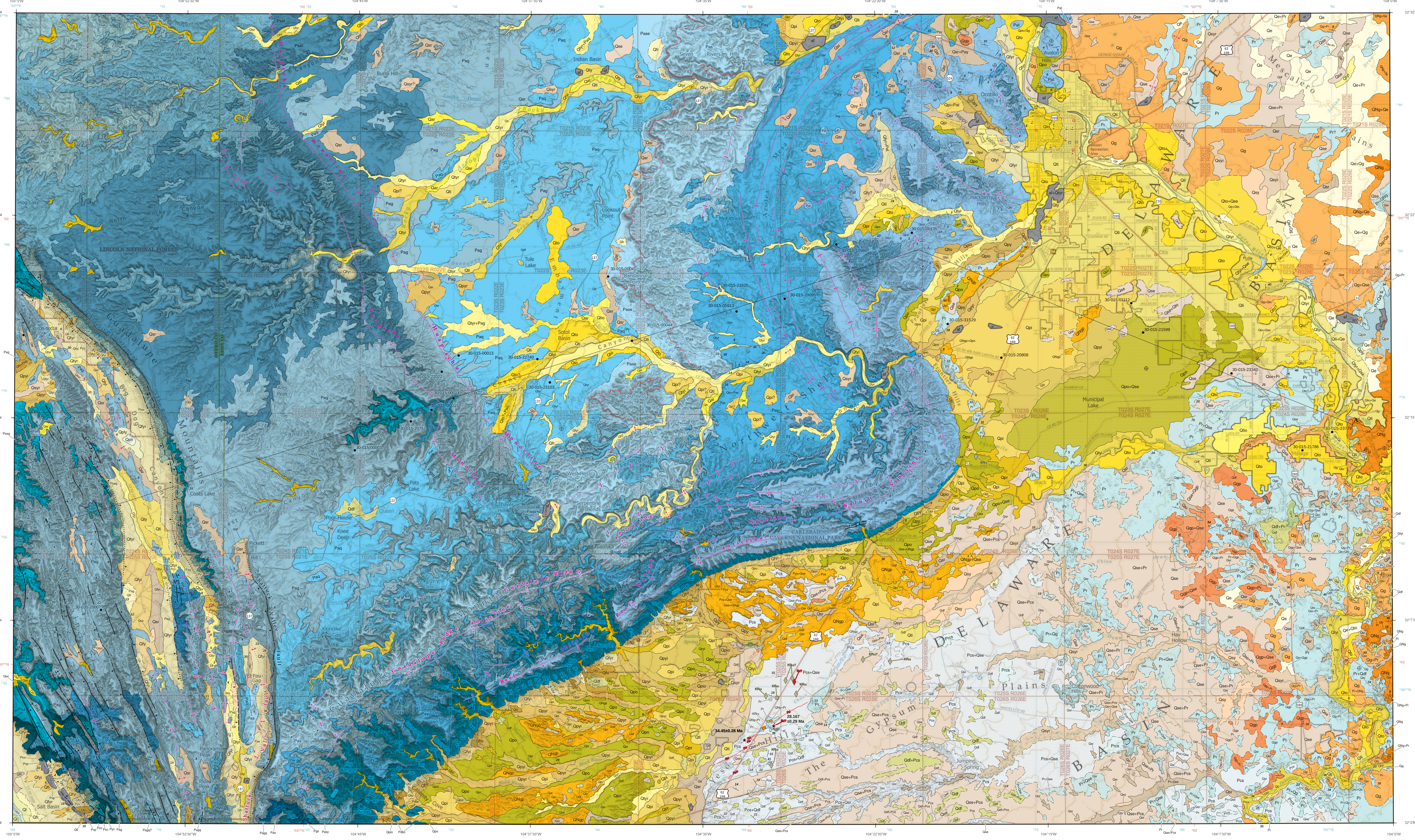


North American Datum of 1983 (NAD83)
Projection and 10,000-meter grid: Universal Transverse Mercator, Zone 13S, shown in blue.
100,000-foot ticks: New Mexico Coordinate System of 1983 (East Zone), shown in red.

