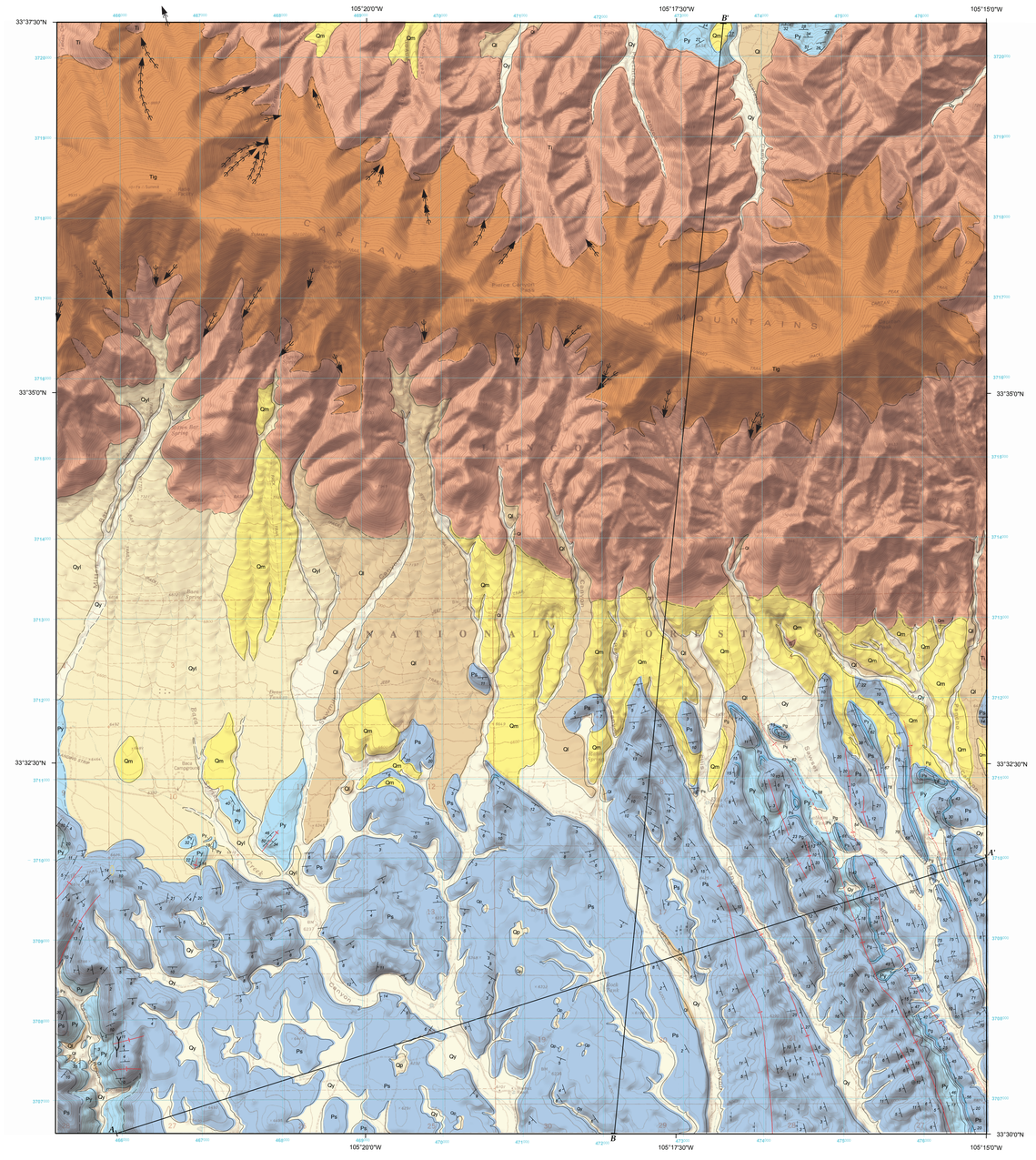

Base map from U.S. Geological Survey 1981, from photographs taken 1973, field checked in 1974, edited in 1981.
1927 North American datum, UTM projection – zone 13N
1000-meter Universal Transverse Mercator grid, zone 13, shown in blue

QUADRANGLE LOCATION

Magnetic Declination
June 2009
9° 42' East
At Map Center

1:24,000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geologic map of the Capitan Peak quadrangle, Lincoln County, New Mexico.

