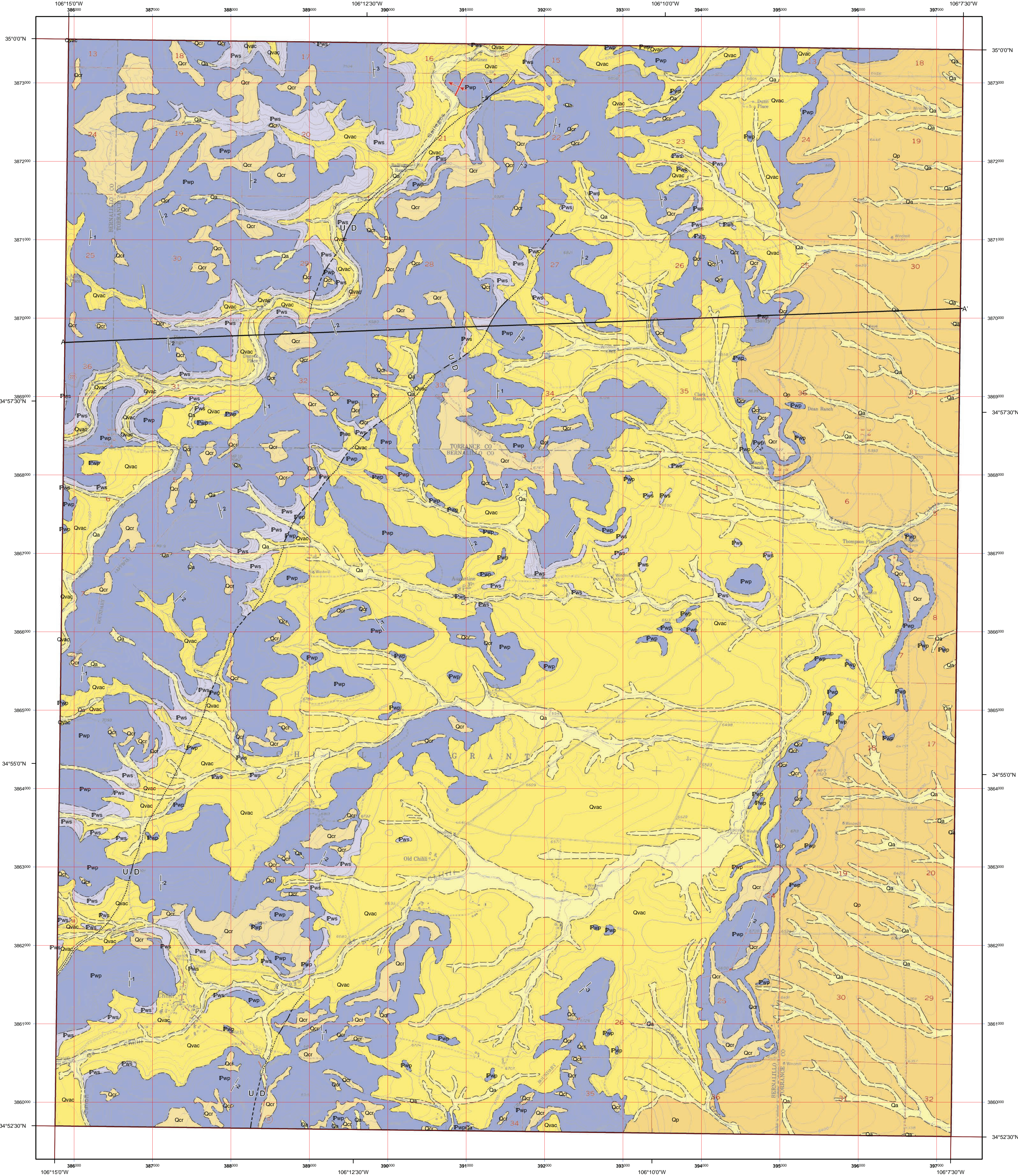
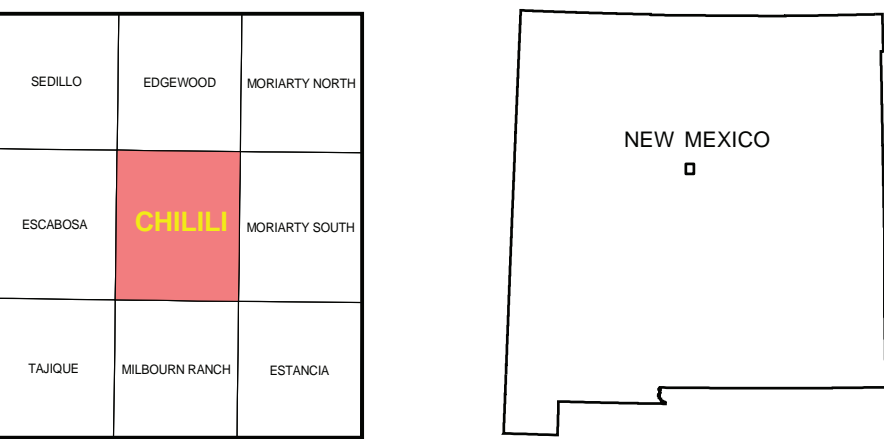


NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES A DIVISION OF NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY



Based upon U.S. Geological Survey 1975,  
1987 North American datum, UTM projection - zone 15N  
1983 datum Universal Transverse Mercator grid zone 15 shown in red



QUADRANGLE LOCATION

This draft geologic map is preliminary and will undergo revision. It was produced from either scans of hand-drawn 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 (OFGM), 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**



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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>

Geologic map of the Chilili  
quadrangle, Bernalillo and Torrance  
Counties, New Mexico.

May 2004

by  
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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map may be based on any of the following: reconnaissance field geologic mapping; compilation of published and unpublished work; and photogeologic interpretation.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 geologists. 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 (drilled) 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.

Description of Map Units to Accompany  
Geologic Map of the Chilili 7.5-Minute Quadrangle

Bruce D. Allen, May 2004

Quaternary Map Units

General

Unconsolidated surface deposits in the map area largely consist of upland-valley alluvium and colluvium derived from the weathering of shale, limestone, and sandstone of the Pennsylvanian Madera Group. Sediment transport is toward the east and the western piedmont of the topographically closed Estancia basin. The upper piedmont slope of the Estancia basin is present along the eastern edge of the map area. Map units consist of valley-floor alluvium associated with modern drainages (Qa), upland-valley alluvium and colluvium (Qac), alluvium, colluvium, and residuum on valley backslopes and bedrock uplands (Qcr), and piedmont alluvium and colluvium (Qp).

Unconsolidated deposits in upland valleys are generally less than 10 m thick, but locally may be up to 20 m thick along higher order drainages. Unconsolidated deposits along the eastern edge of the map area attain a maximum thickness of approximately 30 m, based on well-driller's logs for the area. These upper piedmont slope deposits include the surface deposits shown on the map (Qp and Qa), and underlying deposits referred to here as older basin fill. Unconsolidated sediments in the Estancia basin to the east of the map area reach a maximum thickness of ~120 m (New Mexico State Engineer, 1967).

Radiometric ages for Quaternary map units on the Chilili quadrangle are not available. Likewise, little is known regarding the age of the older basin-fill deposits that are covered by the surface deposits shown on the eastern edge of the map. These older basin-fill deposits may range in age from Pliocene to late Miocene (Smith, 1957). Geologic events leading to topographic closure of the Estancia basin, and the timing of basin closure, are also speculative.

Description of Map Units

Qa- Valley-floor alluvium. Holocene. Predominantly silt, sand, and clay deposits of modern drainages and associated floodplains. Coarser grained sediments are present in some areas. Unit is inset into older deposits of units Qv and Qp, and interfingers with younger deposits of units Qv and Qp along drainage foot slopes. Includes unmapped bedrock exposures in scoured channel reaches. Unit is generally less than 3 m thick.

Qp- Upper piedmont slope alluvium and colluvium, undivided. Holocene to middle Pleistocene (?). Includes alluvial fan and coalescent alluvial fan complex, inset alluvial fills, and colluvium on hillslopes where piedmont deposits have been incised by drainages. Predominantly silt and sand, with coarser grained deposits dominated by sand and gravel adjacent to bedrock uplands and along higher order drainages. Unit ranges in thickness from a few meters or less where it forms a thin mantle over bedrock, to approximately 10 m, and overlies older basin-fill deposits along the eastern edge of the map area.

