Geologic Map of the Glorieta Quadrangle, Santa Fe County, New Mexico

By

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New Mexico Bureau of Geology and Mineral Resources
Open-file Digital Geologic Map OF-GM 011

Scale 1:24,000

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Glorieta 7.5′ Quadrangle
OF-GM 11

GEOLOGY OF THE GLORIETA 7.5-MIN QUADRANGLE SANTA FE COUNTY, NEW MEXICO

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Comments to Map Users

A geologic map graphically displays information on the distribution, nature, orientation and age relationships of rock and surficial units and the occurrence of structural features (Bates and Jackson, 1987). Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic map are based on field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation.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. Significant portions of the study area were mapped at scales smaller than depicted on the geologic map; therefore, the user should be aware of significant variations in map detail. 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 everywhere.

Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. The information provided on this map cannot be substituted for site-specific geologic, hydrogeologic or geotechnical investigations. The use of this map to precisely locate buildings relative to the geological substrate is not recommended without site-specific studies conducted by qualified earth-science professionals.

This map was compiled at a scale of 1:12,000 in order to illustrate specific details of the pre-Cenozoic geology; however, geologic contacts delineatingthe extent of alluvial deposits and basin fill were mapped at scales of 1:24,000 and 1:12,000. The information provided on theis map cannot be substituted for site-specific geologic, hydrogeologic or geotechnical investigations. The use of this map to precisely locate buildings relative to the geological substrate is not recommended without site-specific studies.

The cross-sections in this report are constructed based on surficial geology and where available subsurface and geophysical data. The cross-sections are interpretive and should be used as an aid to understand the geologic framework and not used in locating or designing wells, buildings, roads, or man-made structures.

This quadrangle map has been Open-filed in order to make it available as soon as possible. The map has not been reviewed according to New Mexico Bureau of Mines and Mineral Resources standards, and due to the ongoing nature of work in the area, revision of this map is likely. As such, dates of revision will be listed in the upper right corner of the map and on the accompanying report. ***The contents of the report and map should not be considered final and complete until it is published by the NMBMMR.***

Acknowledgments

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CENOZOIC UNITS

H_f Holocene fans. Locally-derived, poorly-sorted clay, silt, sand and gravel found at the mouths of small tributary streams and gullies. (Subset of Q_a). 0 to 6 m thick. Alternatively Q_a or Q_{al}.

Q_a Quaternary alluvium. Unconsolidated valley fill composed of clay, silt, sand and gravel. Grades into minor colluvia and alluvial fans at valley margins. Includes terrace deposits, whose treads lie within 6 m of grade, and human disturbances, such as dams, roadbeds and raised railroad beds. Alternatively Q_{al}.

Q_c Quaternary colluvium. Primarily talus, locally derived. Commonly occurs as a veneer of variable thickness on slope-forming bedrock. 0 to 6 (?) m thick.

Q_{ca} Quaternary colluvium and alluvium undivided. Intermixed, unconsolidated colluvia and alluvia. Locally contains well developed soils. 0 to 6 (?) m thick.

Q_{ls} Quaternary landslides. Large sandstone blocks down slope from sandstone cliffs. Predominantly rockfall.

Q_{t3} Quaternary terrace deposits. Undivided, gravel-capped terrace deposits whose treads lie approximately 10 to 15 m above grade. 0 to 6 (?) m thick.

Q_{t2} Quaternary terrace deposits. Undivided, gravel-capped terrace deposits whose treads lie between 12 and 45 m above grade. 0 to 13 (?) m thick.

Q_{t1} Quaternary terrace deposits. Undivided, gravel-capped terrace deposits whose treads lie between 50 and 100 m above grade. 0 to 25 (?) m thick.

QT_A Ancha Formation. "Light-tan to pink and orange thick-bedded arkosic sand and gravel composed of Precambrian granite, granite gneiss, and amphibolite gneiss and subordinate amounts of angular fragments of the underlying Tesuque Formation." (Booth, 1977).

T_g Tertiary (?) pediment deposits. Fine- to coarse-grained deposits capped by boulder and cobble gravel composed of angular to rounded Precambrian clasts with fewer clasts of Paleozoic age. Deposits are poorly exposed. 0 to 45 m thick.

