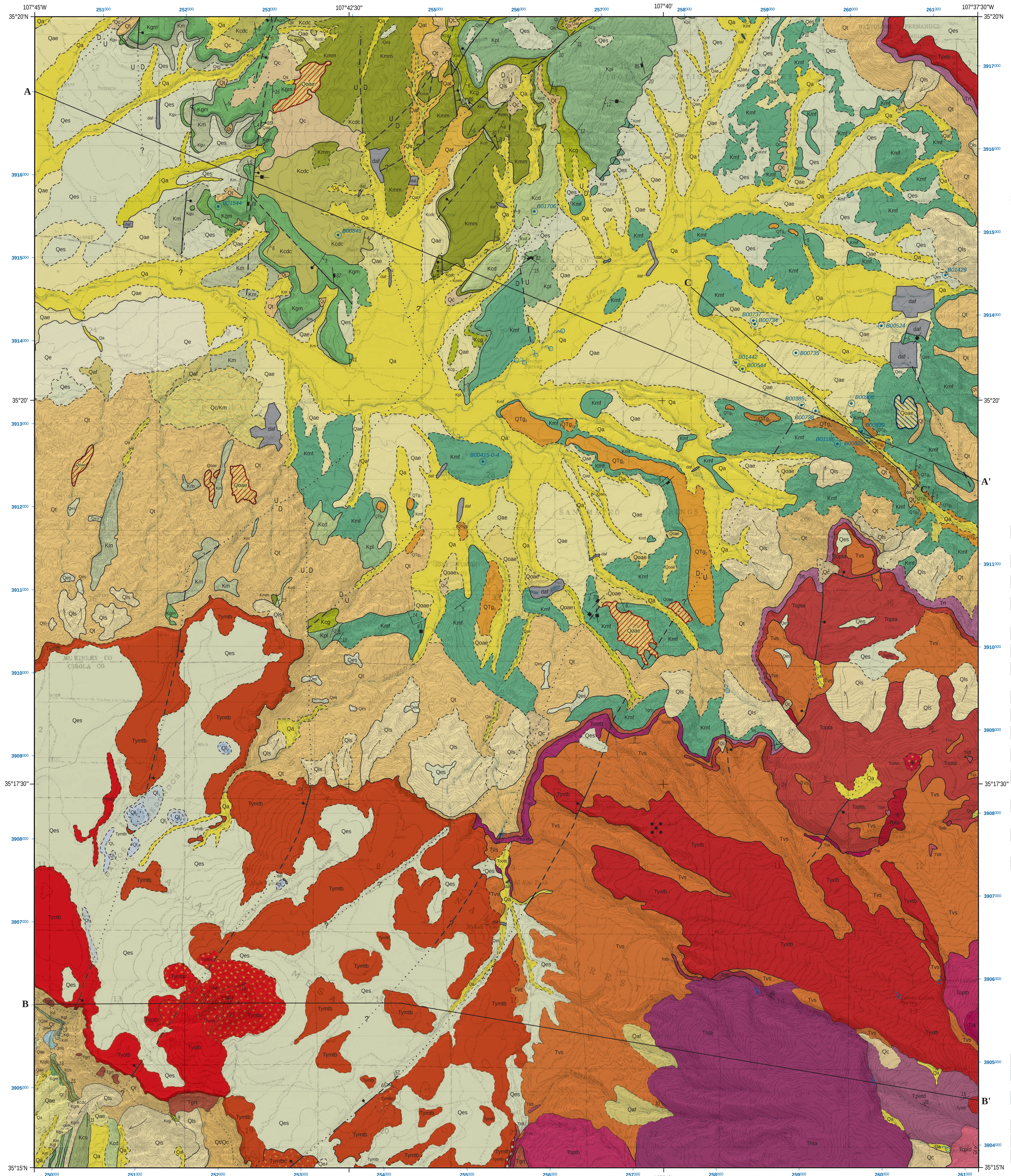
NMBGMR Open-file Geologic Map 194
Last Modified August 2010