Digital base map data.......................U.S. Geological Survey, 2019
Contours and hillshade.......................IFSAR 4.5 m Digital Terrain Model, 2007

1:100,000

Contour Interval 100 Feet

North American Vertical Datum of 1988

Explanation of Map Symbols

Contact—The identity and existence are certain and questionable where queried. 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. Ball and bar are on the downthrown block.

Gradational contact—The identity and existence are certain and questionable where queried. The location is accurate where solid and approximate where dashed.

Unconformable contact—The identity and existence are certain and questionable where queried. The location is accurate where solid and approximate where dashed.

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

Sedimentary facies boundary—Showing approximate boundary between diagnostic mineral assemblages.

Scarp on normal fault—The identity or existence are questionable. The location is accurate. Ball and bar are on the downthrown block. Hachures point downscarp.

Dike—Ri—The identity and existence are certain. The location is accurate.

Key bed—Pgl—The identity and existence are certain. The location is accurate.

Key bed—Psab—The identity and existence are certain. The location is accurate.

Key bed—Psa—The identity and existence are certain. The location is accurate.

Key bed—Pagq—The identity and existence are certain. The location is accurate.

Key bed—Paq—The identity and existence are certain. The location is accurate.

Key bed—Pas—The identity and existence are certain. The location is accurate.

Key bed—Pay—The identity and existence are certain. The location is accurate.

Key bed—Pbss—The identity and existence are certain. The location is accurate.

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.

Monocline, anticlinal bend—The identity and existence are certain. The location is accurate where solid and concealed where dotted. Arrows show direction of dip; shorter arrow on steeper limb.

Monocline, synclinal bend—The identity and existence are certain. The location is accurate where solid and concealed where dotted. Arrows show direction of dip; shorter arrow on steeper limb.

Horizontal bedding.

Inclined bedding—Showing strike and dip.

Oil well showing API number (nonspecific depth)

Area of KRu outcrop point too small to map as an area at map scale. See the accompanying report for unit description.

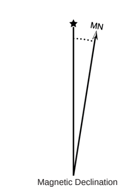
Area of Ri outcrop point too small to map as an area at map scale. See the accompanying report for unit description.

Radiometric sample locality—Showing age (if available at the time of publication).

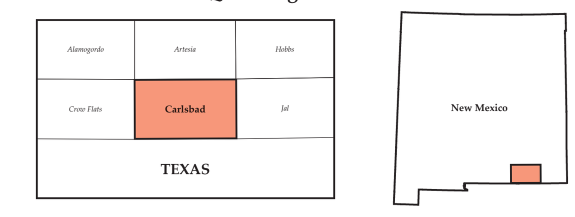
Areas of disturbed land that mask the underlying geology without having a deposit of significant thickness (ie., tilled land, concrete, and/or roads).

Well location (in cross section)—The projected location and depth of a well used to establish stratigraphy and geologic unit depth. Showing well number and total depth if known.

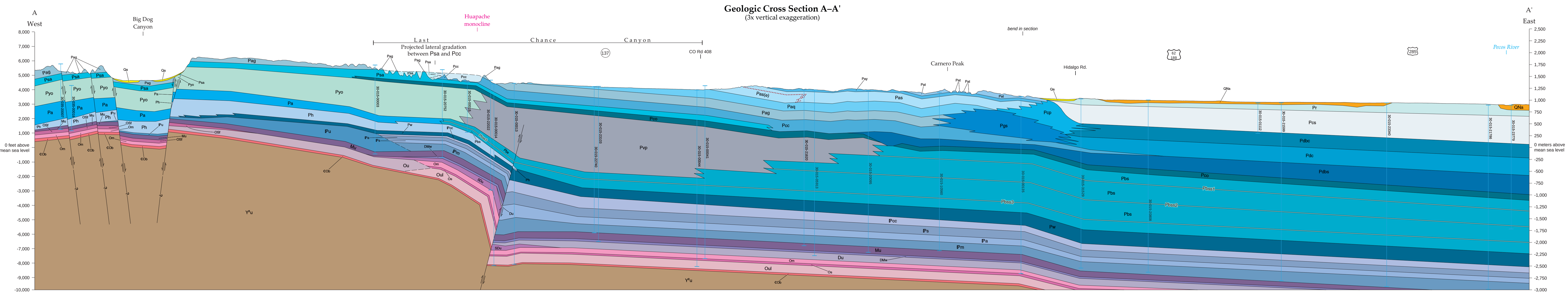
Cross section line and label.



