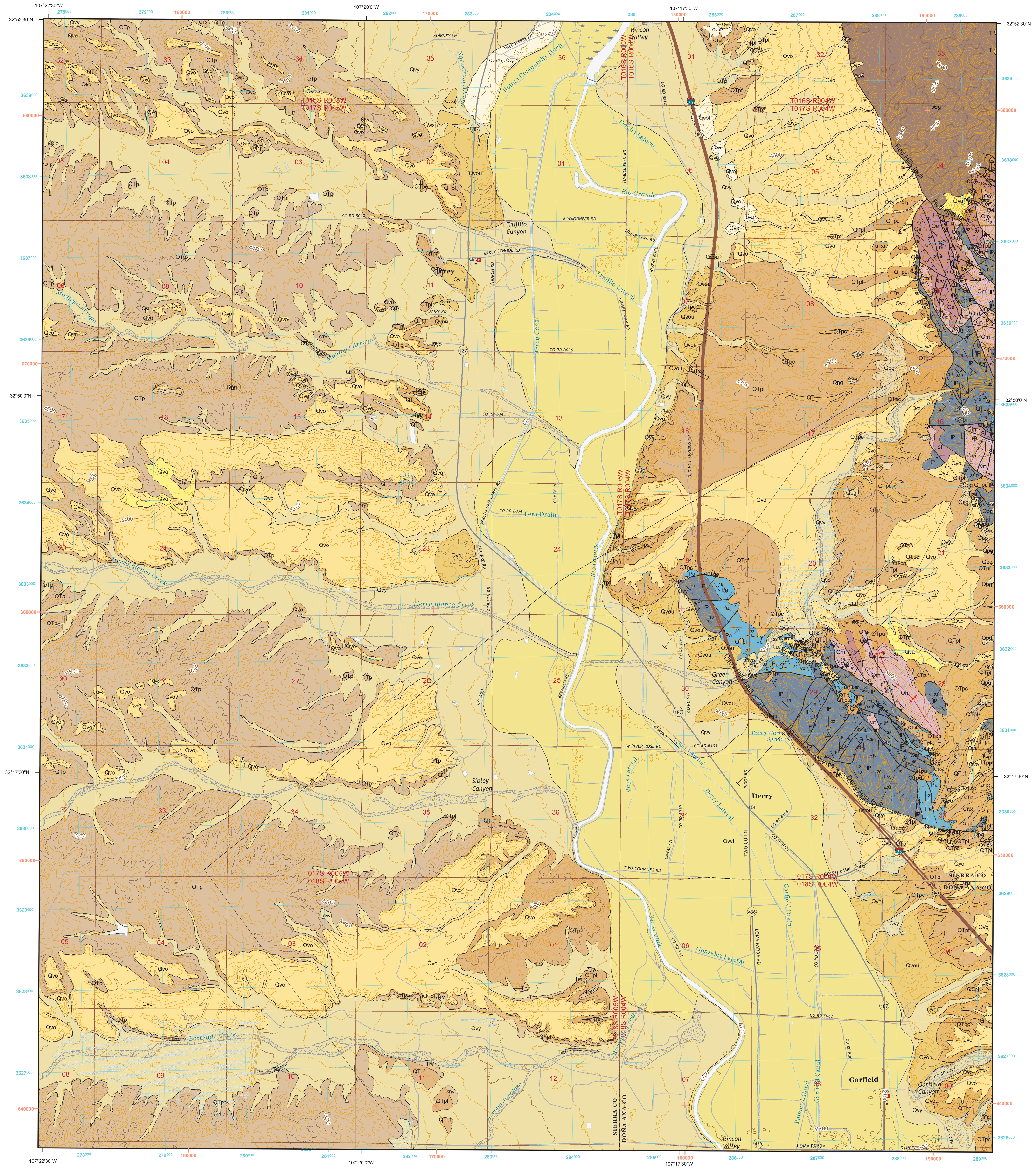
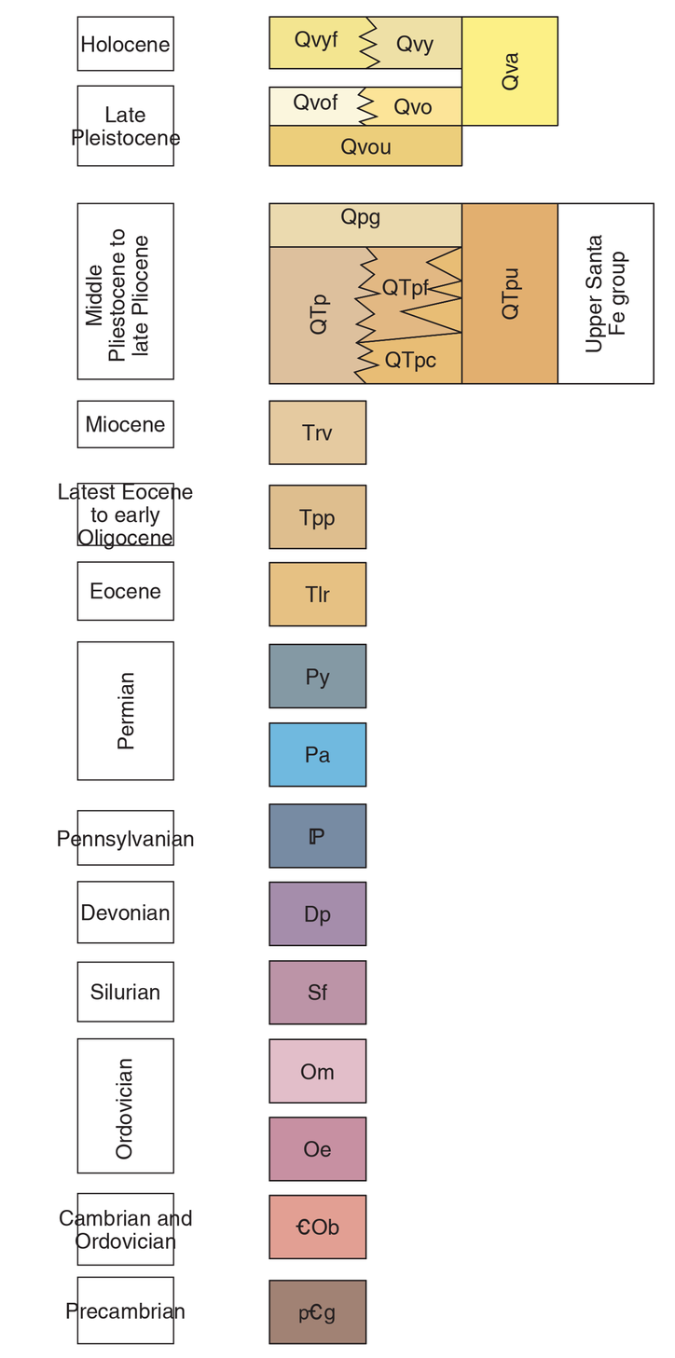
NMBGMR Open-File Geologic Map XXX
Last Modified June 2019