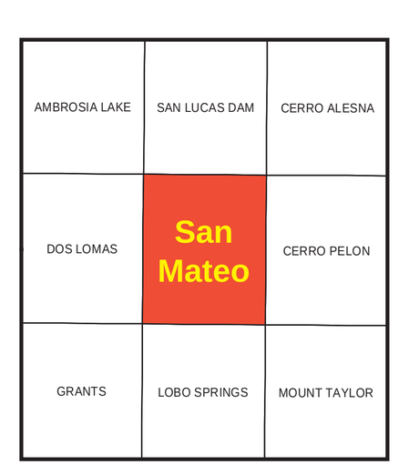
Base map from U.S. Geological Survey 1963, from photographs taken 1956 and 1958, field checked in 1963.
1927 North American datum, UTM projection -- zone 13N
1000-meter Universal Transverse Mercator grid, zone 13, shown in red

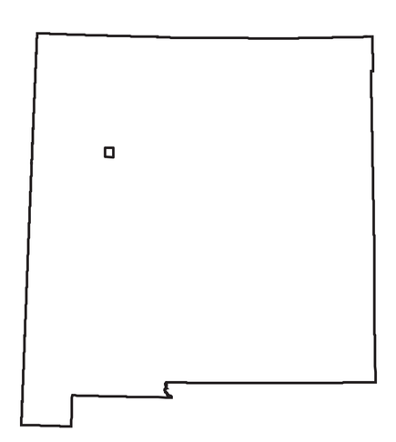
1:24,000

CONTOUR INTERVAL 20 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

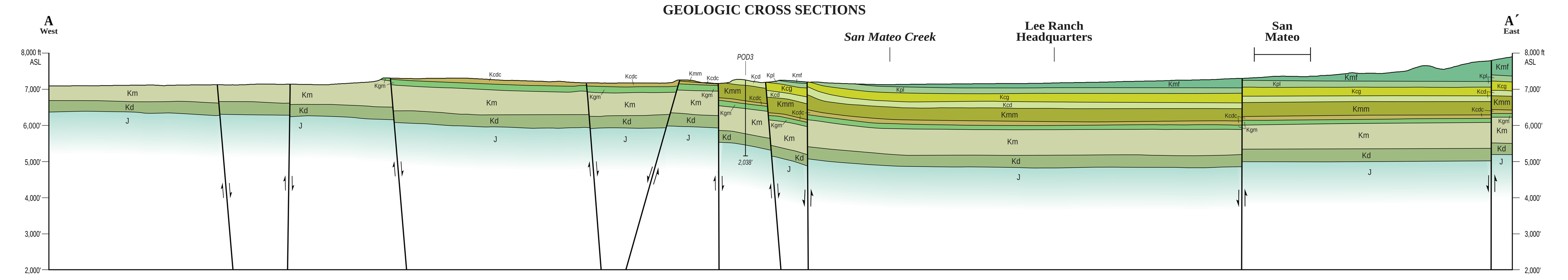
Magnetic Declination
March 2008
10º 03' East
At Map Center