Qv- Upland-valley alluvium and colluvium. Holocene to middle Pleistocene (?). Predominantly silt, sand, and gravel grading into relatively coarse-grained colluvium along valley backslopes. Along higher order drainages unit consists of eroded older deposits and younger inset fills. Includes unmapped bedrock exposures along valley backslopes. Thickness ranges from a few meters or less in upland valleys and over bedrock highs, to an estimated 10 m or more along trunk drainages.

Qcr- Alluvium, colluvium, and residuum on valley backslopes and interfluvial summits in bedrock uplands. Holocene to middle Pleistocene (?). Predominantly silt, clay, and sand. Derived from weathering of the Madera Group (residuum on relatively flat-lying areas), and from downslope transport of weathering products. Mapped where accumulations cover extensive areas and are sufficiently thick to support large areas of grass cover. Also includes areas of unmapped bedrock exposure. Unit ranges from less than one to several meters in thickness.

Bedrock Map Units

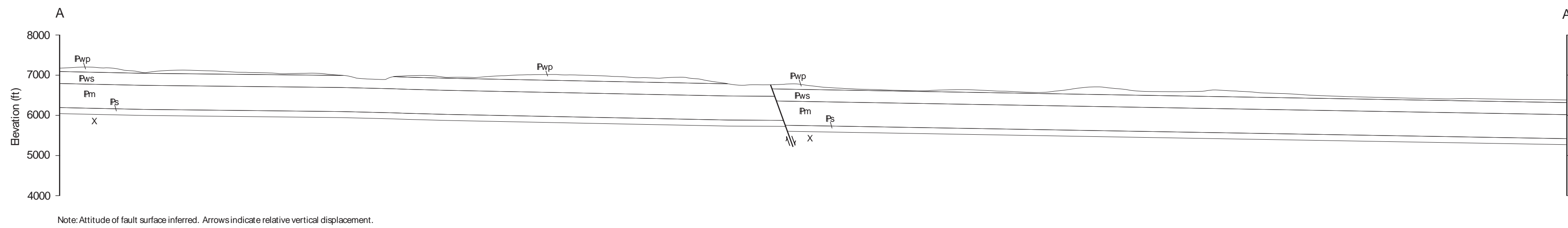
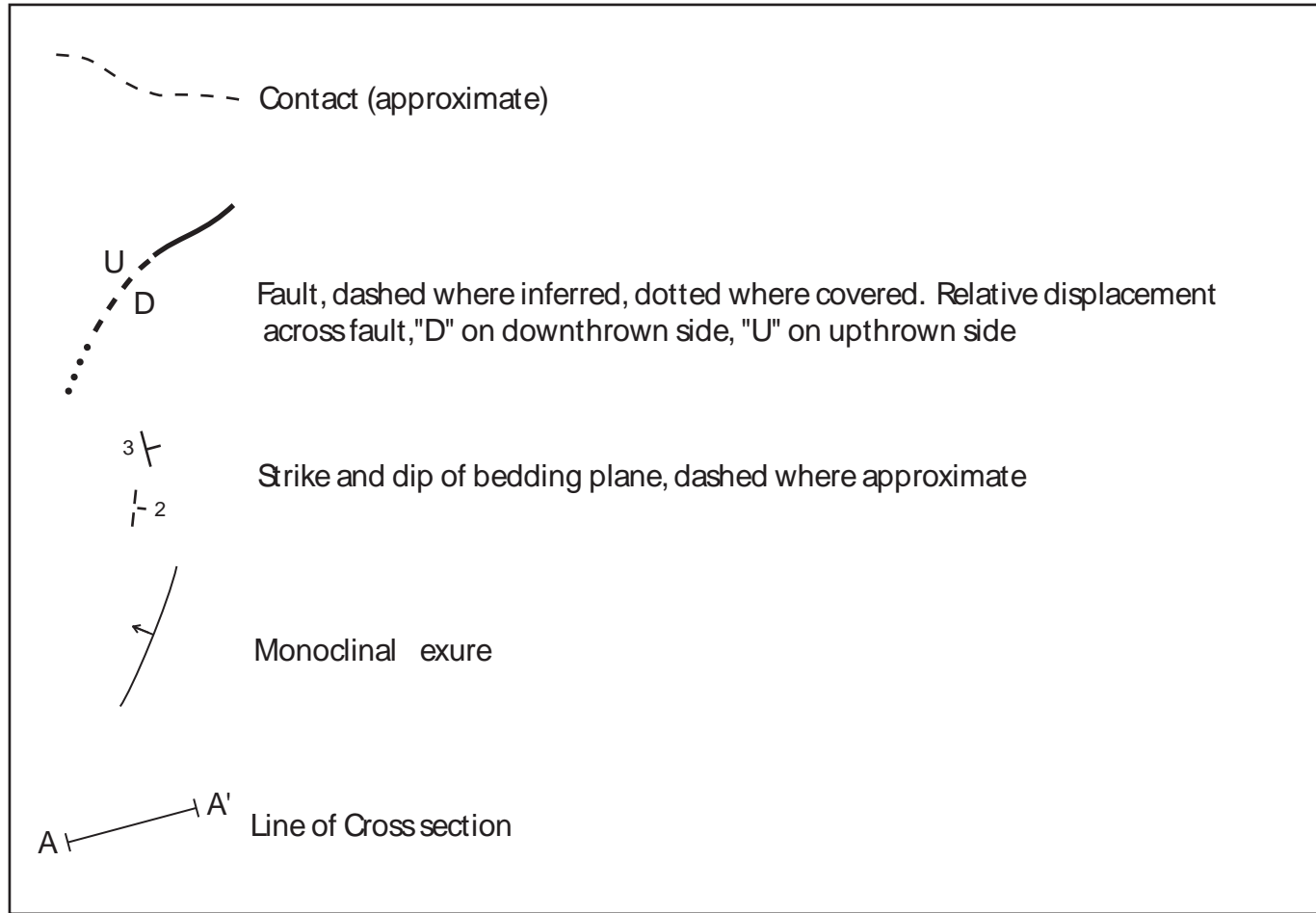
General

