

North American Datum of 1983 (NAD83)
Projection and 1,000-meter grid. Universal Transverse Mercator, Zone 13S, shown in blue.
10,000-foot scale. New Mexico Coordinate System of 1983 Control Points, shown in red.

Digital base map data: U.S. Geological Survey, 2019
Contours and Mileage: IFM44-4.5 in Digital Terrain Model, 2017

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<https://goinfo.nmt.edu>
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Geologic Map of the Navajo Peak 7.5-Minute Quadrangle, Rio Arriba County, New Mexico

April 2026

by
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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.

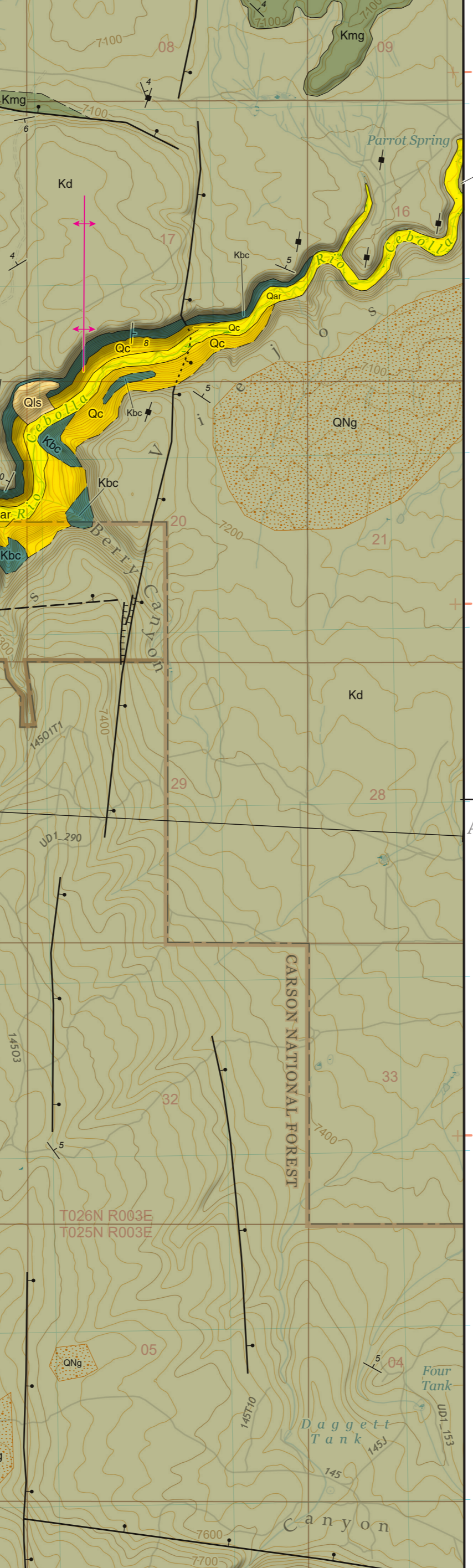
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The views and conclusions in these map documents are those of the authors and should not be interpreted as necessarily representing the official policies, expressed or implied, of the State of New Mexico or the U.S. Government.