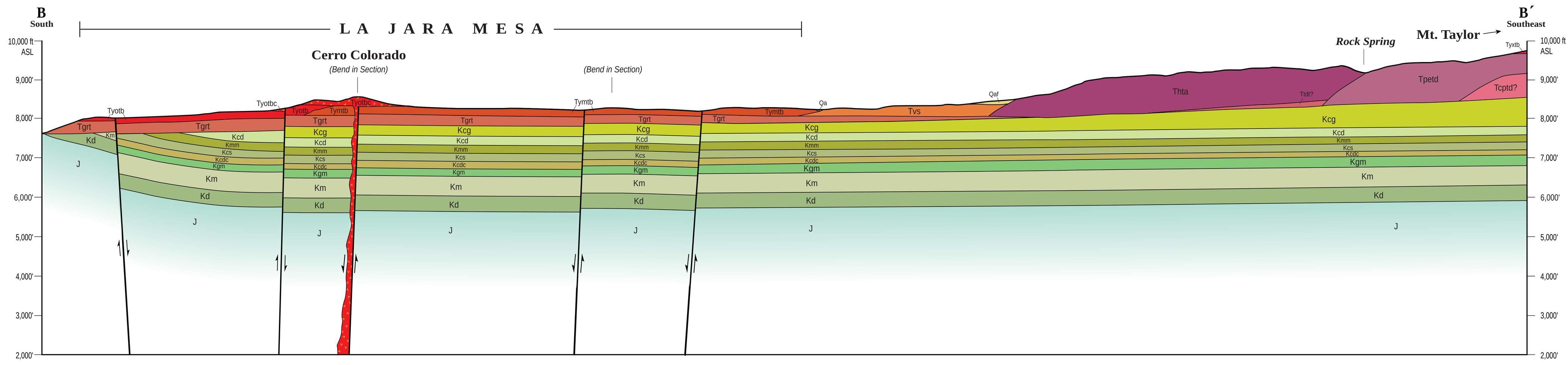


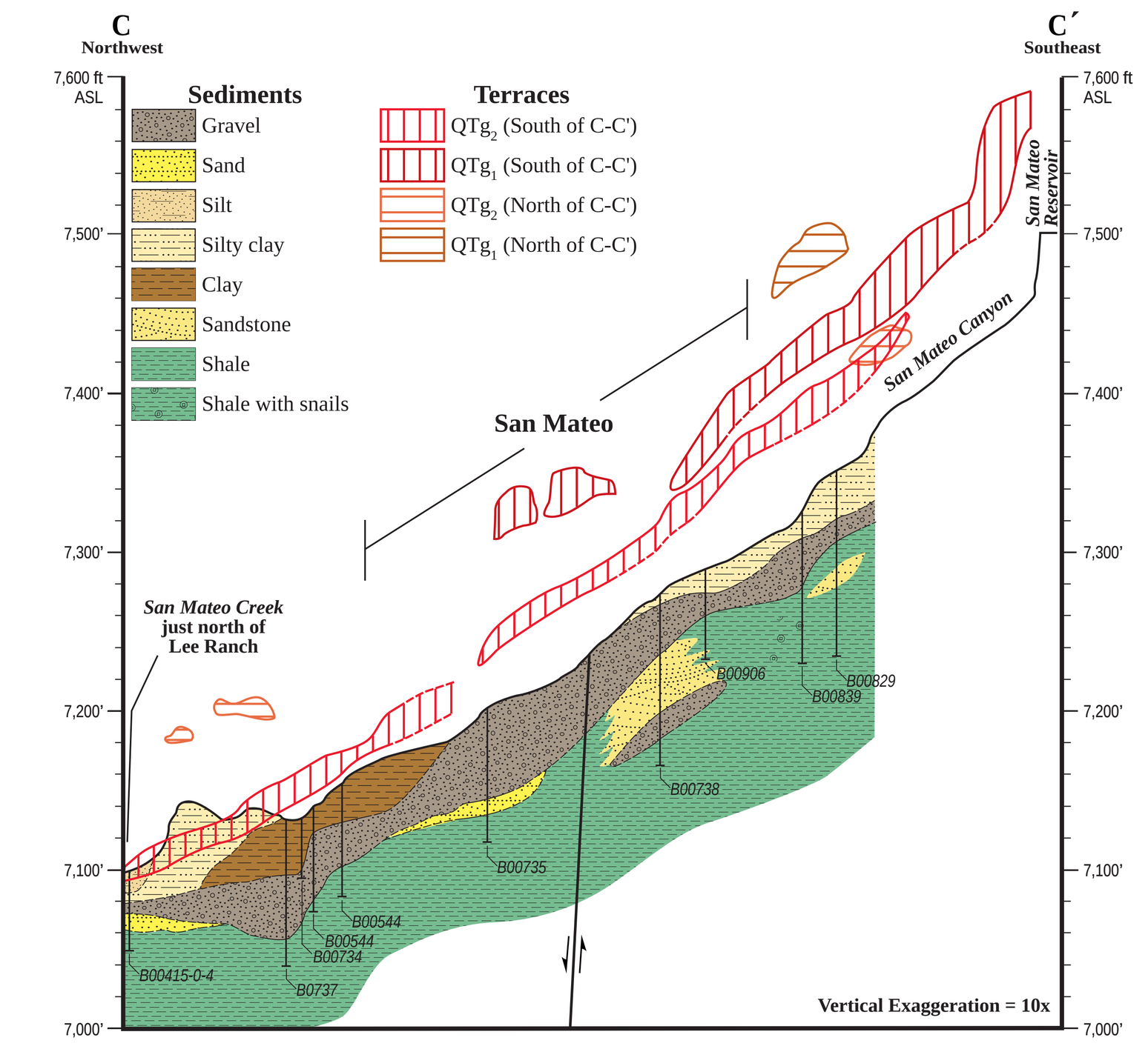


QUADRANGLE LOCATION

GEOLOGIC CROSS SECTIONS







DESCRIPTION OF MAP UNITS

Descriptions of map units are listed in approximate order of increasing age. Formal stratigraphic names of Cretaceous units are described by Sears, *et al.* (1941), Lipman, *et al.* (1979), and Dillinger (1990). Field identification of volcanic rocks is based on hand specimens, petrography and chemical data published by Hunt (1938), Baker and Ridley (1970), Lipman and Moench (1972), Lipman and Mehnert (1979), Crumpler (1980a, 1980b, 1982), and Perry, *et al.* (1990). The names of volcanic units are based on the above chemical data and the alkali-silica diagram of Le Bas, *et al.* (1986). See Goff, *et al.* (2008) for a contemporary description of the rocks and geology in the Mount Taylor area.

CENOZOIC

Quaternary/Neogene

Alluvium, colluvium, eolian, and anthropogenic deposits

daf — **Disturbed areas and/or artificial fill (Historic) —** Disturbed areas, dumped fill, and areas affected by other human disturbances. Mapped where mining deposits or extractions are areally extensive. Includes mine pads and settling ponds associated with the uranium mining industry, as well as check dams.

Qa — **Stream alluvium (Quaternary)** — Brown (7.5YR4/2) to light reddish-brown (5YR 6/4), unconsolidated, moderately sorted, silty sand to sandy clay at the surface with buried gravel/boulder beds subsurface. Varies considerably in thickness from <1 to 3 m in tributaries and up to 30+ m.

Qae — **Stream and valley slope alluvium subjected to eolian processes (Quaternary)** — Unconsolidated to partly consolidated, well-sorted, fine-grained sand, silty sand, and clay. Thickness 1 to 3 m.

Qaf — **Alluvial fan deposits (Quaternary)** — Typically fan-shaped deposits of coarse to fine gravel and sand, silt, and clay within and at the base of steep relief; grades into alluvial deposits along main channels; probably Holocene to middle Pleistocene in age; maximum thickness about 15 m.

