

Preliminary Geologic Maps of the Cloudfrock, Bluff Springs, and Rogers Ruins Quadrangles

Mapped and compiled by Benjamin Hallett

EXPLANATION OF MAP UNITS

Quaternary and Tertiary Surficial Deposits
Qal - Alluvium - Holocene and older stream and minor terrace deposits. This unit fills floors and active stream channels and is characterized as a silty, sandy gravel composed of mainly carbonate and minor quartz sandstone clasts.

Qtrav - Quaternary Travertine - Layered and often incised travertine deposits associated with active and dry springs and spring-fed streams. Most prominent at Bluff Springs (Bluff Springs quadrangle) and in Monument canyon (Rogers Ruins quadrangle).

QTg - Gravels - Quaternary and Tertiary gravel surface deposits filling the broad Sacramento River valley in and near the developed area of Timberon in the southern part of the Rogers Ruins quadrangle. Generally composed of sandy and silty gravels with a predominantly carbonate clast composition.

Paleozoic Sedimentary Rocks

Psa - San Andres Formation (middle to upper Permian) - Light to dark gray and bluish or brownish gray limestone and dolomite. This unit occurs on slopes and ridge tops across map area. Limestones and dolomites range from thin to very thick bedded, and are carbonate mudstones, wackestones, and grainstones. Freshly broken surfaces are darker gray than weathered surfaces and occasionally fetid. Beds are often silty or sandy. Dark brown irregular chert nodules are sparse. Fossils are sparse and are dominantly crinoid stem fragments and ammonites. Intraformational solution breccias and paleokarst features such as collapsed caves occur in this unit, but are more common to the north in the Ruidoso area. They are characterized by red soil and red and yellow stained breccia fragments. Delineation of the San Andres into the lower thick-bedded Rio Bonito member and upper thin-bedded Bonney Canyon member (Kelley, 1971) was not possible due to steep topography, heavy vegetation, and sparse outcrop.

Near the base of the San Andres Formation occur lenses of fine-medium grained rusty quartz arenite sandstone, believed to be equivalent to the Glorieta sandstone (Kelly, 1978). The Glorieta sandstone is not entirely continuous, but it can generally be found along strike within 500 feet of where it pinches out. As this is the only documented and recognized non-carbonate lithology within the San Andres formation, it was generally utilized to map the contact between San Andres and carbonate-bearing Yeso formation. The Glorieta sandstone commonly occurs 60-120 feet (20-40 m) above the base of the San Andres formation (Pray, 1961). As little outcrop occurs in much of the map area, the location of this contact was generally estimated relative to the highest float blocks of Glorieta sandstone. The entire section of the San Andres formation is not exposed in these quadrangles, yet its thickness is estimated at ~700 feet (Kelley, 1978).

Py - Yeso Formation (middle Permian) - A very thick and heterogeneous unit of mudstone, fine sandstone, limestone, dolomite, and evaporates. The Yeso occurs mainly in canyon bottoms and lower slopes across the map area. Yellow to tan siltstone and fine sandstone, red to pink muddy siltstone and fine sandstone, gray to tan silty limestone and dolomite, and white to gray gypsum. Siltstone and sandstones are thin to medium bedded and friable. Muddy siltstones and sandstones are laminated to very thin bedded.

Limestones are very thin to thin bedded, rarely medium to thick bedded. In general, they are thinner bedded than overlying basal San Andres beds. Meter scale interbedding of carbonate, siltstone, and sandstone is common. Evaporite lithologies, mainly gypsum in surface exposures, are less common in the upper part of the Yeso exposed in canyon bottoms across the map area. Evaporites are prevalent in the lower part of the full Yeso section exposed only in the southwestern part of the Rogers Ruins quadrangle. Bedding dips are commonly chaotic due to dissolution of gypsum and (and carbonates?) and individual beds are generally not traceable laterally for more than a few 10's of meters in more mudstone-rich parts of the Yeso. Exposures are poor and the upper contact is usually mantled by colluvium from overlying San Andres Formation. Thickness: ~1800 feet (~550 meters) based well data from Cloudfrock Unit #1 well (1991) in northwestern Bluff Springs quadrangle.

Pa - Abo Formation (early to middle Permian) - The Abo formation is composed of medium to dark reddish brown mudstones with minor coarse arkosic sandstone lenses. Sandstones are commonly cross-bedded and individual grains are subangular to angular. In the middle of the Abo section occurs an argillaceous and variably dolomitic limestone unit, defined by Pray (1961) as the Pendejo tongue of the Hueco formation. Only about 1 km2 of the Abo formation is found along the southwestern edge of the Rogers Ruins quad, and the Pendejo tongue of the Hueco formation was lumped in with the Abo for this mapping, due to poor outcrop in this area.