Surface exposures of bedrock in the map area belong to the Madera Group. The Middle to Upper Pennsylvanian (Desmoinesian-Virgilian) Madera Group includes marine and marginal-marine carbonate and siliciclastic sediments consisting of interbedded limestone, shale, sandstone, and minor conglomeratic sandstone. The thickness of the Madera Group in the vicinity of the Sandia and Manzano Mountains ranges from about 400 m (Kelley and Northrop, 1975) to perhaps 580 m (Read et al., 1944, measured section 14), or more, and has traditionally been divided (e.g. Read et al., 1944; Kelley and Northrop, 1975) into a lower unit containing a large proportion of limestone ("lower gray limestone"), and an upper unit containing a large proportion of siliciclastic sediments ("upper arkosic limestone"). The Madera Group gradationally overlies rocks of the Middle Pennsylvanian (Atokan) Sandia Formation, which is also marine to marginal-marine in origin and is dominated by siliciclastic sediments. The Sandia Formation generally overlies Proterozoic crystalline rocks in the area, although a thin (up to 20m thick) sequence of limestone and shale deposited during Mississippian (?) time is present between the Sandia Formation and Proterozoic crystalline rocks at several localities in the Sandia and Manzano Mountains (Kelley and Northrop, 1975). The Madera Group is gradationally overlain by the Bursum Formation (Virgilian-Wolfcampian), which, in the Manzano Mountains, consists of interbedded siliciclastic sediments with a few thin limestone interbeds. The Bursum Formation was probably deposited as the last of the Pennsylvanian seas withdrew from the area, and is overlain by continental redbeds of the Abo Formation.

Subdivision of the Madera Group in the Manzano Mountains was formalized by Myers (1973), who elevated the Madera to group status and designated two formations within the Madera—the Los Moyos Limestone and the overlying Wild Cow Formation (Myers also included the Bursum Formation in the Madera Group). The Los Moyos Limestone and Wild Cow Formation generally correspond to the earlier concept of lower gray limestone and upper arkosic limestone members of the Madera "Formation". As noted by Myers (1973), the Los Moyos and Wild Cow Formations are likely equivalent to the Gray Mesa and Atrasado Members, respectively, of the Madera "Formation" as defined by Kelley and Wood (1946) in the vicinity of the Lucero uplift. Recent recommendations to simplify the stratigraphic nomenclature of Pennsylvanian rocks in New Mexico (Kues, 2001) suggest that the formation names Los Moyos and Wild Cow may eventually be abandoned in favor of the names Gray Mesa and Atrasado, which have precedence.