Qes — **Eolian silt and sand subjected to sheetwash (Quaternary)** — Windblown and sheet wash deposits of loose, silt and fine sand, 0.2 to >2 m thick.

Qe — **Eolian sand (Quaternary)** — Fine- to medium-grained sand capping low mesas at the foot of La Jara Mesa. Up to 15 m thick.

Qls — **Landslide deposits (Quaternary)** — Poorly sorted debris that has moved chaotically down steep slopes; slumps or block slides partially to completely intact, that have moved down slope; slumps and block slides usually display some rotation relative to their failure plane; ages vary from Holocene to mid- to late-Pleistocene; thicknesses vary considerably depending on the size and nature of the landslide.

Qt — **Talus (Quaternary)** — Poorly sorted debris and mass wasting deposits primarily from trachybasalt-covered mesa tops; thickness can locally exceed 15 m.

Qc — **Colluvium (Quaternary)** — Poorly sorted slope wash and mass wasting deposits from local sources; thickness can locally exceed 15 m.

Ql_2 — **Younger lacustrine deposits (Quaternary)** — Fine-grained sand to silty clay located in small closed basins within the Bajios Redondos graben. Holocene in age. Water still ponds after heavy rains. Thickness about 2 m.

Ql_1 — **Older lacustrine deposits (Quaternary)** — fine-grained sand to silty clay located in small closed basins within the Bajios Redondos graben, often surrounding Ql_2. Late Pleistocene in age. Thickness 2-3 m.

Qat — **Stream terrace alluvium (Quaternary)** — Brown (7.5YR4/2) to light reddish-brown (5YR 6/4), unconsolidated, moderately sorted, silty sand to sandy clay at the surface. Two distinct tributary valley fill deposits record 3 cut and fill cycles since the mid to late Pleistocene. Thickness 1-4 m.

Qoae — **Fan pediment alluvial and eolian deposits (Quaternary)** — Unconsolidated to partially indurated fine- to medium-grained sand and gravel. Often associated with either the Upper or Lower San Mateo geomorphic surfaces. Soils exhibit Stage III pedogenic carbonate. Thickness approximately 2 m.

