, rounded to subrounded, dominantly quartz sand. Locally pebbly, with pebbles and cobbles reworked from the underlying Ogallala Formation. Covers upland surfaces with little or no development of drainage incision. Often disturbed by agricultural development. Possibly equivalent in part to the Blackwater Draw Formation of the southern High Plains (Holliday, 1989). Thickness: 0 – 10 meters.

Qvf **Valley fill in drainages (Quaternary) –** Unlithified, often stratified sediment composed of poorly to moderately sorted clay, silt, and sand along the flanks of stream valleys. Locally contains pebbles and cobbles derived from underlying units. Unit grades into alluvium (**Qal**) along active drainages and colluvium (**Qc**) along the toes of hillslopes. Thickness: 0 – 5 (?) meters.

Qc **Colluvium (Quaternary) -** Poorly sorted boulder to cobble gravel in a matrix of sand, silt and clay. Clasts are composed of Clayton basalt (**QTb**). Boulders may be up to several meters in diameter. Unit was deposited by mass-wasting process and mantles the base of slopes. Locally includes small alluvial fans and interfingers with unit **Qvf** on valley bottoms. Thickness: 0 - 25 meters.

Qls **Slump blocks, landslide deposits, and associated colluvium (Quaternary)** – Hummocky slope failure deposits and rotational landslide blocks along the flanks of uplands capped with Clayton basalt (**QTb**) along Apache Creek north of Clayton. Stabilized by vegetation and not active. Thickness: 0 – 25 meters.

Qt **Terrace deposits (Quaternary)** – Unlithified, generally coarse, deposits composed largely of sand and gravel and incised by active drainages. Thickness: 0 – 10 meters.

QTb **Clayton basalt (Quaternary) –** Medium-gray porphyritic holocrystalline medium-grained olivine basalt. Contains 5 – 10 % phenocrysts of olivine. Thickness: 5 – 10 meters.

To **Ogallala Formation (Tertiary) –** Interbedded well-lithified cobble to boulder conglomerate and medium to coarse sandstone overlain by semi-to unlithified medium- to coarse-grained sand. Conglomerates are clast-supported with matrix of coarse quartzose sandstone. Lower sandstones are quartzose, pebbly, medium- to coarse-grained, and commonly trough cross-bedded. Uppermost 0.5 to 2 meters of unit is a stage II – IV calcic paleosol ("caliche") gradational with underlying sandstone. Thickness: 0 – 120 meters, up to 43 meters exposed.

Kg **Graneros shale (Cretaceous) –** Dark to pale gray shale. Contains one to three dark golden brown sandy limestone beds less than 0.5 meters in thickness. Siderite concretions are locally abundant. Thickness: 0 – 38 (?) meters in the county, up to 4 meters exposed.

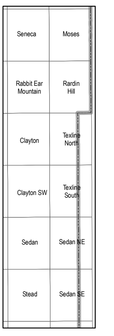
Kd **Dakota Formation (Cretaceous) -** Gold to pale yellow, fine- to medium-grained quartz sandstone with lenses and interbeds of pale gray shale. Sandstones have trough cross-bedding, trough cross-laminations, hummocky bedding, or thin planar tabular bedding. Moderately well- to very well-cemented. Manganese staining and siderite cementations abundant locally. Thickness: 0 – 92 meters, up to 50 meters exposed.

Kp **Purgatoire Formation (Cretaceous) –** White sandstone with white siltstone pebbles, thin-bedded silty to fine-grained sandstone, and fine-grained fucoidal sandstone. Identification of this unit is tenuous and it may be part of either the overlying Dakota or underlying Morrison Formations (Baldwin and Muehlerger 1959). Only exposed along Tramperos Creek in the southwest corner of the study area. Thickness: 5 – 10 meters.

Jm **Morrison Formation (Jurassic) –** White, gold, and buff, thin-bedded, medium- to fine-grained sandstone. Only exposed along Tramperos Creek in the southwest corner of the study area. Thickness: 52 – 150 meters, about 55 meters exposed.

COMPILATION LOCATION

24K QUAD INDEX MAP



Geology by B. Baldwin with revisions by K. Zeigler and G. Rawling. Compiled by G. Rawling. Unit descriptions adapted in part from Baldwin and Muehlberger (1959) and Zeigler (2011).

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GIS Support and Layout by Brigitte Felix

Magnetic Declination
January 2013
7° 31' East
At Map Center

1:100,000

2 1 0 2 MILE

10,000 5,000 0 10,000 FEET

2 1 0 2 KILOMETERS

NAD 1927, UTM Zone 13N

COMMENTS TO MAP USERS

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photo-geologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes associated with recent development may not be shown.

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 State of New Mexico, or the U.S. Government.

New Mexico Bureau of Geology and Mineral Resources
Open-file Report 555-Geologic Map, Plate 1

Geology of East-central Union County, Northeastern New Mexico

January, 2013

Compiled by
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