May 2010

by
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New Mexico Bureau of Geology and Mineral Resources
Open-File Geologic Map 209

Mapping of this quadrangle was funded by a matching-funds grant from the STATEMAP program of the National Cooperative Geologic Mapping Act, administered by the U. S. Geological Survey, and by the New Mexico Bureau of Geology and Mineral Resources. (Dr. Peter Scholle, *Director and State Geologist*, Dr. J. Michael Timmons, *Geologic Mapping Program Manager*).

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

http://geoinfo.nmt.edu

COMMENTS TO MAP USERS

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation.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(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. 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.

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

The map has not been reviewed according to New Mexico Bureau of Geology and Mineral Resources standards. The contents of the report and map should not be considered final and complete until reviewed and published by the New Mexico Bureau of Geology and Mineral Resources. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the State of New Mexico, or the U.S. Government.

FIGURE 1—Deposits of **Qy** exposed in a ravine near UTM 475600, 3710500. This exposure is typical of **Qy** deposits in the area, where coarse gravel deposits are overlain by 1–2 meters of fine, predominantly silty material.

Map Symbols

- Gelogic contact– solid where exposed, dashed where inferred, dotted where concealed.
- Detachment fault–solid where exposed, dashed where inferred. Hatchures on upper plate.
- Anticline–solid where known, dashed where inferred, dotted where concealed.
- Syncline–solid where known, dotted where concealed.
- Strike and dip of vertical bedding
- Strike and dip of bedding
- Strike and dip of bedding, interpreted from aerial photo
- Strike and dip of overturned bedding
- Location of cave
- Sinkhole
- Talus slopes
- A — A' Geologic cross section

Correlation Diagram

CENOZOIC	QUATERNARY	Holo.		Qy, Qp
		Pleistocene	Late	Qyl, Ql
			Mid.	Qm
	TERTIARY			Tig, Ti
PALEOZOIC	PERMIAN			Ps, Pg, Py, Pa

FIGURE 2—Stream-cut exposure of **Qt** deposits on the eastern side of the Capitan Peak quadrangle near UTM 476600, 3710700. Note the absence of extensive carbonate cement and the presence of accumulated reddish clays.

Map Unit Descriptions

QUATERNARY

Qy — **Holocene alluvial deposits**—These deposits were mapped separately from the remainder of the Quaternary surficial deposits because they are relatively easy to identify and are important because these are areas that may be prone to flooding. Composed of weakly consolidated interbedded gravel, silt, and clay. Commonly form relatively flat deposits at the bottom of the wider drainages, and characteristically contain abundant dark brown, organic- and silt-rich soils at the surface. These deposits are commonly incised up to about 2–3 m by the modern drainages, where vertical faces locally show older soil horizons. As mapped, this unit locally contains at least two and possibly three separate terrace levels.

Qp — **Holocene playa deposits**—Mostly weakly consolidated silt and clay. These fill depressions within the San Andres Formation in the southern part of the Capitan Peak quadrangle where they are interpreted to be sink holes that have filled with sediment. The presence of small seasonal ponds within some of them suggests that water does not infiltrate within them very quickly.

Qyl — **Holocene and Late Pleistocene alluvial deposits, undivided**—Dominated by sand to boulders of fine-grained granite. As mapped, this unit contains both Late Pleistocene deposits with elevations about 3–9 m (10–30 feet) above the level of the modern drainages. Holocene deposits form one or more terrace levels below the level of **Ql** deposits. The two ages are very difficult to distinguish on the broad alluvial apron on the south side of the Capitan Mountains.

Ql — **Late Pleistocene alluvial deposits**—These deposits consist of poorly–sorted sand, gravel, and boulders of dominantly **Ti**. They are poorly–exposed, but commonly form terrace remnants less than about 6 m (20 feet) above the **Qyl** deposits.