QTg_2 — **Terrace gravel (Pliocene-Early Pleistocene)** — Unconsolidated fine- to medium-grained sand, gravel, and rounded trachybasalt boulders up to >3 m in size. Deposits were shed off of Mount Taylor down both San Mateo and La Mosca Canyons out onto the valley floor. Thickness varies from 10-20 m at heads of canyons to 3-5 m at distal margins.

QTg_1 — **San Mateo Creek terrace gravel (Pliocene-Early Pleistocene)** — Unconsolidated fine- to medium-grained sand, gravel, and rounded trachybasalt boulders up to >2 m in size capping Menefee Fm. deposits (*Kmf*) in San Mateo Canyon. Thickness 5-8 m.

Pliocene volcanic and volcaniclastic deposits

Panorama east-southeast across La Jara Mesa from the lacustrine beds within the Bajios Redondos graben, to the cinder cone of Cerro Colorado and the associated fault scarp to the northeast (right) in the middle distance, and 3,345 m (11,301 ft) Mount Taylor in the far distance. Photo by J. R. Lawrence.

Tyotb, Tyotbc — **Younger olivine trachybasalt** — Black to gray, fine- to medium-grained very weakly porphyritic trachybasalt flow and red ferruginous cinder deposits (*Tyotbc*). Sparse phenocrysts (<1% by volume) of small (≤ 2 mm in diameter) subhedral plagioclase, euhedral fresh green olivine and trace clinopyroxene that locally occur in cumulophyric clusters. Extensive flow originated from cinder cone forming Cerro Colorado near the south edge of La Jara Mesa. Overlies *Tgrt* along south and southwest mesa margin. Unit not dated. Thickness of flow(s) is ≤30 m.

Tyxtb — **Younger xenocrystal trachybasalt** — Two distinct flows of black to gray, medium- to fine-grained basalt having very sparse phenocrysts of olivine, plagioclase, and augite and very rare xenoliths mantle peridotite. Flows occur in east-central and northeast portions of quadrangle from vents on adjacent Cerro Pelon quadrangle. Flows overlie unit *Tvs*. Flows not dated. Maximum thickness is <40 m.

Tymtb, Tymtbc, Tymth — **Younger megacrystal trachybasalt** — Black to gray, medium-grained porphyritic hawaiite and red to black cinder deposits (*Tymtbc*) having abundant megacrysts of augite and olivine and phenocrysts of olivine and plagioclase. Unit consists of cinder cone complex with exposed conduit and multiple flows on southern edge of La Jara Mesa. Unit also contains thin hydromagmatic beds (*Tymth*) exposed beneath flows to north and east of cone, partly north of quadrangle boundary. Texture is intersertal to slightly trachytic. Microphenocrysts consist of olivine, (titan) augite, plagioclase, and opaque oxides in glass. Olivine shows considerable iddingsite alteration. Overlies thin bed of trachydacite tuff (*Ttdt*) and older trachybasalt (*Totb*) along highway NM 457. Overlies tuff of Grant's Ridge (*Tgrt*) along all of southern La Jara Mesa. Unit not dated. Thickness of flows is <60 m.

Tta — **Trachyandesite, undivided** — Multiple flows of gray to blue-gray, porphyritic lavas. Phenocrysts consist of resorbed plagioclase, oxidized clinopyroxene, hypersthene, sparse biotite, sparse oxidized hornblende, and magnetite in a pilotaxitic groundmass containing microphenocrysts of plagioclase, clinopyroxene, apatite, opaque oxides, and devitrified glass. May contain rare, small (≤5 mm) hornblende megacrysts. Some specimens show minor Fe-oxide alteration. Overlies older plagioclase phyric basalt (*Toptb*) near SE corner of map. Interbedded with volcaniclastic sedimentary deposits (*Tvs*). Flows not dated. Exposed thickness is ≤100 m.

Thta — **Hornblende trachyandesite** — Multiple flows of gray to yellow-gray to pale pink, porphyritic lavas with conspicuous hornblende megacrysts (≤5 cm). Three probable vents are identified on the SW flank of Mount Taylor but similar lavas occur elsewhere on Mount Taylor. Megacrysts consist of partly resorbed brown hornblende with partial jackets of magnetite. Phenocrysts consist of partly resorbed and complexly zoned plagioclase and plagioclase clots, clinopyroxene, magnetite, resorbed olivine, orthopyroxene, and oxidized hornblende in a trachytic to pilotaxitic groundmass having microphenocrysts of plagioclase, pyroxene, opaque oxides, apatite, and devitrified glass. Some specimens have plagioclase-pyroxene clots and clinopyroxene jackets over orthopyroxene. Interbedded with *Tvs*. Overlies older trachybasalt (*Totb*) and porphyritic enclave-bearing trachydacite (*Tpetd*). Long flow complex on southern edge of quadrangle is dated at 2.52 ± 0.07 Ma (Perry *et al.*, 1990). Maximum exposed thickness at least 275 m.