Explanation of Map Units

01.01.01 Contact—Identity and existence are certain. Location is accurate.

01.01.03 Contact—Identity and existence are certain. Location is approximate.

02.01.01 Fault (generic; vertical, subvertical, or high-angle; or unknown or unspecified orientation or sense of slip)—Identity and existence are certain. Location is accurate.

02.01.03 Fault (generic; vertical, subvertical, or high-angle; or unknown or unspecified orientation or sense of slip)—Identity and existence are certain. Location is approximate.

02.01.07 Fault (generic; vertical, subvertical, or high-angle; or unknown or unspecified orientation or sense of slip)—Identity and existence are certain. Location is concealed.

02.02.01 Normal fault—Identity and existence are certain. Location is accurate. Ball and bar on downthrown block.

02.02.03 Normal fault—Identity and existence are certain. Location is approximate. Ball and bar on downthrown block.

02.02.07 Normal fault—Identity and existence are certain. Location is concealed. Ball and bar on downthrown block.

02.08.01 Thrust fault (1st option)—Identity and existence are certain. Location is accurate. Sawteeth on upper (tectonically higher) plate.

02.08.03 Thrust fault (1st option)—Identity and existence are certain. Location is approximate. Sawteeth on upper (tectonically higher) plate.

02.08.07 Thrust fault (1st option)—Identity and existence are certain. Location is concealed. Sawteeth on upper (tectonically higher) plate.

31.08 Map neatline

05.01.01 Anticline (1st option)—Identity and existence are certain. Location is accurate.

05.01.07 Anticline (1st option)—Identity and existence are certain. Location is concealed.

05.03.17 Overturned anticline (1st option)—Identity and existence are certain. Location is accurate. Beds on one limb are overturned; arrows show dip direction of limbs.

02.11.09 Inclined fault (2nd option)—Showing dip value and direction.

06.01 Horizontal bedding

06.02 Inclined bedding—Showing strike and dip.

06.03 Vertical bedding—Showing strike.

06.04 Overturned bedding—Showing strike and dip.

09.017 Inclined slickenline, groove, or striation on fault surface—Showing bearing and rake.

31.10 Cross section line and label

PLSSTownship

PLSSFirstDivision

Description of Map Units

01-01-00-00-00—Unit—Qvy—Younger valley-fill alluvium —Arroyo, fan and terrace deposits (from boulder gravel to clay-silt) associated with surfaces graded to or within a few feet of the modern Rio Grande floodplain; unit intertounges with and overlaps Qvyf; as much as 12 m (40 ft) thick

01-02-00-00-00—Unit—Qvyf—Younger valley-fill fluvial facies—Rio Grande floodplain and channel deposits (mostly gravel, sand, and clay); as much as 21 m (69 ft) thick

01-03-00-00-00—Unit—Qvo—Older valley-fill alluvium—Arroyo, fan, and terrace deposits and erosion-surface veneers (from boulder gravel to silt-clay) associated with graded surfaces formedduring at least three major episodes of valley entrenchmentsnf partial back filling; pedogenic lime cements uppermost parts of deposits, especially the older (higher) ones; as much as 30 m (99 ft) thick

01-04-00-00-00—Unit—Qvof—Older valley-fill fluvial facies—River-channel and floodplain deposits (sand to cobble gravel with lesser silt-clay) as much as 55 m (181 ft) above the modern river floodplain; unit interfingers with at least the lowest of the three Qvo deposits; as much as 15 m (50 ft) thick

01-05-00-00-00—Unit—Qvou—Intertounging Qvo and Qvof—Intertounging Qvo and Qvof

01-06-00-00-00—Unit—Qva—Undifferentiated Qvo and Qvy—Undifferentiated Qvo and Qvy

02-00-00-00-00—Heading—Upper Santa Fe Group—Upper Santa Fe Group, Palomas Formation—Qpg, QTp, QTpf, QTpc, QTpu (Descriptions of individual units listed below)

02-01-00-00-00—Unit—Qpg—Upper piedmont-slope facies—Boulder to pebble conglomerate and gravel with zones of well-developed (stage IV) soil carbonate as much as 0.8 m (2.5 ft) thick; unit is 18 m (60 ft) or more thick near mountain fronts, thinning basinward

02-02-00-00-00—Unit—QTp—Distal piedmont-slope facies—Pink, tan, and brown mudstone, siltstone and sandstone with thin soil-carbonate horizons and thin interbeds of pebble conglomerate or gravel; unit consists of the distal parts of Black Range alluvial fans on the western side of the Rio Grande and represents environments of deposition ranging from arroyo channel and overbank to alluvial flat; intertounges locally with QTpf; at least 75 m (247 ft) thick

02-03-00-00-00—Unit—QTpf—Fluvial and associated facies —Light-gray, yellow, and pink to tan sand, sandstone, gravel, conglomerate, conglomeratic sandstone, and mudstone representing fluvial-channel and overbank depositsof the ancestral Rio Grande as well adjacent alluvial-flatand eolian environments; tonguesof piedmont-slope conglomerate (QTpc) are interbedded with the unit; as much as 100 m (329 ft) thick