Correlation of Map Units



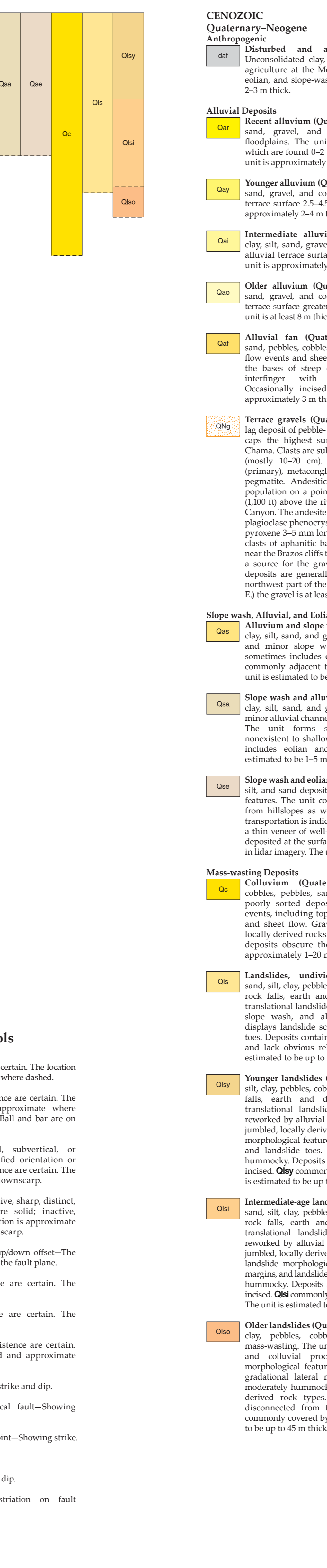
Explanation of Map Symbols

- 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. Ball and bar are on the downthrown block.
- Scarp on fault (generic, vertical, subvertical, or high-angle) or unknown or unspecified orientation or sense of slip—The identity and existence are certain. The location is accurate. Hatchures point downscarp.
- Head or main scarp of landslide—Active, sharp, distinct, and the location is accurate where solid; inactive, subdued, indistinct, and (or) the location is approximate where dashed. Hatchures point down scarp.
- Fault in cross section showing local updown offset—The location is accurate.
- Anticline—The identity and existence are certain. The location is accurate.
- Syncline—The identity and existence are certain. The location is accurate.
- Key bed—*Jmw*—The identity and existence are certain. The location is accurate where solid and approximate where dashed.
- Small, minor inclined fault—Showing strike and dip.
- Small, minor vertical or near-vertical fault—Showing strike.
- Inclined bedding—Showing strike and dip.
- Inclined slickenline, groove, or striation on fault surface—Showing trend and plunge.
- Cross section line and label.

