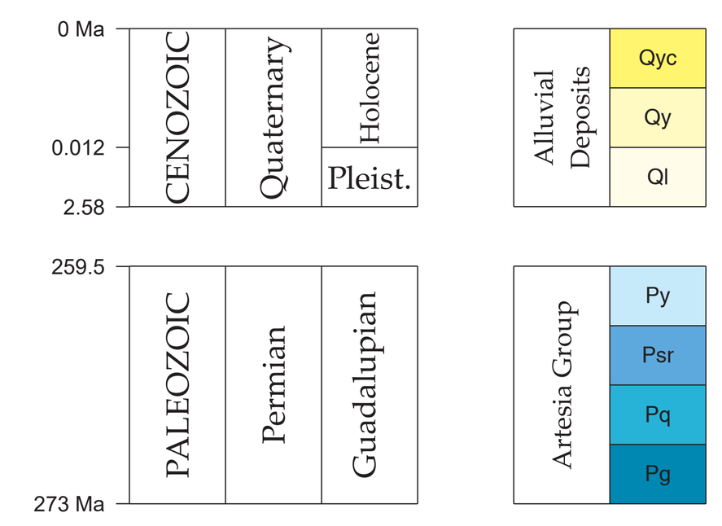
Correlation of Map Units



Explanation of Map Symbols

Contact—The identity and existence are certain. The location is accurate where solid and approximate where dashed.

Normal fault—The identity and existence are certain. The location is accurate where solid, approximate where dashed, and concealed where dotted. Bar and ball on downthrown block.

Fault in cross section showing local up/down offset—The arrows show the relative motion along the fault plane.

Anticline—The identity and existence are certain. The location is accurate where solid, approximate where dashed, and concealed where dotted.

Syncline—The identity and existence are certain. The location is accurate where solid, approximate where dashed, and concealed where dotted.

Horizontal bedding.

Inclined bedding—Showing strike and dip.

Cross section line and label.

Description of Map Units

CENOZOIC ERATHEM
Quaternary System
Alluvial Deposits

Holocene Series

Qyc **Active channel deposits (Holocene)**—Predominantly unconsolidated sand and gravel dominated by carbonate clasts surrounded by a silty to sandy carbonaceous matrix. Mostly devoid of vegetation though some low terraces, typically less than 1 m above the active channel, contain weak soil horizons and thicker vegetation. Thickness is unknown but probably less than several meters.

Qy **Older Holocene sedimentary deposits (Holocene)**—Deposits are composed of weakly to strongly indurated sand and gravel in a silty to sandy carbonaceous matrix. They form terraces typically between 1–3 meters above the active channel deposits. Most terraces have well developed silty soil that supports abundant vegetation, particularly grasses. Estimated thickness of deposits are up to 5 meters.

Pleistocene Series

Ql **Pleistocene sedimentary deposits (Pleistocene)**—Contains poorly sorted, angular- to subrounded-material from boulders to sand and silt composed dominantly of dolomite locally derived from the nearby bedrock and strongly cemented by carbonate. This unit forms small remnants slightly higher in the landscape than **Qy**, and exposed is mostly in the northwestern portion of the map.

PALEOZOIC ERATHEM
Permian System
Guadalupian Series

Artesia Group

Py **Yates Formation (Permian, Guadalupian)**—Interbedded dolomite and siltstone/fine-grained sandstone. Characteristically contains many interbeds of dark-yellow-weathering siltstone and fine-grained sandstone that tend to form vegetated slopes. Dolomite is typically light-gray, massive and fenestrated, and commonly weathers a darker tan. In the southeast portion of the map, particularly closer to the Capitan Formation, the dolomite beds locally contain abundant beds of pisoids (or pisoliths) interbedded with wavy-laminated dolomite. No teepee structures were obvious within the map area. The Yates Formation was recognized only in the southeast portion of the map.

Psr **Seven Rivers Formation (Permian, Guadalupian)**— Thick-bedded, gray dolomite occurs in rather massive beds between 1–3 meters thick separated by thin partings. From a distance, the formation contains very few siltstone and fine-grained sandstone beds up to tens of centimeters thick, mostly in the lower portion of the exposed outcrops. Forms cliffs and steep ledgy slopes. The best exposures are along the steep cliffs in the southeastern potion of the map. The more accessible outcrops in the east-central portion of the map are mostly covered with vegetation and form slopes covered with soil and debris. The contact with the underlying Queen Formation is drawn above a thick interval of sandstone within the Queen Formation.