02-04-00-00-00—Unit—QTpc—Piedmont-slope fanglomerate—Well to modereately cemented, tan to red or pink boulder to cobble-pebble conglomerate; dervied largely from Caballo Mountain fault blocks and Derry Hills: intertounges with QTpf and QTp' at least 100 m (329 ft) thick and perhaps thicker in the subsurface

02-05-00-00-00—Unit—QTpu—Qpg and QTpc undifferentiated—Locally contains tongues of QTpf

03-01-00-00-00—Unit—Trv—Lower Santa Fe Group, Rincon Valley Formation—Pale-red gypsiferous claystone, mudstone, and siltstone that formed on playas and alluvial flatson "early rift" basin floors; slightly tilted, at least locally; approximately 15 m (50 ft) exposed

03-02-00-00-00—Unit—Tpp—Palm Park Formation—Cobble-Boulder conglomerate derived from Precambrian granite, Paleozoic carbonates and sandstone, and uppermost Cretatp lower Tertiary hypabyssal porphyrys or lavas; andesitic strata; only 30-60 m (99-197 ft) are exposed in Garfield quadrangle, but the information is 455 m (1,500 ft) or more thick in adjacent areas

03-03-00-00-00—Unit—Tlr—Love Ranch Formation—Reddish-brown to reddish-gray cobble-boulder conglomerate, conglomeritic sandstone, and arkosic sandstone, siltstone, and mudstone; Derived largely from precambrian granite and Paleozoic carbonates and sandstone; only 30 m (99 ft) are exposed in Garfield quadrangle, but the formation may be more than 150 m (493 ft) thick in adjacent parts of the Caballo Mountains.

03-04-00-00-00—Unit—Py—Yeso Formation—Orange to pale-red, very fine grained sandstone and subordinate siltstone and shale, approximately 76 m (250 ft) thick (Meseta Blanca Member), overlain by at least 21 m (69 ft) of medium-bedded, light- to dark-gray limestone (red siltstone-dolomite member); Yeso is poorly exposed in Garfield quadrangle, but the formation is at least 97 m (319 ft) thick in adjacent areas

03-05-00-00-00—Unit—Pa—Abo Formation—Reddish-brown to light-brown sandstone interbedded with grayish-red shale, claystone, and siltstone; chert- and limestone-pebble conglomerate, coarse-grained arkosic sandstone, and fresh-water limestone are present at the base; approximately 141 m (463 ft) thick

03-06-00-00-00—Unit—*—Magdalena Group—Lower unit of gray to green shale, thin- to medium-bedded limestone, and tan quartzite (Red House Formation), approximately 64 m (210 ft) thick, grading upward into medial unit of medium of medium- to thick-bedded, fossiliferous, gray limestone, which is often cherty, and interbedded shale (Nakaye Formation), approximately 151 m (496 ft) thick; upper unit consists of soft, gray to purple, argillaceous limestone and calcareous shale with interbedded fossiliferous limestone ledges and chert-pebble conglomerate (Bar B Formation) and is approximately 62 m (204 ft) thick; total thickness is approximately 277 m (463 ft) thick

03-07-00-00-00—Unit—Dp—Percha Formation—Black to gray fissile shale at least 19 m (62 ft) thick along western margin of Derry Hills