Description of Map Units

- CENOZOIC**
- Quaternary-Neogene**
- Anthropogenic**
- Qcl** Disturbed and artificial fill (late Holocene)—Unconsolidated clay, silt, and fine sand associated with agriculture at the Monastery. The unit contains alluvial, eolian, and slope-wash input. The unit is estimated to be 2-3 m thick.
 - Qcl** Recent alluvium (Quaternary)—Unconsolidated clay, silt, sand, gravel, and cobbles in active channels and floodplains. The unit also includes the lowest terraces, which are found 0-2 m above modern channel grade. The unit is approximately 1-2 m thick.
 - Qcl** Younger alluvium (Quaternary)—Unconsolidated clay, silt, sand, gravel, and cobbles that form an inactive alluvial terrace surface 2.5-4.5 m above channel grade. The unit is approximately 2-4 m thick.
 - Qcl** Intermediate alluvium (Quaternary)—Unconsolidated clay, silt, sand, gravel, and cobbles that form an inactive alluvial terrace surface 4-7 m above channel grade. The unit is approximately 4-7 m thick.
 - Qcl** Older alluvium (Quaternary)—Unconsolidated clay, silt, sand, gravel, and cobbles that form an inactive alluvial terrace surface greater than 8 m above channel grade. The unit is at least 8 m thick.
 - Qcl** Alluvial fan (Quaternary)—Unconsolidated clay, silt, sand, pebbles, cobbles, and boulders deposited by debris-flow events and sheetwash. The unit forms fan shapes at the base of steep channels. Deposits grade into and interfinger with adjacent Quaternary deposits. Occasionally incised by active channels. Deposits are approximately 3 m thick.
 - Qcl** Terrace gravels (Quaternary-Neogene)—Unconsolidated lag deposit of pebble- to cobble-gravel that discontinuously caps the highest surfaces on volcanic cones and the Rio Chama. Clasts are subrounded to subangular and 1-30 cm (mostly 10-20 cm). Clast lithologies include quartzite (primary), metaconglomerate, granite, gneiss, schist, and pegmatite. Andesitic clasts make up 24% of the clast population on a point overlooking the Rio Chama 33% (1,000 ft) above the river between Dark Canyon and Mine Canyon. The andesite clasts are crystal-rich with about 25% plagioclase phenocrysts 1-3 mm long and about 3% altered pyroxene 3-5 mm long in a black, aphanitic matrix. A few clasts of aphanitic basalt were also observed. The basalt near the Brazos cliffs to the east in the Tusas Range could be a source for the gravels observed in the map area. Lag deposits are generally less than one meter thick. In the northwest part of the quadrangle (section 15, T. 26 N, R. 2 E) the gravels are at least 12 m thick.
 - Qcl** Slope wash, alluvium, and eolian deposits
 - Qcl** Alluvium and slope wash (Quaternary)—Unconsolidated clay, silt, sand, and gravel deposited by alluvial channels and minor slope wash into valley bottoms. The unit sometimes includes eolian and colluvial deposits and is commonly adjacent to and interfingering with **Qsa**. The unit is estimated to be 1-5 m thick.
 - Qcl** Slope wash and alluvium (Quaternary)—Unconsolidated clay, silt, sand, and gravel deposited by slope wash and minor alluvial channels into small basins and on hilltops. The unit forms smooth, sloped topography with numerous to shallowly incised channels and sometimes includes eolian and colluvial deposits. The unit is estimated to be 1-5 m thick.
 - Qcl** Slope wash and eolian (Quaternary)—Unconsolidated clay, silt, and sand deposited in small depressions on landslide features. The unit contains sheet-flow sediments sourced from hillslopes as well as windblown sediments. Eolian transportation is indicated by other subdued dune forms or a thin veneer of well-sorted, silt to fine-grained sand deposited at the surface. The unit exhibits a bumpy texture in lidar imagery. The unit is up to 3 m thick.
- Mass-wasting Deposits**
- Qcl** Colluvium (Quaternary)—Unconsolidated boulders, cobbles, pebbles, sand, silt, and clay that form thick, poorly sorted deposits from undivided mass-wasting events, including topples, slides, earth and debris flows, slope wash, and alluvial input. The unit commonly displays landslide scars, lateral margins, and landslide toes. Deposits contain jumbled, locally derived rock types and lack obvious relative-age relationships. The unit is estimated to be up to 45 m thick.
 - Qcl** Landslides, undivided (Quaternary)—Unconsolidated sand, silt, clay, pebbles, cobbles, and boulders deposited by rock falls, earth and debris flows, and rotational and translational landslides. The unit contains minor colluvial, slope wash, and alluvial input. The unit commonly displays landslide scars, lateral margins, and landslide toes. Deposits contain jumbled, locally derived rock types and lack obvious relative-age relationships. The unit is estimated to be up to 45 m thick.
 - Qcl** Younger landslides (Quaternary)—Unconsolidated sand, silt, clay, pebbles, cobbles, and boulders deposited by rock falls, earth and debris flows, and rotational and translational landslides. The unit has been somewhat reworked by alluvial and colluvial processes and contains jumbled, locally derived rock types. The unit displays fresh morphological features, including scars, lateral margins, and landslide toes. Topography is moderately to very hummocky. Deposits are commonly not incised or minimally incised. **Qcl** commonly cuts across **Qsl** and **Qls**. The unit is estimated to be up to 45 m thick.
 - Qcl** Intermediate-age landslides (Quaternary)—Unconsolidated sand, silt, clay, pebbles, cobbles, and boulders deposited by rock falls, earth and debris flows, and rotational and translational landslides. The unit has been somewhat reworked by alluvial and colluvial processes and contains jumbled, locally derived rock types. The unit displays muted morphological features, including scars, lateral margins and landslide toes. Topography is moderately to very hummocky. Deposits are commonly not incised or minimally incised. **Qcl** commonly crosscut **Qsl** and is crosscut by **Qcl**. The unit is estimated to be up to 45 m thick.
 - Qcl** Older landslides (Quaternary)—Unconsolidated sand, silt, clay, pebbles, cobbles, and boulders deposited by mass-wasting. The unit is commonly reworked by alluvial and colluvial processes. The unit displays subtle morphological features, with poorly defined scars and gradational lateral margins. Topography is smooth to moderately hummocky. Deposits contain jumbled, locally derived rock types. Deposits of **Qcl** are commonly disconnected from the landslide source area. **Qcl** is commonly covered by **Qcl** and **Qls**. The unit is estimated to be up to 45 m thick.
- ME SOZOIC**