Qm — **Middle Pleistocene alluvial deposits**—Composed of poorly–sorted subangular–to subrounded–pebbles to large boulders, the vast majority are composed of fine–grained granite (**Ti**). Some deposits contain a significant amount of angular–to subrounded dark–gray to black– iron clasts (magnetite and hematite) from small pebbles up to about 40 cm across. Where **Qm** deposits have been significantly eroded the iron clasts locally form a lag placer. Although poorly–exposed, these deposits locally contain a well–developed horizon of laminar caliche. These deposits are higher in the landscape than **Ql** deposits have been dissected by deeper drainages. Commonly less than 12 m (40 feet) thick.

TERTIARY

Tig — **Fine-grained granite**—Areas subjected to periglacial activity. This unit contains the areas of the Capitan pluton that were subjected to glacial or periglacial processes. There is almost no intact outcrop, yet nearly all of the surface rubble is composed of fine-grained granite. As mapped, this unit also contains talus and rock glacier deposits which contain material that has moved down-slope. Since it was not practical with the time available to distinguish the different types of slope deposits, it made sense to lump them into this one unit.

Ti — **Fine-grained granite**— The rock is characteristically fine-grained and tan-colored, exhibiting phenocrysts of subhedral to euhedral K-feldspar up to about 4 mm across, and anhedral muscovite and/or biotite from 1–2 mm across. The rock commonly weathers a light–rusty tan color and commonly exhibits either a smooth or slightly–granular texture. Commonly forms large subangular to rounded boulders.

PERMIAN

Ps — **San Andres Formation**—Medium- to thick-bedded dolomite and limestone. Dolomite beds are typically light–gray, whereas limestone beds are commonly darker–gray. Many beds contain sand-sized broken fossil debris surrounded by a matrix composed of micrite and more commonly microspar. Some beds contain faint, parallel laminae that are parallel to bedding. Other beds are massive and appear bioturbated. Orange-weathering chert is minor but widespread and is composed of granular microcrystalline quartz. The chert commonly forms irregularly shaped masses up to several tens of centimeters across that is both discordant and concordant to bedding. Common larger fossils include coiled gastropods up to about 5 cm across and less abundant nautiloids up to about 10 cm. Smaller recognizable fossils include crinoid stem segments, disarticulated brachiopods (commonly up to 2 cm and replaced by chert), and sparse fussilinids. The carbonate beds are interbedded with well–sorted, fine- to medium-grained quartz sandstone from 1–10 m (3–32 feet) thick, which probably represent intertonguing Glorieta Sandstone. Maximum thickness of the San Andres Formation is about 244 m (800 feet).

Pg — **Glorieta Sandstone**—Well sorted, fine- to medium-grained quartz sandstone from 1–10 m thick. The sandstone beds appear to occur within a few hundred feet of the base of the San Andres Formation. Sandstone beds typically weather light–orange to brown and in most outcrops contain abundant calcite-cemented concretions up to 2–3 mm across. Maximum thickness is about 9 m (30 feet).

Py — **Yeso Formation**—Interbedded fine-grained quartz sandstone, siltstone, dolomite, and bedded gypsum. Siltstone is commonly rusty–red and pale–yellow. Dolomite beds are locally fossiliferous and contain silicified brachiopod and crinoid fragments, abundant coiled gastropods, aminods, and possibly other cephalopods. Dolomite beds locally contain moldic porosity with some pores still filled with gypsum. Gypsum beds are typically sub-horizontally banded and are locally thicker than 10 m (33 feet). Exposures are poor and typically mantled by regolith. The thickness obtained from the log of the Muñoz Canyon AAN Fed. No. 1 well is 1,685 feet.

FIGURE 3–Road-cut exposure of **Qm** near UTM 454500, 3717600, showing extensively developed pedogenic carbonate cement. Almost all clasts are fine-grained granite (**Ti**). Note thin, dark brown organic-rich soil on top surface.

FIGURE 4—Fine-grained granite forms giant monoliths on the eastern end of the Capitan Mountains. View is to the northeast of the mountains just beyond the eastern edge of the Capitan Peak quadrangle.

FIGURE 5—This view looking northwest was taken immediately west and downhill from Photo 6 (see report), and shows steeply-dipping and folded dolomite beds of the Yeso Formation overlain by a mesa of nearly flat-lying San Andres Formation.