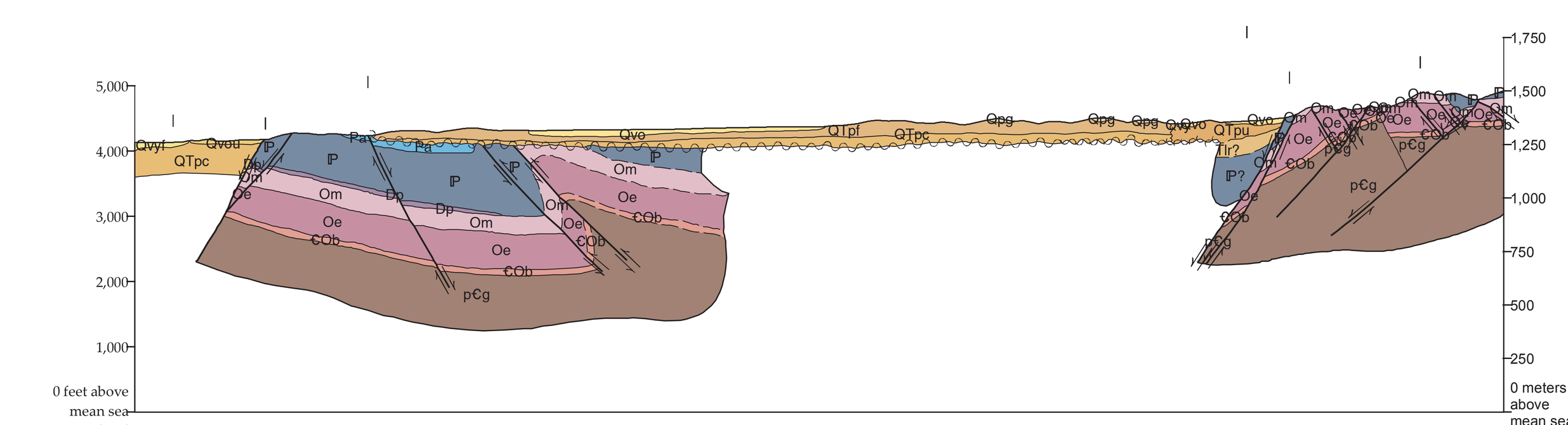
03-08-00-00-00—Unit—Sf—Fusselman Dolomite—Basal unit of tan, sandy dolomite approximately 5 m (16.5 ft) thick overlain by dark brownish-gray, cherty dolomite approximately 21 m (69 ft) thick

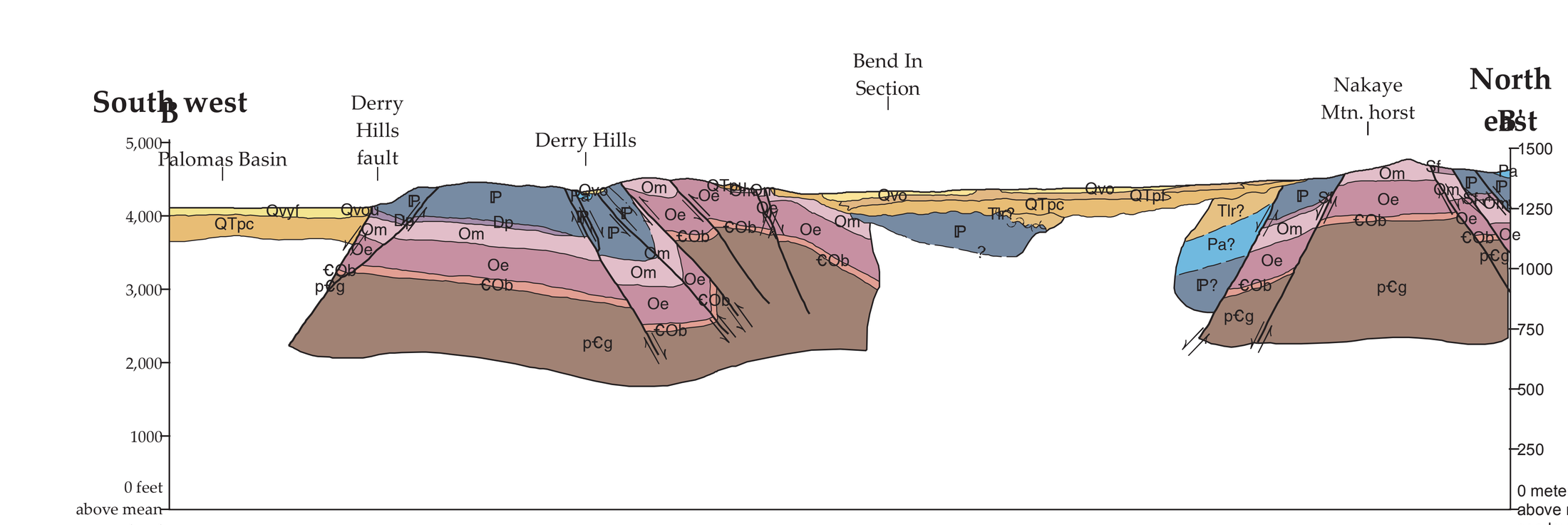
03-09-00-00-00—Unit—Om—Montoya Dolomite—Basal, tan to brown, coarse-grained Cable Canyon Sandstone, approximately 6 m (20 ft) thick, overlain by massive, dark-gray, coarse-grained Upham Dolomite, 21 m (69 ft) thick, followed by 46 m (151 ft) of very cherty, light- to dark-gray, fine- to medium-grained Aleman Dolomite; formation is capped by 43 m (141 ft) of light- to medium-gray, medium-bedded Cutter Dolomite; total thickness is approximately 116 m (381 ft)

