

Preliminary Geologic Map of the Sedillo Quadrangle, Bernalillo County, New Mexico

By

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**New Mexico Bureau of Geology and Mineral Resources
*Open-file Digital Geologic Map OF-GM 20***

Scale 1:24,000

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Sedillo 7.5' Quadrangle
OF-DM20



GEOLOGIC MAP AND CROSS SECTIONS OF THE SEDILLO 7.5' QUADRANGLE, NEW MEXICO

by

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COMMENTS TO MAP USERS

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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 NMBMMR standards, and due to the ongoing nature of work in the area, revision of this map is likely. As such, dates of revision are 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.***

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 such as faults and folds. Geologic 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 Data depicted on this geologic map are based on field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation.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 may have been mapped at scales smaller than the final map; therefore, the user should be aware of potentially 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.

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 as the sole source of data in locating or designing wells, buildings, roads, or other structures.

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

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May, 1998

The Sedillo 7.5' Quadrangle is located east of Albuquerque, NM in hilly to mountainous uplands of the Sandia and Manzanita Mountains (Fig. 1). Interstate 40 passes through the northern part of the quadrangle. Much of the map area is underlain by comparatively flat-lying, interbedded limestone, sandstone, and shale of the Pennsylvanian Madera Group. The northwestern part of the quadrangle includes younger, upper Paleozoic and Mesozoic rocks that have undergone significant structural deformation in the past, as evidenced by folds, steeply dipping beds, and large-displacement faults.

Because of its upland position the study area has been subject to overall degradation and accumulations of Cenozoic sediments are limited to unconsolidated Quaternary deposits on hillslopes and in valleys. Valleys on the western side of the map area drain into Tijeras Arroyo, which delivers sediment to the west and the Rio Grande. Establishment of a through-flowing Rio Grande fluvial system in mid Pleistocene time, and associated downcutting of the Rio Grande valley, resulted in overall lowering of regional base-level and incision of drainages in the western part of the map area. In contrast, valleys in the eastern part of the map area drain towards piedmont slopes of the topographically closed Estancia basin.

Quaternary map units are described below, and tentative correlation of units is depicted in Figure 2.

Qal - Holocene alluvium underlying present drainageways. Includes arroyo channel and floodplain alluvium and adjacent terrace deposits. Unit may include bedrock outcrops in scoured channel reaches. Deposits generally consist of silt and sand with varying amounts of gravel and clay. Stream and floodplain deposits range in thickness from very thin to 3 meters. Terrace deposits range in thickness from 1 to 4 meters, with treads 2 to 8 meters above modern channel. Straths underlying terraces may be cut into older valley-fill alluvium or into bedrock.

Qvf- Holocene to middle Pleistocene (?) valley-fill alluvium and colluvium. Predominantly silty, pebbly sand with increasing gravel content towards valley backslopes; clay content higher in valleys bounded by limestone and shale bedrock units. Ranges in thickness from a thin mantle on valley backslopes and bedrock highs to 10 meters. In western part of map area unit is graded to local base levels that predate latest Pleistocene/Holocene incision of trunk drainages. Unit forms an extensive alluvial cover in intermontane valleys in the eastern map area. Unit is locally subdivided along Arroyo San Antonio (unit Qvft), where it is locally overlain by gravely deposits of unit Qpg, and

in northeastern part of map area (unit Qvfe), where remnant depositional surfaces have survived subsequent incision of valley fill.

Qvft- Holocene to upper Pleistocene valley-fill alluvium and colluvium graded to former, higher levels of Arroyo San Antonio. Up to 4 meters thick. Unit is significantly disturbed in places along Highway 14 due to road and building construction.

Qvfe- Upper Pleistocene valley-fill alluvium and colluvium, underlying high (pre-incision) valley-fill depositional surfaces in northeastern part of map area. Younger valley-fill deposits and alluvium associated with modern drainageways are inset into unit. Soils developed on unit exhibit stage III calcic horizons, suggesting that incision of valley fills in eastern map area and abandonment of surface occurred during latest Pleistocene time.