Tvs — **Volcaniclastic sedimentary rocks** — Gray to tan to white debris flows, fluvial deposits and interbedded tuffs shed from the Mount Taylor stratovolcano during growth. Debris flow component is most abundant near source (SE) and consists primarily of boulders and cobbles of angular to subangular trachydacite and trachyandesite in a volcanic sand matrix. Boulders form a lag deposit on surface of debris flows. Fluvial component contains rounded to subrounded cobbles including a higher proportion of basaltic clasts, especially to NW. Tuffs consist mostly of thin beds and lenses of fall deposits with vesiculated pumice having phenocrysts of plagioclase, clinopyroxene ± hornblende ± biotite. Unit is interbedded with practically all lavas on northwest side of Mount Taylor. Underlies two flow complexes of *Tyxtb*. Overlies older olivine basalt (*Toob*) and tuff of Grant's Ridge (*Tgrt*). Maximum exposed thickness is >200 m.

Tpetd — **Porphyritic enclave-bearing trachydacite** — Thick, multiple flows of dark gray to tan porphyritic lavas having conspicuous enclaves up to 50 cm in diameter, especially in the lower flows. Lava contains phenocrysts of large potassium feldspar, plagioclase, clinopyroxene, orthopyroxene and biotite in an intergranular to hyalopilitic groundmass of plagioclase, potassium feldspar, clinopyroxene and devitrified glass. Groundmass contains sparse phenocrysts (?) of quartz. Enclaves consist of potassium feldspar, plagioclase, clinopyroxene, orthopyroxene, magnetite, and vesiculated glass. Source of lavas is from obliterated vent in amphitheater of Mount Taylor. Underlies *Tyxtb*, *Thta*, and *Tvs*. Unit not dated. Maximum exposed thickness >200 m.

Tcptd — **Coarse porphyritic trachydacite** — Pale pink to tan, very coarse porphyritic lava containing large (≤ 3 cm) phenocrysts of potassium feldspar. Unit superficially looks like granite and makes a distinctive fine gravelly soil. Smaller phenocrysts consist of magnetite, potassium feldspar, plagioclase, oxidized clinopyroxene, and apatite in a hyalopilitic groundmass of tiny felted plagioclase, potassium feldspar, clinopyroxene, opaque oxides and devitrified glass. Unit shows minor Fe-oxide alteration. Unit underlies *Thta* and *Tpetd* in extreme SE corner of quadrangle. Unit is not dated. Maximum observed thickness is about 80 m.

Tbta — **Basaltic trachyandesite** — Dike, plug, and flow complex of black, sparsely porphyritic lava containing small phenocrysts of plagioclase and clinopyroxene, and tiny plagioclase-clinopyroxene-olivine clots. Groundmass is hyalopilitic containing microphenocrysts of plagioclase, iron oxides and devitrified glass. Contains very minor cinder deposits at highest elevations of unit. Intrudes and partially covers older plagioclase basaltic trachyandesite (*Topta*) in eastern portion of quadrangle. Unit is not dated. Maximum exposed thickness is 45 m.

Topta — **Older plagioclase basaltic trachyandesite** — Flows of splotchy white and black porphyritic lavas and minor cinder deposits (*Toptac*) containing abundant large (2 cm), often aligned plagioclase phenocrysts. Other phenocrysts consist of clinopyroxene and minor iddingsitized olivine. Groundmass is intersertal and slightly vesicular containing micorphenocrysts of plagioclase, iron oxides and devitrified glass. Forms circular hill in east central margin of quadrangle. Intruded by *Tbta*. Interbedded in *Tvs*. Overlies *Trt* and *Tgrt*. Unit is not dated. Maximum exposed thickness is over 200 m.