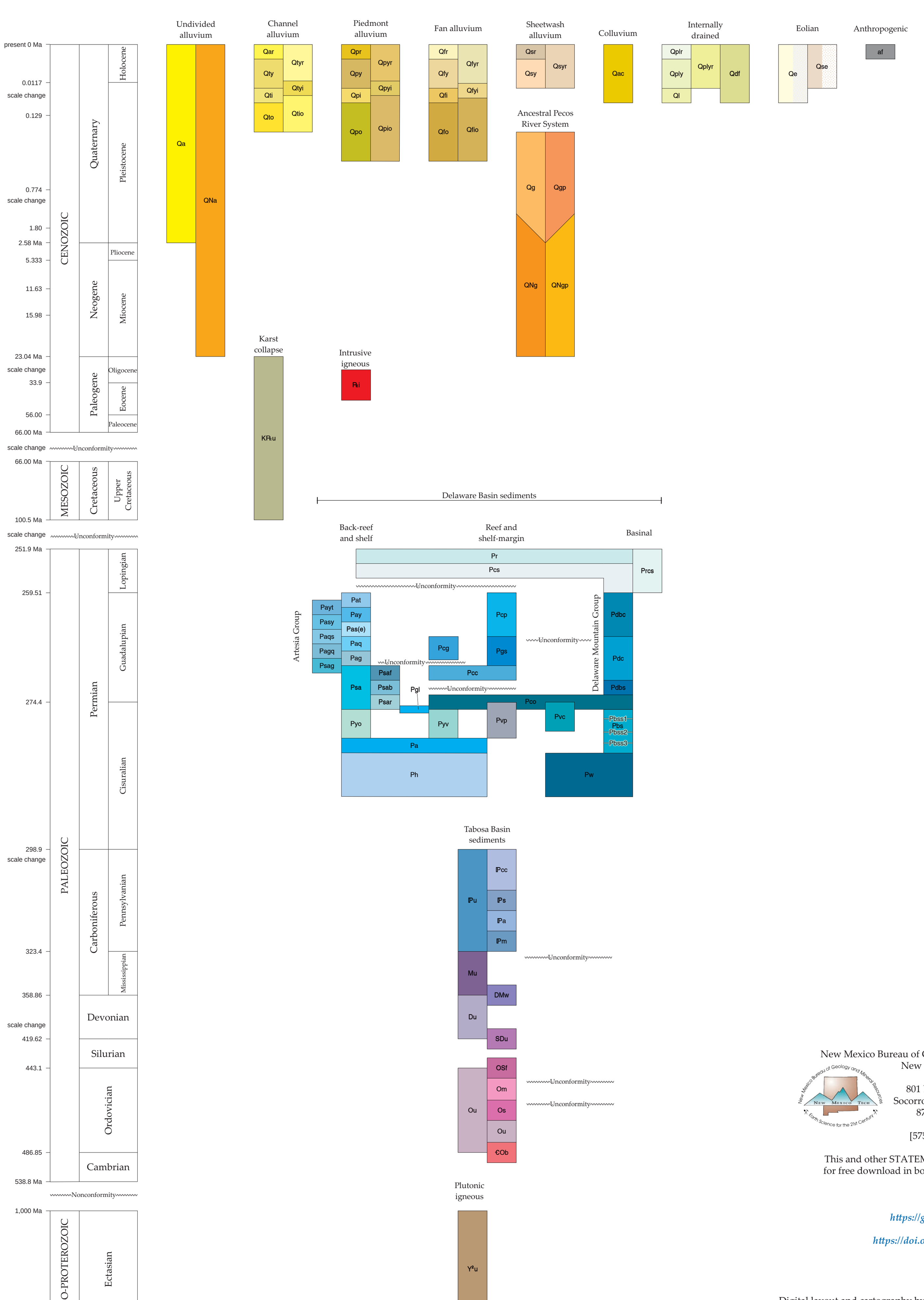
Quadrangle Location



Geologic Cross Section A–A'
(3x vertical exaggeration)