Qfc- Holocene to Upper Pleistocene small alluvial fans and colluvial wedges along Arroyo San Antonio and Tijeras Arroyo. Silty sand and gravelly sand, 1 to 4 meters thick. Unit occurs near mouths of tributaries to trunk drainages.

Qc- Holocene to middle Pleistocene (?) hillslope colluvium. Poorly sorted accumulations of clay, silt, sand, and gravel, up to several meters thick, deposited by mass-wasting, slope wash, and fluvial transport in steep hillslope drainages. Mapped primarily on slopes developed in clastic sedimentary rocks along I-40.

Qac- Holocene to middle Pleistocene (?) hillslope colluvium and alluvium in upland interfluvial and valley backslope areas. Predominantly sandy, clayey silt with varying amounts of gravel. Ranges from <1 to several meters in thickness. Unit differentiated in upland areas isolated from major valleys. Derived from weathering of limestone, sandstone, and shale of the Madera Group (residuum on relatively flat-laying, limestone ledges), and from downslope movement of these materials. Mapped where accumulations cover extensive areas.

Qpg- Upper Pleistocene stream and piedmont alluvium and colluvium along Arroyo San Antonio. Sandy gravel and silty sand, 1 to 3 meters thick. Unit caps discontinuous bench ~12 m above modern floor of Arroyo San Antonio. Soils on deposit exhibit stage II calcic horizons.

Qpg- Middle to lower (?) Pleistocene piedmont/pediment gravels. Unconsolidated coarse gravelly sand, ~4 m thick; caps ridges west of mouth of Arroyo San Antonio (T10N, R5E, sec.14). Larger clasts include abundant limestone cobbles. Unit is more widespread to the west (see Tijeras 7.5' quadrangle) where it is considered to overlie a former pediment developed on the eastern dip-slope of the Sandia Mountains.

af- Areas affected by human disturbance, including dumped fills, quarries, and areas that have been extensively modified by road construction.

Table 1. Correlation of alluvial map units for Sedillo Quadrangle with units used on adjacent, STATEMAP geologic quadrangle maps.

Sedillo	Sandia Park	Tijeras
Qal	Qal / Qacu	QHva
Qvf	Qacu	Qvy / Qvm
Qvft	--	"
Qvfe	Qacu	--
Qfc	Qfu	--
Qpg	--	Qpm3
Qpo	--	Qpo

Geologic Map and Cross Sections Of the Sedillo 7.5' Quadrangle New Mexico

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Bedrock Unit Descriptions for The Sedillo 7.5' Quadrangle

Tertiary igneous units

Ti – Dike (Tertiary?)—Generally deeply weathered mafic to intermediate dikes that strike N-S and are steeply dipping.

Mesozoic Rocks

Upper Cretaceous

Kv – Mesaverde Group, undifferentiated—A complex unit of marine, marginal-marine, and fluvial sandstones, shales, and siltstones with at least two intervals of coal-bearing strata. The sequence is divided into three mappable lithofacies, which have been given interpretive informal names: 1) marine sandstone and shale (Kvm); 2) fluvial and distributary-channel sandstones, which include the coal beds (Kvt); and 3) shoreface sandstones (Kvs). The sandstones of the Mesaverde Group range from feldspathic arenites to quartz arenites, and, locally, dark-colored chert grains are abundant

Kvm – Mesaverde Group marine sandstone and shale—A map unit recognized only in areas where molluscan shell fragments (chiefly bivalves) are present. The unit is typically recessive weathering, and the sandstones are thin to medium bedded, dark brown to greenish, argillaceous, and variably calcareous. The unit along the west limb of the Tijeras syncline includes at least one medium-bedded calcareous sandstone containing septarian nodules and bivalve shell fragments

Kvt – Mesaverde Group terrestrial sandstones—A map unit characterized by abundant woody debris and mud-chip intraclasts. It consists of two types of sandstones: 1) resistant, medium- to thick-bedded, trough and wedge-planar cross-stratified, light-colored sandstones and 2) recessive, massive or flaggy-weathering, argillaceous, greenish-brown sandstones and siltstones with

abundant woody debris and mud-chip clasts. Three intervals of this map unit are recognized, each overlying marine sequences, and the upper two contain coal beds. The middle unit thins dramatically to the east, where it is represented by a 1–3-m thick, clean, cross-stratified sandstone along the east limb of the Tijeras synclinorium