Totb — **Older trachybasalt** — Black to dark gray, fine-grained basalt having sparse olivine and plagioclase phenocrysts in intersertal groundmass containing microphenocrysts of plagioclase, augite, olivine, opaque oxides and glass. May have rare quartz xenocrysts. Underlies *Tyxtb*, *Tvs*, and *Thta*. Unit not dated. Maximum observed thickness is about 20 m.

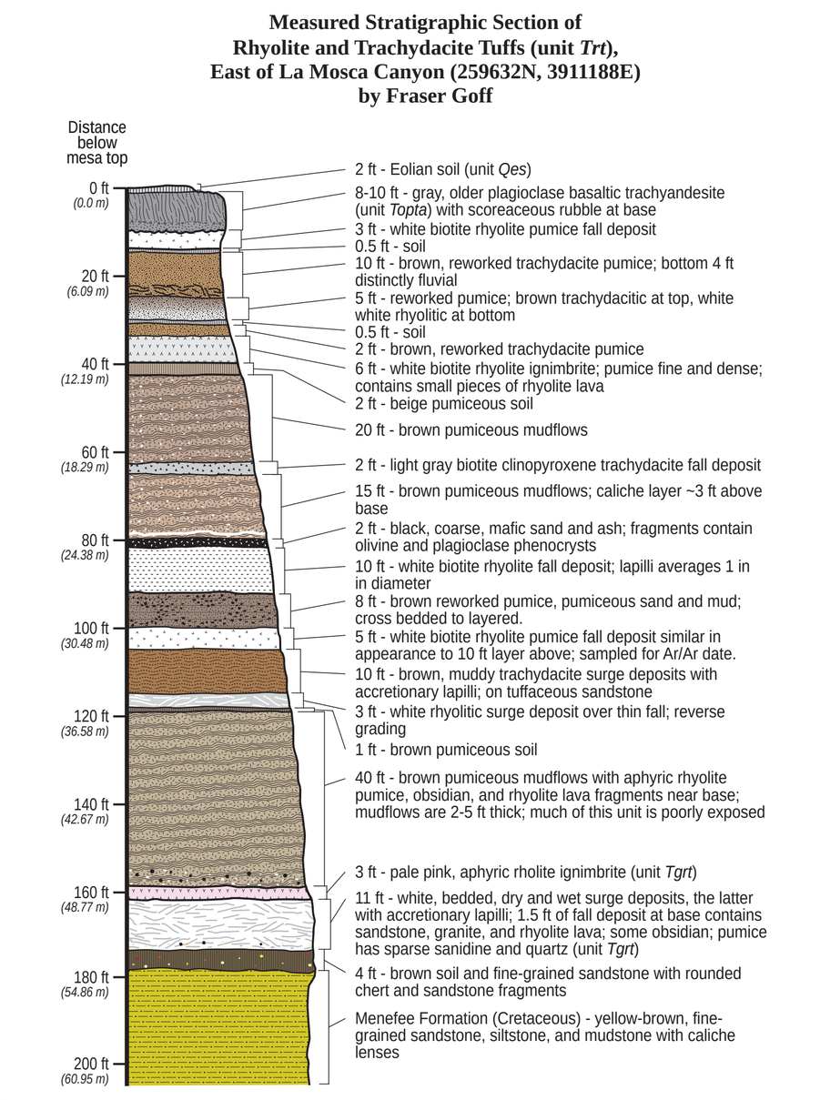
Toptb — **Older porphyritic trachybasalt** — Black to gray basalt with sparse plagioclase and olivine phenocrysts. Texture is intersertal and slightly vesicular. Groundmass contains plagioclase, augite, minor olivine, opaque oxides, and glass. Olivine shows iddingsite alteration. Overlain by *Tta* and *Tvs*. Unit not dated. Maximum exposed thickness is about 130 m.

Trt — **Rhyolite and trachydacite tuffs, undivided** — White to gray, bedded tuffs with interbedded sands and gravels. Tuffs consist primarily of fall deposits no more than 4 m thick. Phenocrysts in rhyolitic pumice consist of potassium feldspar, plagioclase, minor clinopyroxene, quartz, and biotite in eutaxitic groundmass. Trachydacite pumice contains phenocrysts of plagioclase, clinopyroxene, biotite ± hornblende in eutaxitic groundmass. Unit may contain a few meters of Grant's Ridge tuff (*Tgrt*) at very bottom. Unit not dated. Maximum exposed thickness is about 75 m (see measured stratigraphic section, right, and additional data in Appendix A).