Structure
A tilted fault block of the Rio Grande rift system, the southern Sacramento range was uplifted along the Alamogordo fault. The map area is east of the range crest, and characterized by a generally shallow (3-5°) regional southeast dip. Minor undulations are in some places recognized as poorly defined low-amplitude folds in the San Andres formation with variable orientations. Due to the very low angle dips across much of the map area, fold axes were not generally defined well enough for mapping. Within the Yeso formation and the lowest part of the San Andres formation, highly variable dips on the 1 - 100 meter scale, mainly defined by carbonate beds, are attributed to volume changes due to gypsum dissolution and leaching.

A series of southwest dipping normal faults occur in the Sacramento River canyon in the western part of the Rogers Ruins quadrangle. These faults, poorly exposed but defined by minor fault breccia and slickenlines, form a steep escarpment, repeating the upper Yeso / lower San Andres section on the northeastern wall of the canyon. To the southeast of these faults, a large monoclinical dip slope forms the eastern wall of the Sacramento River canyon north of Timberon. Low amplitude fold axes occur along the Sacramento River and west of the canyon and are better defined than in the rest of the mapping area. These folds trend parallel to the strike of these normal faults, and are probably related to extensional deformation. The broad Sacramento River syncline, mapped by Pray (1961) to the west, can be traced for over 10 km. The southeast continuation of the high angle Wild Boy fault, mapped to the west by Pray (1961), occurs near the southwest corner of the Rogers Ruins quadrangle. This fault places the Abo formation directly against the Yeso, suggesting that the fault may have accommodated strike-slip deformation at one time, though no indication of fault kinematics was recognized.

REFERENCES CITED AND SELECTED REFERENCES

- Kelley, V.C., 1971, Geology of the Pecos Country, Southeastern New Mexico: New Mexico Bureau of Mines and Mineral Resources Memoir 24, 75 p.
- Kelley, V.C., 1978
- Pray, L.C., 1961, Geology of the Sacramento Mountains Escarpment, Otero County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Bulletin 35, 144 p.

Legend

- strike and dip of inclined bedding
- horizontal bedding
- indicates relative movement of fault
- bar-ball on down block of normal fault
- anticline, dashed where approximate
- monocline, dashed where approximate
- syncline, dashed where approximate dotted where concealed
- contact, certain, exposed
- contact, certain, int-obscured
- contact, probable, int-obscured
- fault, certain, concealed
- fault, certain, int-obscured
- fault, probable, int-obscured
- fault, uncertain, concealed
- fault, uncertain, int-obscured

- Pa
- Psu
- Py
- QTg
- Qal
- Qtr
- cross section

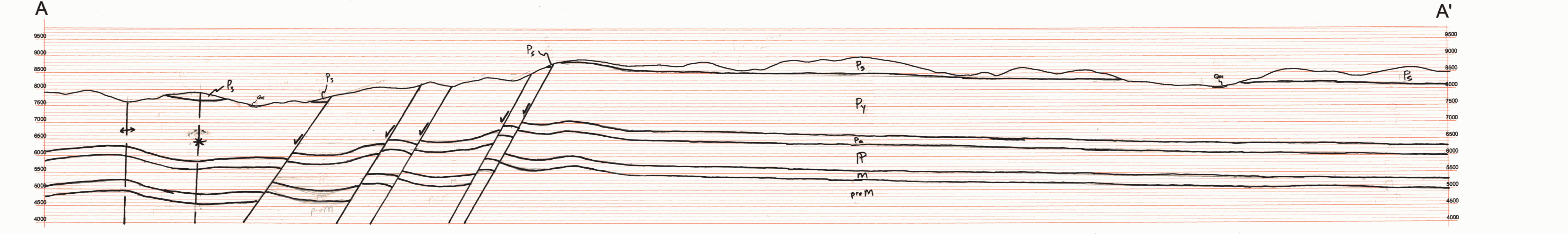
Geologic map of the Rogers Ruins quadrangle, Otero County, New Mexico.

June 2006 by Benjamin Hallett

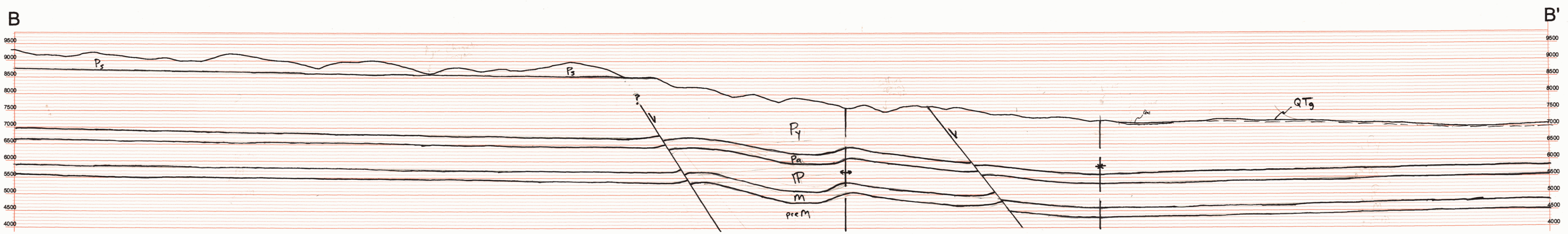
New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Pl., Socorro, NM, 87801