Myers (1988) concluded that most of the Los Moyos Limestone lies within the fusulinid zone of *Bedeletia*, indicating that the unit is correlative to Desmoinesian strata of the mid-continent. The overlying Wild Cow Formation lies within the zone of *Triticites*, and corresponds for the most part to Missourian and Virgilian strata of the mid-continent. The Wild Cow Formation was subdivided by Myers (1973) into three members. The three members in ascending order are the Sol se Mete, Pine Shadow, and La Casa. Each of the three members conceptually consists of a basal sequence containing an abundance of siliciclastic beds that grade upward into capping intervals dominated by carbonate-shelf limestone beds.

Subdivision of the Madera Group on the geologic map and cross sections uses the nomenclature of Myers (1973). Surface exposures in the map area are limited to portions of the Sol se Mete and Pine Shadow Members of the Wild Cow Formation.



Description of Map Units

Pennsylvanian

Wild Cow Formation. Upper Pennsylvanian. Approximately 90 m (~300 ft) of the lower part of the Wild Cow Formation is exposed across the map area. Outcrops are largely restricted to limestone ledges and resistant sandstone beds; exposures of fine-grained siliciclastic intervals are generally limited to roadcuts and the walls of arroyos.

[Pwp- Pine Shadow Member. Approximately 60 m (~200 ft) of the lower part of the member is exposed in the map area, where it consists of 2 to 3 siliciclastic intervals, several meters thick, and intervening intervals, up to a few meters in thickness, dominated by ledge-forming limestone beds. Siliciclastic intervals are generally poorly exposed and contain thin interbeds of tabular- and nodular-weathering limestone and calcareous shale. A one- to several-meter-thick sandstone to silty sandstone commonly crops out approximately 12m (~40 ft) above the base of the member in the map area. Blocks of sandstone from this interval are generally red to yellow, are composed of fine- to coarse-grained sand and pebbly sand, and are quartzose to arkosic. Ledge-forming limestone intervals typically consist of mudstones and wackestones, although coarse skeletal fragments are abundant in some beds. Fusulinids are locally abundant in limestone beds in the lower part of the unit. Total thickness of the Pine Shadow Member is approximately 60 to 90 m (200 to 300 ft) thick on adjoining quadrangles to the west and northwest.

[Pws- Sol se Mete Member. Approximately 30 m (~100 ft) of the upper part of the member is exposed in the map area. The upper 5 to 10 m (~15 to 30 ft) of the unit is dominated by thick beds of ledge-forming limestone. Underlying deposits consist of yellow, gray, and red shale with discontinuous siltstone and sandstone interbeds, and limestone beds that range from less than one to a few meters in thickness. Limestone beds are typically mudstones and wackestones, although brachiopods, crinoid stems, and other bioclasts are abundant in some intervals. Laterally continuous limestone intervals containing abundant fusulinids were not identified in the map area. Total thickness of the Sol se Mete is assumed to be 90 m (~300 ft) thick on the cross sections.

[Pm- Los Moyos Limestone (cross sections). Middle Pennsylvanian. On adjoining quadrangles to the west and northwest, the Los Moyos Formation is characterized by several-meter-thick intervals of thin- to thick-bedded limestone and thin shale and calcareous shale interbeds, separated by one to several-meter-thick intervals containing relatively abundant, fine-grained siliciclastic sediment. The formation also contains relatively minor sandstone and pebbly sandstone interbeds. Limestones commonly contain abundant chert. Overall the Los Moyos Formation contains a higher proportion of limestone relative to siliciclastic sediments than the overlying Wild Cow Formation. Assumed to be 180 m (~600 ft) thick on the cross sections.

[Ps- Sandia Formation (cross-sections). Middle Pennsylvanian. On adjoining quadrangles to the west and northwest, the Sandia Formation consists of sandstone, shale, and pebbly sandstone, with thin interbeds of limestone and calcareous shale in some areas. The thickness of the Sandia Formation is variable, with an average thickness of about 45 m in the Manzano Mountains (Kelley and Northrop, 1975) and ranging up to about 90 m in the Manzano Mountains (Myers, 1988). Pre-Sandia Formation (Mississippian (?) sedimentary rocks in the map area, if present, are included in the Sandia Formation in the accompanying cross sections, with an assumed, overall thickness of the combined Sandia Formation plus pre-Sandia strata of 45 m (~150 ft).

Proterozoic

Xu- Proterozoic crystalline rocks, undifferentiated (cross sections).

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