Correlation of Map Units



List of Map Units
(see accompanying report for complete Description of Map Units)

CENOZOIC
Quaternary System
Anthropogenic Units

- af — artificial fill (recent)

Eolian deposits

- Qe — Eolian sediments (recent to late Pleistocene)
- Qse — Sheetwash alluvium and loessal eolian sediments, interbedded (recent to late Pleistocene)

Colluvial deposits

- Qac — Alluvium and colluvium, undifferentiated (recent to late Pleistocene)

Internally drained deposits

- Qdf — Depression fill (recent to Holocene)
- Qplr — Playa sediments, recent (recent to late Pleistocene)
- Qplyr — Playa sediments, younger and recent (recent to Holocene)
- Qply — Playa sediments, younger (Holocene)
- Ql — Lacustrine sediments (late Pleistocene)

Alluvium deposits

- Qa — Alluvium of Quaternary age, undivided (recent to early Pleistocene)—Cross section only.

Sheetwash alluvium deposits

- Qsr — Sheetwash alluvium, recent (recent to Holocene)
- Qsyr — Sheetwash alluvium, younger and recent (recent to late Pleistocene)
- Qsy — Sheetwash alluvium, younger (Holocene to late Pleistocene)

Fan alluvium deposits

- Qfr — Fan alluvium, recent (recent to Holocene)
- Qfyr — Fan alluvium, younger and recent, undifferentiated (recent to late Pleistocene)
- Qfy — Fan alluvium, younger (Holocene to late Pleistocene)
- Qfyi — Fan alluvium, younger and intermediate, undifferentiated (Holocene to late Pleistocene)
- Qfi — Fan alluvium, intermediate (late Pleistocene)
- Qfio — Fan alluvium, intermediate and older, undifferentiated (late to middle Pleistocene)
- Qfo — Fan alluvium, older (late to middle Pleistocene)

Channel alluvium deposits

- Qar — Alluvium, recent (recent to Holocene)
- Qtyr — Recent alluvium and younger terrace alluvium, undifferentiated (recent to late Pleistocene)
- Qty — Terrace alluvium, younger (Holocene to late Pleistocene)
- Qtyi — Terrace alluvium younger and intermediate, undifferentiated (Holocene to late Pleistocene)
- Qti — Terrace alluvium, intermediate (late Pleistocene)
- Qtio — Terrace alluvium, intermediate and older (late to middle Pleistocene)
- Qto — Terrace alluvium, older (late to middle Pleistocene)

Piedmont alluvium deposits

- Qpr — Piedmont alluvium, recent (recent to Holocene)
- Qpyr — Piedmont alluvium, younger and recent, undifferentiated (recent to late Pleistocene)
- Qpy — Piedmont alluvium, younger (Holocene to late Pleistocene)
- Qpyi — Piedmont alluvium, younger and intermediate, undifferentiated (Holocene to late Pleistocene)
- Qpi — Piedmont alluvium, intermediate (late Pleistocene)
- Qpio — Piedmont alluvium, intermediate and older, undifferentiated (late to middle Pleistocene)
- Qpo — Piedmont alluvium, older (late to middle Pleistocene)

Quaternary–Neogene Systems
Basin-fill deposits

- Qg — Gatuña Formation, axial fluvial facies (late Pleistocene to early Pleistocene)
- Qgp — Gatuña Formation, piedmont facies (late Pleistocene to early Pleistocene)
- QNa — Alluvium of Quaternary and Neogene age, undivided (recent to Miocene)—Cross section only.
- QNg — Gatuña Formation, lower axial fluvial facies (early Pleistocene to Miocene)
- QNgp — Gatuña Formation, lower piedmont facies (early Pleistocene to Miocene)

Intrusive rocks

- Ri — Intrusive mafic–intermediate dikes (Eocene to Oligocene)

Cenozoic–Mesozoic Erathems
Paleocene–Cretaceous Systems

- KRu — Fracture fill of Cretaceous strata (Oligocene to late Cretaceous)

PALEOZOIC
Lopingian Series

- Pr — Rustler Formation (Lopingian (Late Permian))
- Prcs — Rustler, Castile, and Salado formations, undivided (Lopingian (Late Permian))
- Pcs — Castile and Salado formations, undivided (Lopingian (Late Permian))

