

Preliminary Geologic Map of the Dos Lomas Quadrangle, Cibola and McKinley Counties, New Mexico

By

Steven Cather

June 2011

New Mexico Bureau of Geology and Mineral Resources
Open-file Digital Geologic Map OF-GM 219

Scale 1:24,000

This work was supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program (STATEMAP) under USGS Cooperative Agreement 10HQPA0003 and the New Mexico Bureau of Geology and Mineral Resources.



New Mexico Bureau of Geology and Mineral Resources
801 Leroy Place, Socorro, New Mexico, 87801-4796

The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government or the State of New Mexico.

PRELIMINARY GEOLOGIC MAP OF THE DOS LOMAS 7.5' QUADRANGLE, McKINLEY AND CIBOLA COUNTIES, NEW MEXICO

Steven M. Cather
June, 2011

SUMMARY

The Dos Lomas quadrangle occupies part of the Chaco homocline that forms the southern limb of the San Juan Basin (Cather, 2004). Stratal dips are generally from one to three degrees to the northeast. Faults are north- to east-striking, steeply dipping and mostly exhibit small normal separations. Two moderate-displacement, northeast-trending, east-down faults occur in the central and southeastern part of the quadrangle.

Bedrock units consist of Upper Triassic through Upper Cretaceous strata that represent a broad spectrum of eolian, fluvial, lacustrine (or salina), marginal marine, and marine depositional environments. I utilize the stratigraphic nomenclature for the Jurassic Morrison Formation that was developed largely by the U.S. Geological Survey, because this is the stratigraphy that is generally used by the mining industry in the Grants uranium district (V.T. McLemore, 2011, oral commun.). For an alternative stratigraphy for these rocks, see Lucas (2004).

Quaternary sedimentary units include active eolian sand (unit Qe), semi-stabilized eolian sand (Qes), talus (Qt), alluvium (Qal), and alluvially reworked eolian silt (Qae). Numerous uranium mines and dumps occur on the quadrangle. These mines are developed in the Todilto and Morrison formations.

ACKNOWLEDGEMENTS

This map is derived from the earlier mapping of Thaden et al. (1967). The bedrock geology has been modified only slightly from their map, principally by incorporation of a few their informal units into currently recognized stratigraphic units. Other changes include a more detailed treatment of Quaternary units and construction of a cross section.

DESCRIPTION OF UNITS

CENOZOIC ERATHEM

Quaternary System

af Disturbed and/or artificial fill—Areas affected by human disturbances, mapped where deposits or extractions are areally extensive.

Qal Alluvium (Holocene)—Sand, gravel, and mud in and adjacent to modern arroyo channels. Alluvium is typically at or near the grade of modern channels. 0-10 m thick.

Numerous shallow (< 2 m deep) pits are present in this unit and units Qae, Qe, and Qes near San Mateo Creek in the southwest part of the quadrangle. These pits (stippled areas on map) are largely the result of deflation, but some may be the result of soil collapse.

Qae Eolian and alluvial deposits (Upper Pleistocene–Holocene)—Reddish-brown eolian sand and loessic silt locally reworked by alluvial processes. Deposits are stabilized by vegetation in most areas. Includes discontinuous eolian veneers on stable upland surfaces. 0–10 m thick.

Qe Eolian sand (Upper Pleistocene–Holocene)—Sparsely vegetated to unvegetated sand in active eolian dunes and sand sheets. 0–10 m thick

Qes Semi-stabilized eolian sand (Upper Pleistocene–Holocene)—Eolian sand dunes and sand sheets stabilized by vegetation. 0–10 m thick

Qt Talus and colluvium (Upper Pleistocene–Holocene)—Coarse mass-wasting deposits of sand to boulder size that mantle steep slopes adjacent to upland areas. 0–15 m thick.

Neogene System

Tb Basalt (Pliocene or Early Pleistocene?)—Flows of black to gray, medium- to fine-grained trachybasalt on La Jara Mesa. Flows contain sparse phenocrysts of olivine, plagioclase, and clinopyroxene. Erupted from vents on adjacent San Mateo quadrangle (McGraw et al., 2009). Unit is not dated. Maximum thickness is ~30 m. Corresponds to map units Tyotb and Tymtb of McGraw et al. (2009).