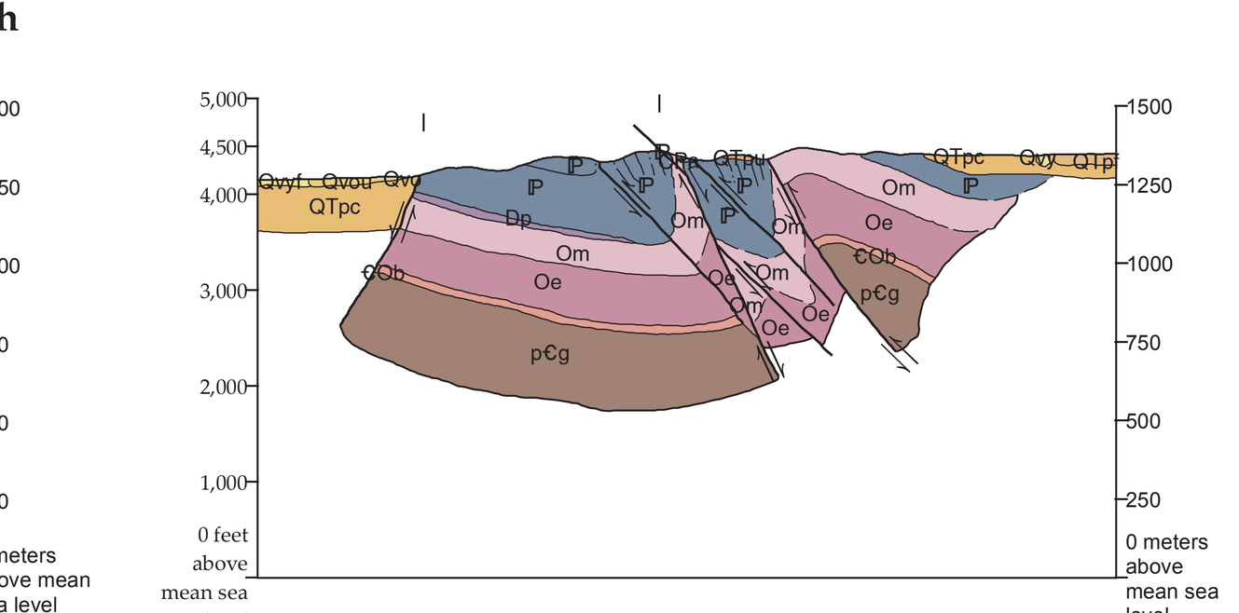
03-10-00-00-00—Unit—Oe—El Paso Formation—Lower Hitt Canyon member consists of approximately 91 m (299 ft) of medium-bedded, burrowed, mottled, limestone, sandy at the base: medial Jose Member, approximately 7 m (23 ft) thick, is dark-gray, burrowed and mottled, oolitic limestone; upper McKelligon Membar is 54 m (178 ft) thick and is largely light-colored, fine-grained dolomite; total thickness is approximately 152 m (499 ft)