Pq **Queen Formation (Permian, Guadalupian)**—Quartz siltstone and fine-grained, quartz sandstone. Grains are subangular to subrounded. Typically contains very planar, thin- to thick-beds that commonly erode recessively and form slopes. Locally contains very minor thin beds of light-gray dolomite approximately 10–30 cm thick that typically form small resistant ledges. The uppermost 20 meters or so contain several thin to thick interbedded light–gray dolomite layers up to several meters thick. The unit commonly forms deep rusty orange soils.

Pg **Grayburg Formation (Permian, Guadalupian)**—Light-gray to very pale-yellowish-gray laminated, fine-grained dolomite, interbedded with pale-orange siltstone and very fine-grained sandstone. Most beds are massive to weakly laminated and locally fenestrate. As mapped, this unit forms a thick sequence of layers that comprises most of the outcrops in the western half of the map. Some of the best exposures are seen along Route 137 in the north-central portion of the map and, in particular along the steep gorge where the stream cuts through the hills in the same area.

Capitan Formation

Pcp **Capitan Formation (Permian, Guadalupian)**—Massive dolomite and dolomite breccia. From a distance, the top of this unit exhibits a weakly developed inclined layering that dips southeastward between ≈15–30°. This layering is more pronounced up-section where it merges with the bedding in the lower part of the Seven Rivers Formation. Because of this, the contact as drawn, is dashed and is somewhat arbitrary. In outcrop, most exposures appear massive and structureless. A faint brecciated texture is visible locally where angular clasts of dolomite of all sizes are strongly cemented by different generations of carbonate. Coarse-grained, light-yellow sparite commonly fill dissolution fissures and cracks. Fossils of sponge and brachiopod fragments are locally visible. Forms steep slopes and imposing cliffs. This unit represents the Capitan Reef itself and the fragmented debris-shed from the ancient reef into the Delaware Basin. Typically forms very steep slopes and cliffs.

Pu **Paleozoic basement rock, undivided (Paleozoic)**—Deeper regions in the subsurface where no confidence exists for placing contacts or unit names. Shown only in cross section.

FIGURE 1—View of the Shattuck Valley fault scarp, looking south. Note the west-dipping layers within the large hill downslope of the scarp, and within the hanging wall of the fault.

FIGURE 2—Looking southwest towards Martine Tank from the southeast corner of Section 25, T. 25 S., R. 20. E.; the distant ridge forms an anticline. The axis of the adjacent syncline parallels the ridge in the hills closer to the viewer (east) than the dark patch of vegetation at the base of the ridge.

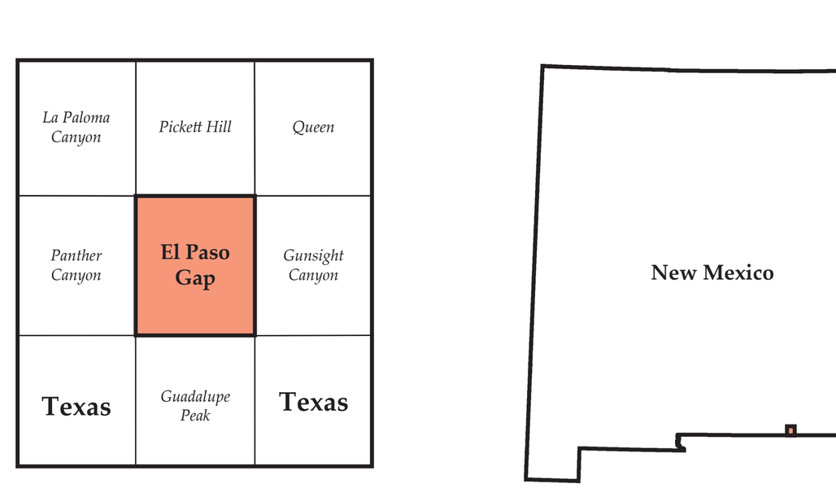
FIGURE 3—Looking southeast towards the mouth of Big Canyon in the southeast corner of the map, from near the very southeast point of Big Canyon Ridge. The layered strata belong to the Seven Rivers Formation, overlain by the darker Yates Formation that forms the tops of the mesas. All of the steep slopes below exhibiting the vertical fluted ridges are composed of the Capitan Formation.