Kvs – Mesaverde Group near shoreface sandstones—A map unit recognized by a combination of at least two of the following features: 1) clean (nonargillaceous), well-sorted nature of the sandstone; 2) planar bedding or low-angle cross-stratification; 3) recognition of the upper-shoreface-environment restrictive trace fossil *Macaronichnus* (c.f. Mieras et al., 1993). Molluscan shell fragments are also recognized, and at the top of the easternmost mapped outcrop, vertical, lined burrows are present. The combination of textural maturity, sedimentology, and ichnofauna are indicators of a high-energy near-shoreface environment. The map unit is discontinuous, appearing to grade laterally into marine or nonmarine sandstone units

Km – Mancos Shale—Dark-gray shale, slightly calcareous shale, and septarian nodule-bearing shale with rare, thin, black micrite beds and at least two 3–4-m-thick, medium-bedded calcareous sandstone intervals. The micrites and sandstones are typically fossiliferous, yielding abundant molluscan shell fragments. A prominent noncalcareous sandstone is present in the middle of this unit that directly overlies a calcareous shale and siltstone interval containing the late Turonian ammonites *Prionocyclus novimexicanus* and *Scaphites whitfieldi*, indicating that these strata are equivalent to the late Turonian Juana Lopez Member of the Mancos Shale

Kdu – Dakota Formation, upper map unit—A thin unit of thin- to medium-bedded slightly calcareous sandstone, siltstone, and silty shale separated from the main body of the Dakota Formation by a covered interval. The map unit is probably correlative with the Twowells Tongue of the Dakota Formation. (This unit is not seen on the map but is projected south from the Sandia Park and Sandia Crest quadrangles).

Kd – Dakota Formation—Medium-bedded, pervasively silica cemented, plane-bedded to tabular cross-stratified quartz arenite, typically with abundant vertical, lined burrows, many of which are clearly Diplocraterion traces. (This unit is not seen on the map but is projected south from the Sandia Park and Sandia Crest quadrangles).

Upper Jurassic

Jm – Morrison Formation—Medium- to thick-bedded, light-colored, generally poorly sorted feldspathic sandstones, with green and red shaley interbeds. Sandstones contain abundant quartz granules and greenish mud-chip clasts, and the feldspar grains typically are strongly altered to white clay minerals. The upper part of this unit in some areas is a moderately to well-sorted, moderately bioturbated feldspathic sandstone, which may be equivalent to the Jackpile Member. Abundant dark grayish-green shaly intervals with thin, dark-colored micritic limestones are present in some areas near the base of the map unit. (This unit is not seen on the map but is projected south from the Sandia Park and Sandia Crest quadrangles).

Middle Jurassic

Je-t – **Toldilto & Entrada Formations Undifferentiated: (This unit is not seen on the map but is projected south from the Sandia Park and Sandia Crest quadrangles).**

Todilto Formation, chiefly Luciano Mesa Member—In most areas the only part of the Todilto Formation exposed is the Luciano Mesa Member, which is a laminated, fetid, dark-gray micritic limestone. Laminations in the limestone appear to be algal in origin, and macrofossils are conspicuously absent

Entrada Formation—Light-green, massive (bioturbated?) sandstone. Rarely, this unit displays high-angle cross-stratification

Upper Triassic

Trc – Chinle Group—Dark-red, mostly medium bedded, trough and wedge-planar cross-stratified feldspathic sandstone and silty micaceous shale. Green reduction spots are common, as are limestone-pebble conglomeratic intervals, particularly near the base of the unit

Trz – Agua Zarca Formation—The only subdivision of Chinle Group recognized during this study. It is a tan to light grayish-pink, resistant, thin- to medium-bedded quartz arenite and feldspathic arenite

Middle and Lower Triassic

Trm – Moenkopi Formation—Recessive-weathering, dark-red micaceous shale, silty shale, and thin-bedded feldspathic sandstone