Tgrt Rhyolite tuff of Grants Ridge (Pliocene)—White to pale pink, bedded pyroclastic fall, flow, and surge deposits on La Jara Mesa. Contains abundant clasts of obsidian, pumice, and lithics. Lithics consist of Precambrian granite and gneiss, chert, sandstone, and limestone. Unit is ~3.3 million years old. Maximum thickness is about 100 m.

MESOZOIC ERATHEM

Upper Cretaceous System

Km Mancos Shale, main body (Cenomanian–Turonian)—Medium to dark gray marine mudstone intercalated with thin-bedded sandstone. Only the lower ~80 m is exposed in quadrangle.

Kd Dakota Sandstone (Cenomanian)—Yellowish-brown to light-gray shore-zone sandstone and gray mudstone. About 25 m thick.

Jurassic System

Morrison Formation (Kimmeridgian and Tithonian)

Jmb Brushy Basin Member—Grayish-green to bluish- green fluvial mudstone and lenticular, light-gray sandstone. 10 to 40 m thick.

Jmw Westwater Canyon Member—Light yellowish to reddish gray fluvial sandstone with subordinate greenish-gray mudstone. Includes units Jmw1 and Jmwu of Thaden et al. (1967). 30 to 60 m thick.

Jmr Recapture Member—Variegated fluvial mudstone and interbedded sandstone. 40 to 75 m thick.

Jb Bluff Sandstone (Oxfordian)—Light gray, yellowish gray and pale orange crossbedded eolian sandstone. Includes units Jb and Jsa of Thaden et al. (1967). 30 to 100 m thick. Numerous sinkholes (small circular areas on map) are exposed in the Bluff Sandstone in the northwest part of the quadrangle. These are presumably the result of solution collapse in the underlying Todilto Formation.

Js Summerville Formation (Callovian and Oxfordian)—Variegated mudstone and tabular sandstone. 40 to 50 m thick.

Jt Todilto Formation, Luciano Mesa Member (Callovian)—Olive-gray to pale yellow, thin- to thick-bedded limestone deposited in a lacustrine or salina environment. About 10 m thick. Gypsum of the Tonque Arroyo Member is not present in the quadrangle.

Je Entrada Sandstone (Callovian)—Light brown, cross-bedded eolian sandstone and reddish brown, tabular-bedded siltstone. About 50 m thick. Includes units Jem and Jeu of Thaden et al. (1967).

Triassic System

Trw Wingate Sandstone (Rhaetian?)—Reddish-brown, cross-bedded eolian sandstone. About 30 m thick.

Trc Chinle Group (Norian)—Dark red to bluish gray mudstone, lenticular sandstone, and thin-bedded limestone. About 400 m thick, although only the middle and uppermost parts are exposed on the quadrangle. Includes units Trcs and Trcu of Thaden et al. (1967).

REFERENCES

Cather, S.M., 2004, The Laramide orogeny in central and northern New Mexico and southern Colorado, in Mack, G.H., and Giles, K.A., eds., *The Geology of New Mexico, A Geologic History*: New Mexico Geological Society Special Publication 11, p.203-248.

Lucas, S.G., 2004, The Triassic and Jurassic systems of New Mexico, in Mack, G.H., and Giles, K.A., eds., *The Geology of New Mexico, A Geologic History*: New Mexico Geological Society Special Publication 11, p.137-152.

McCraw, D.J., Read, A.S., Lawrence, J.R., Goff, F., and Goff, C.J., 2009, Preliminary geologic map of the San Mateo quadrangle, McKinley and Cibola counties, New Mexico: New Mexico Bureau of Geology and Mineral Resources, Open-file Digital Geologic Map OF-GM 194, scale 1:24,000.

Thaden, R.E., Santos, E.S., and Ostling, E.J., 1967, Geologic map of the Dos Lomas quadrangle, Valencia and McKinley counties, New Mexico: U.S. Geological Survey Geologic Map GQ-680, scale 1:24,000.