Guadalupian–Cisuralian Series
Shelf deposits

- Pat — Tansill Formation of the Artesia Group (Guadalupian (Late Permian))
- Payt — Yates Formation and Tansill Formation of the Artesia Group, undivided (Guadalupian (Late Permian))
- Pay — Yates Formation of the Artesia Group (Guadalupian (Late Permian))
- Pasy — Seven Rivers Formation and Yates Formation of the Artesia Group, undivided (Guadalupian (Late Permian))
- Pas(e) — Seven Rivers Formation of the Artesia Group (Guadalupian (Late Permian))
- Paqs — Queen Formation and Seven Rivers Formation of the Artesia Group, undivided (Guadalupian (Late Permian))
- Paq — Queen Formation of the Artesia Group (Guadalupian (Late Permian))
- Pagq — Grayburg Formation and Queen Formation of the Artesia Group, undivided (Guadalupian (Late Permian))
- Pag — Grayburg Formation of the Artesia Group (Guadalupian (Late Permian))
- Pcg — Cherry Canyon Sandstone Tongue of the Delaware Mountain Group and Grayburg Formation of the Artesia Group, undivided (Guadalupian (Late Permian))
- Pcc — Cherry Canyon Sandstone Tongue of Deleware Mountain Group (Guadalupian (Late Permian))
- Psag — San Andres Formation and Grayburg Formation of the Artesia Group, undivided (Guadalupian–Cisuralian (Permian))
- Psa — San Andres Formation, undivided (Guadalupian–Cisuralian (Permian))
  - Psaf — Fourmile Draw Member of the San Andres Formation (Guadalupian–Cisuralian (Permian))
  - Psab — Bonney Canyon Member of the San Andres Formation (Guadalupian–Cisuralian (Permian))
  - Psar — Rio Bonito Member of the San Andres Formation (Guadalupian–Cisuralian (Permian))
- Pgl — Glorieta Sandstone (Cisularian (Early Permian))
- Pyv — Yeso Formation and Victorio Peak Limestone, undivided (Cisularian (Early Permian))
- Pyo — Yeso Formation (Cisularian (Early Permian))

Shelf-margin reef deposits

- Pcp — Capitan Formation (Guadalupian (Late Permian))
- Pgs — Goat Seep Dolomite (Guadalupian (Late Permian))

Shelf-margin deposits

- Pco — Cutoff Formation (Guadalupian– Cisuralian (Permian))
- Pvp — Victorio Peak Limestone (Cisularian (Early Permian))
- Pvc — Victorio Peak Limestone and Cherry Canyon Sandstone Tongue of the Delaware Mountain Group, undivided (Cisularian (Early Permian))
- Ph — Hueco Formation (Cisularian (Early Permian))—Cross section only.

Basin deposits
Delaware basin sediments

- Pdbc — Bell Canyon Formation of Deleware Mountain Group (Guadalupian (Late Permian))
- Pdc — Cherry Canyon Formation of Deleware Mountain Group (Guadalupian (Late Permian))
- Pdbs — Brushy Canyon Formation of Deleware Mountain Group (Guadalupian (Late Permian))
- Pbs — Bone Spring Formation (Cisularian (Early Permian))—Cross section only.
- Pbss(1-3) — Bone Spring sand (Cisularian (Early Permian))—Cross section only.
- Pw — Wolfcamp Formation (Cisularian (Early Permian))—Cross section only.