Tt Santa Fe Group? - Tan, pinkish-tan and orange thick-bedded, coarse-grained, arkosic sandstone and some interbedded siltstone and pebble to boulder conglomerate. Moderately well cemented by calcium carbonate. Clasts of granite, granite gneiss, and amphibolite gneiss, and Madera Formation limestone.

MESOZOIC UNITS

TRc Chinle Group, undivided — mudstone interbedded with lenticular lavender-gray sandstone; mudstones are reddish-brown to orange-tan in upper part, and purple to reddish-brown in lower part; local limestone-pebble conglomerate lenses; light gray to grayish orange or tan, conglomeratic sandstone, and reddish-brown mudstone. Regionally 400-500 m thick.

TRs Santa Rosa Formation, undivided.

TRsu Santa Rosa Formation, Upper member - Buff to dark brown, thick bedded, fine-grained sandstone with limestone and chert-pebble conglomerates near base. Crossbedding is uncommon. Thickness 18-25 m.

TRsm Santa Rosa Formation, Middle member - Purple and green mudstone with nodular limestone, gray to buff thinly laminated siltstone, and brown to buff thick bedded, fine- to medium-grained sandstone. Thickness generally 30-40 m.

TRsl Santa Rosa Formation, Lower member - Light gray to buff, thick bedded, fine- to coarse-grained crossbedded sandstone with conspicuous iron oxide staining. Limestone- and chert-pebble conglomerates present in most places. Thickness 30-40 m).

TRm Moenkopi Formation — Grayish red, sandstones, conglomerates, mudstones and siltstones. Lacks gypsum. Sandstones are micaceous litharenites or lithic graywackes. Sandstones are modelately to poorly sorted, subangular to angular, and fine to coarse grained. Sandstones and conglomerates are generally trough crossbedded and lenticular. Fossils include vertebrate bones and coprolites, footprints, charophytes, and ostracods. Contact with underlying Artesia Formation is disconformable. Thickness is 25-30 m.

PALEOZOIC UNITS

Pa Artesia Formation - moderate reddish brown (orange to brick-red), sandstones, siltstones and gypsum. Sandstones and siltstones are quartzarenites and usually gypsiferous. Sandstones are well sorted, subrounded to subangular, and very fine to fine grained. Sandstones are laminated, ripple laminated, and massive (bioturbated), crossbedding is rare, and beds are laterally persistent. Unfossiliferous except for bioturbation. Thickness 10-20 m.

Psa San Andres Formation – Buff to light gray thin-bedded dense silty limestone and interbedded calcareous sandstone. Thickness is 5-13 m.

Pg Glorieta Sandstone – Yellow to buff, thick-bedded, fine- to medium-grained quartz sandstone. Grains are well rounded, well sorted, and frosted. Thickness 20-33 m.

Py Yeso Formation – Reddish-orange to red thick-bedded mudstone and interbedded buff to reddish-orange and yellow (locally purple near Apache Canyon), fine-grained sandstone and some buff, coarse-grained, arkosic sandstone. Buff to yellow, dense, nonfossiliferous, crystalline limestone 2-3 m thick in the upper part. Thickness 22-42 m.

IPPsc Sangre de Cristo Formation – Brownish red to purple, thick-bedded mudstone and interbedded mottled buff to dark brown and green, contains lensoidal coarse-grained buff arkosic conglomeratic sandstone. Contains some gray to purple, thin-bedded, dense, microcrystalline limestone and buff, thin-bedded, medium-grained quartz sandstone. Thickness ranges from 900 m near Canoncito to 90 m to the south near Lamy.

IPm Madera Formation, undivided — Gray to light-brown and purple, thick- to thin-bedded, dense, fossiliferous marine limestone with interbedded gray to brown, calcareous, sandstone and coarse-grained arkosic sandstone. According to Booth (1977), fusilinids near Canoncito are late Virgillian age. Minimum thickness of 250 m. Equivalent to Alamitos Formation and upper part of La Pasada Formation.