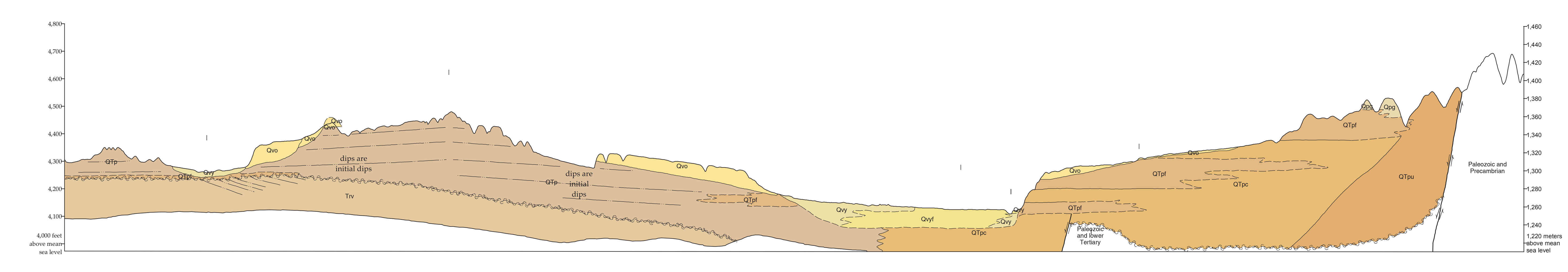
03-11-00-00-00—Unit—_Ob—Bliss Formation—Brown to nearly black, hematic to glauconitic arkosic sandstone, gray orthoquartzite, and dark-brown to greenish-brown siltstone, dolomite, limestone, and shale; approximately 35 m (115 ft) thick

03-12-00-00-00—Unit—=g—Granite—Red, coarse- to fine-grained microcline granite with scattered small bodies of syenite



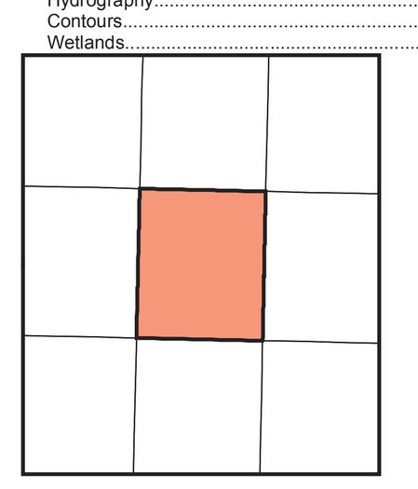


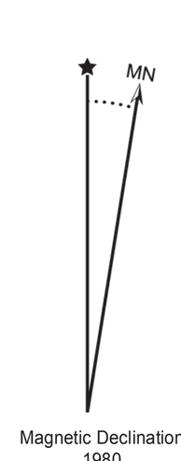




Base map from U.S. Geological Survey 2017.
North American Datum of 1927 (NAD27)
Projection and 1,000-meter grid: Universal Transverse Mercator, Zone 13S, shown in blue.
10,000-foot ticks: New Mexico Coordinate System of 1927 (central zone), shown in red.

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





Magnetic Declination
1980
11° 30' East
At Map Center

Quadrangle Location

1:24,000

Contour Interval 20 Feet
National Geodetic Vertical Datum 1929

New Mexico Bureau of Geology and Mineral Resources
Bulletin 128

Mapping of this quadrangle was funded by the New Mexico Bureau of Geology and Mineral Resources.

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:

http://geoinfo.nmt.edu

Geologic Map of the Garfield 7.5-Minute Quadrangle, Sierra and Dona Ana Counties, New Mexico

June 1991

by
William R. Seagar[1] and Greg H. Mack[2]

[1]Department of Earth Sciences, New Mexico State University, Las Cruces, New Mexico, 88003 [2]Department of Earth Sciences, New

Digital layout and cartography by the NMBGMR Map Production Group:
Phil L. Miller, Amy L. Dunn, and Katherine J. Sauer

Comments to Map Users

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Cross sections are constructed based upon the interpretations of the author made from geologic mapping, and available geophysical, and subsurface (drillhole) 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 man-made structures.

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