COMMENTS TO MAP USERS

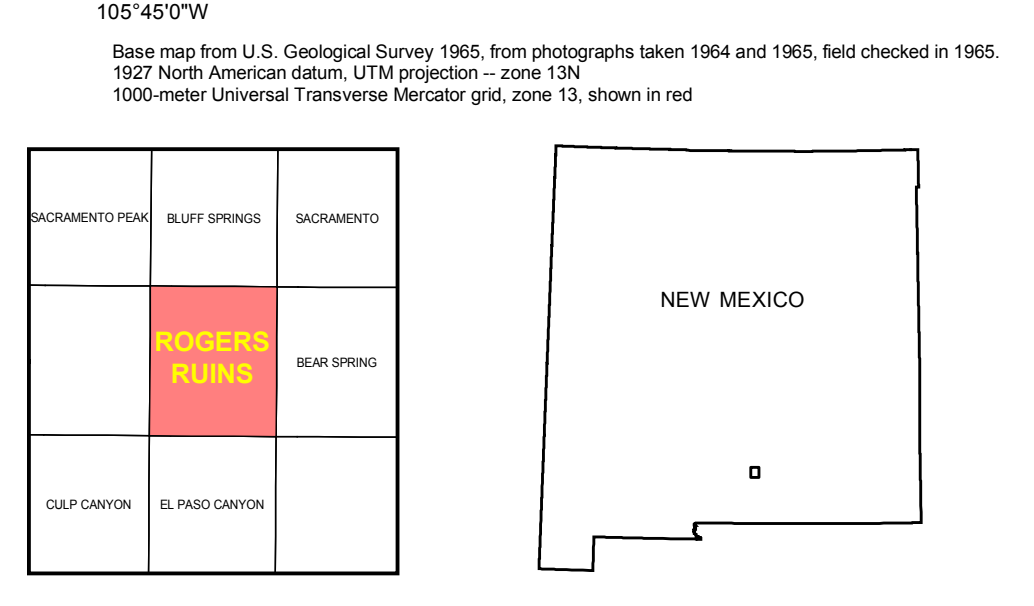
A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic 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.



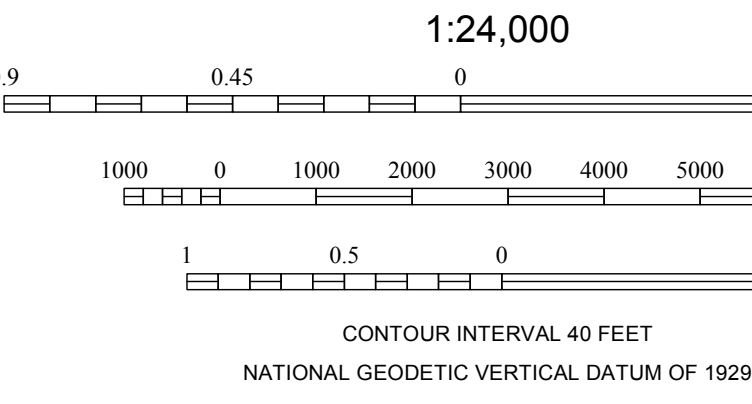
Rogers Ruins A-A'



Rogers Ruins B-B'



QUADRANGLE LOCATION



New Mexico Bureau of Geology and Mineral Resources Open-file Geologic Map 139

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

[505] 835-5490 http://geoinfo.nmt.edu

This and other STATEMAP quadrangles are (or soon will be) available for free download in both PDF and ArcGIS formats at: http://geoinfo.nmt.edu/publications/maps/geologic/ofgm/home.html

This draft geologic map is preliminary and will undergo revision. It was produced from either scans of hand-drafted originals or from digitally drafted original maps and figures using a wide variety of software, and is currently in cartographic production. It is being distributed in this draft form as part of the bureau's Open-file map series (OFMS) due to high demand for current geologic map data in these areas where STATEMAP quadrangles are located, and it is the bureau's policy to disseminate geologic data to the public as soon as possible.

After this map has undergone scientific peer review, editing, and final cartographic production adhering to bureau map standards, it will be released in our Geologic Map (GM) series. This final version will receive a new GM number and will supersede this preliminary open-file geologic map.

DRAFT