Paleozoic Rocks

Upper Permian

Ps-g – San Andres–Glorieta, undifferentiated—The upper two lithostratigraphic units of the Permian are complexly interleaved. The lithotypes, which may not correlate strictly with

formations of the same names, are gray limestone (San Andres) and white quartz arenite (Glorieta). These were differentiated where possible

Ps – San Andres lithotype—Light-gray and less commonly tan, medium- to thick-bedded limestone. The limestones are mostly micrites or skeletal wackestones, commonly with some component of quartz sand

Pg – Glorieta lithotype—White and pink (along contact with underlying Yeso lithotype), massive or plane-bedded to low-angle planar cross-stratified quartz arenite. Locally, the sandstones are extensively bioturbated (*Macaronichnus*), and near the contact with Yeso lithotype they are feldspathic. The sandstones are typically well sorted, but a thin, feldspathic quartz-pebble conglomerate occurs just below the base of the lowermost San Andres lithotype limestone in the Arroyo Armijo area along the boundary between Sandia Park and Sandia Crest quadrangles

Lower Permian

Pa-y – Abo–Yeso, undifferentiated—The lower two lithostratigraphic units of the Permian represent a reddish, feldspathic to quartzose siliciclastic sequence that was mapped as a single unit throughout most of the study area

Py – Yeso lithotype, undifferentiated—Reddish to pink or tan, medium- to thin-bedded feldspathic sandstone, shale, and silty shale interbedded with massive or laminated, micritic, gray or tan limestone near the top. The sandstones are typically cross-stratified and/or cross-laminated and virtually identical to those within the underlying Abo lithotype except that salt-hopper casts and molds are present

Pys – Yeso sandstone—Red to light-red and tan, medium- to fine-grained feldspathic sandstone and red siltstone or shale. Sandstones are typically thin to medium bedded and wedge planar to trough cross-stratified; ripple cross-laminations are common in the finer-grained intervals. Yeso lithotype siliciclastics are virtually indistinguishable from those of the Abo lithotype, and these sequences were usually mapped together. Yeso siliciclastics were differentiated only in areas directly adjacent to Yeso limestones or where salt-hopper casts/molds are abundant. Salt-hopper casts and molds are usually present in the upper part of the Abo–Yeso formation siliciclastic sequence, but because of the generally poor exposure and the small size of float material, the presence or absence of these structures was not considered a reliable criterion for picking the Abo–Yeso contact

Pa – Abo lithotype—Red and locally tan (particularly near the base), medium- and thin-bedded arkose and feldspathic sandstone interbedded with red micaceous siltstone and shale, commonly with green reduction spots. The lowermost arkoses are typically lighter colored and coarser grained than the younger feldspathic sandstones, and at least one of them is strongly bioturbated (*Macaronichnus*). The sandstones are cross-stratified (typically trough and wedge-planar geometries), and the finer-grained rocks are commonly ripple cross-laminated. In addition, mud-chip clasts and plant debris are common

Pac – Abo limestone—Rare, less than 1-m-thick, thin- to medium-bedded, gray to tan limestones, typically containing abundant bivalve fragments and/or echinoid spines

Upper and Middle Pennsylvanian

IPm – Madera Formation, undifferentiated—A mixed sequence dominated by medium- to thick-bedded, light-gray limestone interbedded with subordinate orange to reddish arkose and tan sandstone as well as siltstones (which are less common and can be greenish to tan and micaceous). Dark-colored mudstone intervals with variable amounts of thinly bedded black micrites are also present, particularly at the base of the formation. This formation is informally divided into two members: IPmu—dominated by massive limestone, shale, and thin discontinuous siliciclastic beds near the top of the unit, and IPml—a cyclically interbedded sequence of limestone and thinner siliciclastic and mudstone beds. The upper member is defined by the first occurrence of a thick and relatively continuous siliciclastic bed. Due to poor exposure and the difficulty in tracing thin beds through the folded and likely faulted Chamisoso Monocline south of Tijeras canyon, the distinction between IPmu and IPml is not always clear. Within both members, contacts between the limestones and coarse-grained siliciclastics are generally sharp although occasionally both coarse clastic material is seen within limestone as well as limestone clasts within siliciclastic units. These often arkosic sandstones are typically coarse- to medium-grained, but granules and rarely pebbles also are present. These pebbles can be up to ~4 cm in diameter and consist principally of Precambrian quartzite with minor micaceous felsic schists that look very similar to rocks presently exposed in the basement-cored uplifts of north-central New Mexico. Siliciclastic rocks generally have a well developed planar or cross stratification. Contacts between the limestones and mudstones are generally gradational. Limestones, which vary in thickness from 20 cm to 20 m (amalgamated beds), dominate the formation, and these are typically matrix-supported (micrites and skeletal wackestones). Clast-supported limestones (skeletal grainstones and packstones) are less common, although locally abundant, and these tend to be toward the top of sequences. Skeletal debris in the Madera Formation limestones consist mostly of crinoid stems and columnals, brachiopods, corals, bryzoans, and sometimes abundant fusulinids. Molluscan shell fragments are rare. The lower member (IPml) is generally more fossiliferous.