Base map from U.S. Geological Survey 2023.
North American Datum of 1983 (NAD83)
Projection and 1,000-meter grid: Universal Transverse Mercator, Zone 13S, shown in blue.
10,000-foot ticks: New Mexico Coordinate System of 1983 (East zone), shown in red.
Roads.......U.S. Census Bureau, 2015–2016
Names.......GNIS, 2016
Hydrography.......National Hydrography Dataset, 2014
Contours.......IFSAR 4.5 m Digital Terrain Model, 2008
Wetlands.......FWS National Wetlands Inventory 1977–2014

1:24,000

Contour Interval 40 Feet

North American Vertical Datum of 1988



Magnetic Declination
July 2023
7° 14' East
At Map Center

Quadrangle Location

New Mexico Bureau of Geology and Mineral Resources
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This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu

https://doi.org/10.58799/OF-GM-306

Digital layout and cartography by the NMBGMR Map Production Group:
Phil L. Miller, Amy L. Dunn, Ann D. Knight, Tyler Askin, and Hannah N. Hunt

New Mexico Bureau of Geology and Mineral Resources
Open-File Geologic Map 307

Funding is administered by the New Mexico Bureau of Geology and Mineral Resources (Dr. Nelia W. Dunbar, Director and State Geologist (2023); Dr. J. Michael Timmons, *Director and State Geologist* (2024); Dr. Matthew Zimmerer, Assoc. *Director for Mapping Programs*).

Geologic Map of the El Paso Gap 7.5-Minute Quadrangle, Eddy and Otero Counties, New Mexico and Culberson County, Texas

September 2024

by

Steven J. Skotnicki

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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 quadrangle map may be based on any of the following: reconnaissance field geologic mapping, a compilation of published and unpublished work, and photogeologic 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 may not be shown due to recent development.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping and available geophysical and subsurface (drill hole) data. Cross sections should be used as an aid to understanding the general geologic framework of the map area and not be the sole source of information for use in locating or designing wells, buildings, roads, or other human-made structures.

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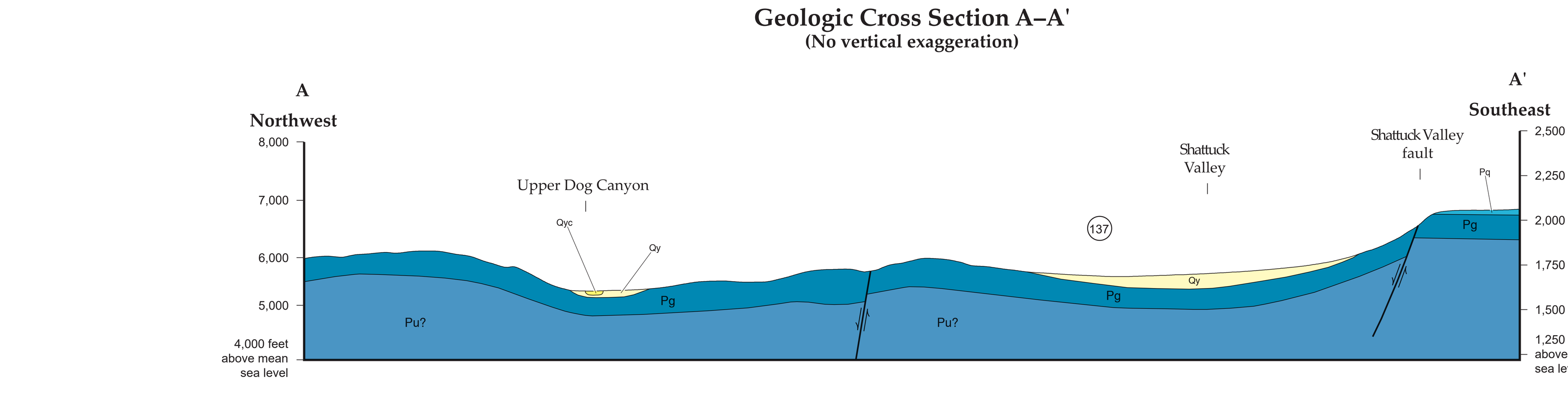
Geologic Cross Section A–A'
(No vertical exaggeration)



Geologic Cross Section B–B'
(No vertical exaggeration)