- Kmg** Morrison Formation, Brushy Basin Member (Late Jurassic)—The Brushy Basin Member of the Morrison Formation consists of variegated light-greenish-gray, light-gray, grayish-yellow-green, light-olive-gray, yellowish-brown, and drab-reddish-brown mudstones with discontinuous beds of cross-bedded to massive white, yellow, tan, or grayish-tan sandstone. Mudstones have moderate silt and minor very fine sand content. Sandstone interbeds are poorly to moderately sorted, fine to coarse-grained, and subangular to well-rounded. The iron-bearing minerals in these sandstones are commonly altered to 2-4 mm oxidation spots, giving the sandstones a speckled appearance on weathered surfaces. Sandstones are typically moderately to well-indurated, and occasionally contain green rip-up clasts, burrows, and large (2-4 m) spherical, iron-cemented concretions. The basal contact is conformable, but abrupt, with the underlying Westwater Canyon Member of the Morrison Formation. The upper contact with the overlying Burro Canyon Formation is sharp and disconformable with significant paleogeography. The unit is up to 68 m thick.
 - Jms** Morrison Formation, Westwater Canyon Member (Late Jurassic)—The Westwater Canyon Member is the middle member of the Morrison Formation. This unit consists of white to buff, ledge-forming, laminated to trough-cross-bedded sandstone with occasional conglomeratic sandstone, and abundant horizons of mudstone rip-up clasts. Channel forms are common. The sandstone is fine- to coarse-grained and poorly sorted; sand grains are subangular to well-rounded. Feldspar is usually altered to clay, forming either white clay clots or a pitted texture where the feldspars have completely weathered. Common 0.5-1.0 cm light-green to yellowish oxidation spots, intervals of red and green silt mudstone rip-up horizons reach 6-8 m above base while isolated rip-ups are found throughout; commonly scoured by sandstone channels. Variable thickness throughout the quadrangle, thin or locally absent to the south-southeast. The basal contact is conformable. The upper contact is abrupt, but conformable, with the overlying Brushy Basin Member of the Morrison Formation. Where present, the unit is up to 50 m thick.
 - Jms** Morrison Formation, Recapture Member (Middle to Late Jurassic)—The Recapture Member consists of drab-maroon to grayish-red or white to gray sandstone, siltstone, and sandy siltstone. Sandstones are light-maroon to whitish, very fine- to medium-grained, poorly to moderately indurated, and are occasionally calcium-carbonate cemented. Sandstones are found in 3-10-cm-thick beds with 0.25-1-cm laminae, and commonly display platy or flaggy bedding. Occasional intervals contain nodules and thin beds of limestone near the base of the unit. Mud-rip-up clasts are present throughout the unit. Siltstones are red, green, and white with variable clay and sand content. Siltstones are occasionally scoured by sandstones. The base of the unit is sandier toward the northern edge of the quadrangle and the unit is white-yellow at its base, right above the Todillo Formation. The thick sandstone interval at the base of the unit in the northern part of the quadrangle may correlate to the Salt Wash Member of the Morrison Formation (Dickinson, 2016). Samples were collected for detrital-sandstone analysis to test this correlation, but the dates are not available at the time of this writing. The unit thickens to the north. The unit is 75-170 m thick.
- PALEOZOIC**
- Tcu** Triassic, Upper Chile Group (Late Triassic)—The upper Chile Group includes mudstones, siltstones, and sandstones of the Rock Point and Petrified Forest formations. These units are eroded because the Rock Point gash is preserved in a cliff just below the Entrada Sandstone cliffs, and thus is difficult to see on the map. This unit is exposed in the southern part of the quadrangle. The uppermost Rock Point Formation consists of 10-30 m of reddish-brown, and grayish-red beds of siltstone and fine sandstone. The top of the Rock Point Formation is marked by a sharp, unconformable contact with the Entrada Sandstone (the F2 unconformity of Phipps and Osullivan [1976]), and the bottom of the unit is disconformable with the underlying Petrified Forest Formation. Only the top 70-80 m of the Famed Desert Member of the Petrified Forest Formation is exposed on the quadrangle. This member is a reddish-brown, bentonitic mudstone with thin ledges and lenses of ripple-laminated or cross-bedded sandstone. Petrified wood is common throughout the unit. The exposed thickness of this combined unit is 80 m.
 - Tcu** Lower Chile Group (Late Triassic)—The lower Chile Group contains the Mesa Montana Member of the Petrified Forest Formation, the Poles Formation, and the Saltil Formation, all of which are exposed on an east-dipping ridge adjacent to the Tierra Montañosa fault zone. The Mesa Montana Member is a red, ripple-laminated, fine-grained sandstone. The Poles Formation consists of white and red sandstone, with minor conglomerate. The sandstone is fine- to medium-grained, with angular to subangular grains. The sandstone contains abundant mica, feldspar, and lithic grains. Conglomeratic intervals contain clasts of siltstone, nodular calcareous chert, and quartzite. Plant fossils were observed in the Poles Formation where Dark Canyon intersects with the Tierra Montañosa fault. The Saltil Formation consists of 10-10 m of poorly exposed, red to maroon shale and siltstone. The Agua Zarca Sandstone, which consists of 1-2 m of white, quartz-rich, coarse-grained sandstone beds with quartz pebbles on the adjacent Laves 15-minute map to the west, is not exposed on this quadrangle. The total exposed thickness of the lower Chile Group is approximately 100 m.
 - Pm** Permian, Cutler Formation (Early Permian)—The Cutler Formation contains red, maroon, and white siltstones, arkosic sandstones and minor intraformational and extraformational conglomerates. The sandstones are mudstone-white and orange-red to maroon, calcium-carbonate cemented, medium- to very coarse-grained, and angular to subangular. Flattened, green mud-rip-ups are found at the base of channels. The unit occasionally displays soft sediment deformation. Conglomerates contain well-rounded, pebble- to cobble-sized clasts of chert, Proterozoic granitic rocks, and quartzite. Thick, slope-forming siltstones contain abundant calcareous nodules and are interbedded with thin sandstone sheets that are massive to trough-cross-bedded. The unit is 100-440 m thick (Fitter, 1988; Lookingbill, 1993).
 - Pm** Pennsylvanian, Madera Formation (Pennsylvanian)—Arkosic sandstone, sandstone, and limestone. (Cross section only)
 - Pcu** Proterozoic rocks (Proterozoic)—Igneous and metamorphic rocks ranging from 17 to 14 Ga. (Cross section only)

Geologic Cross Section A-A'



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 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.

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NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES
Geologic Map 86

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 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.

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