Carboniferous to Cambrian Systems
Tabosa basin sediments

- IPu — Pennsylvanian, undivided (Pennsylvanian (Late Carboniferous))
  - IPcc — Cisco Formation and Canyon Group, undivided (Pennsylvanian (Late Carboniferous))—Cross section only.
  - IPs — Strawn Formation (Pennsylvanian (Late Carboniferous))—Cross section only.
  - IPa — Atoka Formation (Pennsylvanian (Late Carboniferous))—Cross section only.
  - IPm — Morrow Formation (Pennsylvanian (Late Carboniferous))—Cross section only.
- Mu — Mississippian, undivided (Pennsylvanian (Late Carboniferous))—Cross section only.
- DMw — Woodford Shale (Mississippian to Devonian)—Cross section only.
- Du — Devonian, undivided (Devonian)—Cross section only.
- SDu — Silurian, undivided (Silurian)—Cross section only.
- Ou — Ordivician, undivided (Ordovician)
  - OSf — Fusselman Dolostone (Silurian to Ordovician)—Cross section only.
  - Om — Montoya Group (Ordovician)—Cross section only.
  - Oul — Lower Ordivician, undivided (Ordovician)—Cross section only.
  - Os — Simpson Group (Ordovician)—Cross section only.
- ЄOb — Bliss Formation (Ordovician to Cambrian)—Cross section only.
- Y[a]u — Precambrian plutonic igneous rocks (Ectasian)—Cross section only.

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech

801 Leroy Place
Socorro, New Mexico
87801-4796

[575] 835-5490

This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

https://geoinfo.nmt.edu

https://doi.org/10.58799/GM-82

Digital layout and cartography by the NMBGMR GIS Services Program:
Phil L. Miller, Amy L. Dunn, Ann D. Knight,
Tyler Askin, Hannah N. Hunt, and Amanda L.M. Doherty

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program under STATEMAP award number G23AC00578, 2023. Additional support was made possible by the 2023–2024 Technology Enhancement Fund provided by the New Mexico Higher Education Department. Funding is administered by the New Mexico Bureau of Geology and Mineral Resources (Dr. J. Michael Timmons, Director; Dr. Matthew J. Zimmerer, *Associate Director of Mapping and Hazards*).

Geologic Map of the Carlsbad 30 x 60-Minute Quadrangle, Eddy and Otero Counties, New Mexico; and Culberson, Hudspeth, and Reeves Counties, Texas

New Mexico Bureau of Geology and Mineral Resources
Geologic Map 82

April 2026

by

Jon M. Krupnick[1], Tyler Askin[1], Bruce D. Allen[1], Michelle M. Gavel[2], and Victor J. Polyak[3]

[1]*New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Place, Socorro, NM, 87801*
[2]*TerranearPMC LLC, 4200 West Jemez Road, Los Alamos, NM 87544*
[3]*Department of Earth and Planetary Sciences, UNM Albuquerque, NM 87131*

Comments to Map Users

A geologic map displays information on the distribution, nature, orientation, and age relationships of rocks and deposits, and the occurrence of structural features. Lithologic and fault contacts are irregular surfaces that form boundaries between different ages or types of units. Data depicted on this geologic map may be based on any of the following: field geologic mapping, a compilation of published and unpublished work, and/or photogeologic interpretation. Locations of contacts are not surveyed but are plotted by relative position on a topographic or orthophotographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the geologist's interpretation.

Resizing this map would cause the details of the map to be misrepresented and result in erroneous interpretations. Using this product at a scale different than originally intended requires verification of site-specific conditions with detailed surface mapping or subsurface exploration. Topographic and cultural changes may not be shown due to recent development.

Cross sections are constructed based on the author's interpretations of geologic mapping and available geophysical and subsurface (drill hole) data. Cross sections should be used to understand the map area's general geologic framework and not be the sole source of information for locating or designing wells, buildings, roads, or other human-made structures.

Point symbols can be set to rotate around a point of observation using their azimuth values. The point of observation can be one of three possibilities: the trailing end—or tail—opposite the arrowhead or other ornamentation of the symbol; the midpoint—or center of the symbol; or the head of the symbol. See the symbol codes described in the GIS data (FGDC_Symbols nonspatial table) for attributes that describe the azimuth measurement convention and the location of the point of observation for each symbol.

Each publication carries the original date of publication and the latest revision date. Occasionally updates are required and in many cases these updates are only made to the GIS data in the Geodatabase, not the PDF. It is beneficial to compare the GIS data with the PDF to review any changes. While maps are created, updated, and produced as a GIS geodatabase, even if updates are carried out on the GIS data files, citations to these maps should reflect this original publication date with the revisions date and the original authors listed. If required, the updated data as digital products are available for download from the map's publication webpage.

The views and conclusions in these map documents are those of the authors and should not be interpreted as necessarily representing the official policies, expressed or implied, of the State of New Mexico or the U.S. Government.