IPmu – Madera Formation upper member (comprises all members of the Wild Cow Formation of Myers and Mckay, 1976 which were defined on the basis of fusilinid biostratigraphy)—a sequence of alternating limestones and siliciclastic rocks that are often arkosic and generally medium to coarse grained. The base of this member is defined as the first occurrence of a thick and relatively continuous siliciclastic bed. Petrified wood is seen locally throughout this member.

IPml – Madera Formation lower member (Los Moyos Limestone of Myers and Mckay, 1976, which they defined on the basis of fusilinid biostratigraphy)—a sequence of often fossiliferous and massively bedded cliff-forming wavy laminated and cherty micritic limestone interbedded with shales. Shale is particularly abundant near the base of this member where it grades into the Sandia Formation.

lithotypes within IPm, IPmu, and IPml

as – Madera Formation siliciclastics undifferentiated including siltstone, sandstone, and arkose. Most clastic rocks are usually medium to coarse grained. Less common are siltstones and fine- to medium-grained sandstones that are often micaceous. Pebble conglomerates are locally seen but often grade into coarse sandstones. These rocks are generally well stratified from planar to cross bedded (to varying degrees). Individual beds are often tabular extending up to several kilometers but may be lenticular as well.

ak – Madera Formation arkose—orange to pale red, medium- to coarse-grained arkosic to sandstones (10-25% feldspar) that are locally conglomeratic.

ss – Madera formation sandstone

cs and ls – Madera formation limestone and shale undifferentiated

cc – Madera Formation ledge forming limestones

ms – Madera Formation mudstone/shale—generally does not outcrop except in roadcuts. Mudstones locally grade laterally into limy mudstones and nodular limestones or micaceous sandstones. Some maroon mudstones grade laterally and vertically into arkosic sandstones.

IPs – Sandia Formation—Sandstone-rich sequence of interbedded arkoses and feldspathic sandstones, siltstones, silty shales, and limestones. This unit is commonly present between the Madera Formation and Proterozoic basement. Its contact with the overlying Madera Formation is chosen at the base of the oldest, light-gray either massive-appearing limestone or amalgamated sequence of medium- to thick-bedded limestones. The Madera Formation limestones are typically micrites or skeletal wackestones, whereas limestones in the Sandia Formation are typically thinner bedded, clast supported (packstones and grainstones), and greenish, and they contain abundant siliciclastic sand.

Mississippian

Ma – Arroyo Penasco Formation—Thin and discontinuous sedimentary quartzite (seen only as float) of the basal member of the formation sits directly on the unconformity over Proterozoic basement. This very white and extremely well lithified unit is easily mistaken for a metamorphic quartzite but has no apparent foliation, has visible rounded grains on weathered or broken surfaces, and is only seen at the Great unconformity. The upper dolomitic member has not been recognized in this area.

Paleoproterozoic rocks

Xqs – Pelitic and semi-pelitic schist—gray quartz-rich pelitic and semi-pelitic schist with gradational changes in mica content between micaceous quartzite and quartz-muscovite schist, containing multiple tectonic fabrics defined by fine-grained micas. Porphyroblasts have not been seen in hand sample.

Xu – Paleoproterozoic (?) rocks undifferentiated (on cross-section).