IPs Sandia Formation – Buff to brown, fine-grained, thinly- to thickly-laminated course-grained arkosic

sandstone with interbedded gray shale, sandy shale, and lesser amounts of black, thin-bedded coaly shale. Thickness unknown, but at least 45 m. Equivalent to lower part of La Pasada Formation.

Mt Tererro Formation -- Restricted to local outcrops near railroad tracks between Lamy and Canoncito in the Glorieta Quadrangle. Thickness approximately 15 m (see Miller et al., 1963).

Mes Espiritu Santo Formation – Gray to brown microcrystaline dolomite. Restricted to local outcrops near railroad tracks between Lamy and Canoncito in the Glorieta Quadrangle. Thickness approximately 10 m (see Miller et al., 1963).

EARLY PROTEROZOIC UNITS

Xgg Granite to granitic gneiss - orange colored, medium- to coarse–grained granite to gneissic granite consisting predominantly of plagioclase, K-feldspar, quartz, biotite and iron oxides. The gneiss is strongly deformed and varies from an S-tectonite to an L-tectonite. Locally, feldspar augen texture is well developed. Contains small lenses and layers of amphibolite and is intruded by numerous pegmatites. Probably consists of numerous plutons of similar compositions and textures.

Xgr Granodiorite **-** Pink, unfoliated, medium–grained, k-feldspar, plagioclase, quartz and lesser amounts of biotite, chlorite, muscovite, epidote, and iron oxides (Renshaw, 1988). This unit is found within, and east of, the Picuris–Pecos fault zone. Granodiorite crosscuts both diorite (Xd) and leucogranite (Xl), and inclusions of both rock types exist within the granodiorite. Within the fault zone, the rock is highly fractured and brecciated. Moench and others (1988) mapped these rocks as Xgb, biotite granite.

Xmg Megacrystic granitoid – Megacrystic quartz, plagioclase, K-feldspar, biotite granitoid. Megacrysts of K-feldspar are up to 5 cm long. The granitoid crops out in the SW corner of the quadrangle.

Xd Diorite – Medium- to fine-grained, dark greenish, hornblende, plagioclase, quartz, biotite, epidote, and iron oxides.

Xa Amphibolite - black to green, coarse- to fine–grained, with blue-green hornblende, plagioclase, quartz, and minor sphene, ± epidote, ± garnet, ± biotite. Includes amygdaloidal amphibolite and metavolcanic breccia. Continuous layers and discontinuous lenses occur within the gneissic granitoid (Xgg).

Xqms Quartz muscovite schist - gray, fine- to medium-grained, well foliated muscovite-rich schist with variable amounts of plagioclase, biotite, quartz, and minor amounts of iron oxide and chlorite.

Xf Felsic schist and phyllite - Generally fine–grained, orange, brown, or light–gray in color, composed primarily of quartz, muscovite, microcline and plagioclase, with minor biotite and rare garnet. Quartz eye-bearing horizons exist locally. Amphibolite and quartzite layers are interlayered with felsic schists. This unit is interpreted as metamorphosed felsic volcanic and volcaniclastic rocks. Renshaw (1984) mapped these rocks as felsic phyllite.

Xbp Biotite and pelitic schist - a heterogeneous unit of biotite–rich schist, pelitic schist, mafic phyllite, and feldspar–quartz–magnetite phyllite. Green–gray pelitic schist is composed of quartz, muscovite and plagioclase with lesser biotite and chlorite. Co-existing sillimanite (fibrolite), garnet and staurolite have been reported (Renshaw, 1984). A minor component of mafic schist contains hornblende, plagioclase, quartz, oxides, plus minor epidote and biotite. Contacts with muscovite schist (Xms)

and quartz–feldspar schist (Xqfs) are gradational and poorly exposed. Possible protolith is aluminous shale.

Xms Muscovite schist - strongly foliated and crenulated gray to brown muscovite schist composed of muscovite and quartz with lesser amounts of biotite, plagioclase, chlorite, iron oxides and ± garnet, ± staurolite, ± fibrolite. Exposed in the southern half of the Thompson Peak Metamorphic suite. Contacts with biotite and pelitic schists (Xbp) and quartz–feldspar schist (Xqfs) are gradational and generally poorly defined.

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