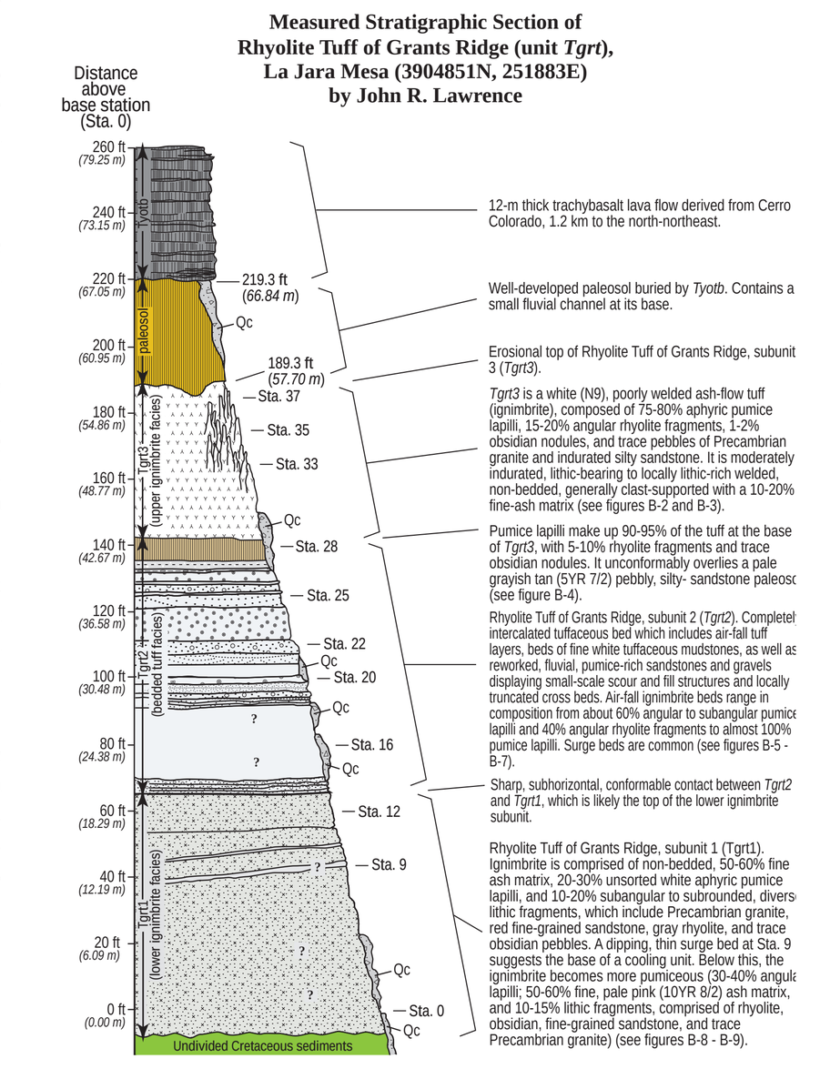
Tootb — **Older olivine trachybasalt** — Black to gray basalt with conspicuous olivine and sparse plagioclase phenocrysts. Texture is intersertal. Groundmass contains plagioclase, olivine, augite, opaque oxides, and glass. Olivine shows iddingsite alteration. Overlies *Tgrt*, and *Kmf*. Underlies *Tvs*. Maximum exposed thickness is >50 m.

Tgrt — **Rhyolite Tuff of Grants Ridge** — White to pale pink, bedded pyroclastic fall, flow, and surge deposits; some beds have abundant aphyric obsidian clasts. Most lithics consist of pink to gray Precambrian granite and gneiss, chert, sandstone, limestone and rare basanite. Pumice clasts are glassy to slightly devitrified with very rare phenocrysts of potassium feldspar. Underlies a wide variety of units, particularly *Toob*, *Totb*, *Tymtb*, and *Tyotb* on La Jara Mesa. Overlies *Kmf*. Unit is not dated. Maximum observed thickness is about 110 m. Measured tuff section on south flank La Jara Mesa is a minimum of 67 m (see measured stratigraphic section, right, and additional data in Appendix B).

Measured Stratigraphic Section of Rhyolite and Trachydacite Tuffs (unit *Trt*), East of La Mosca Canyon (259632N, 3911188E) by Fraser Goff



Measured Stratigraphic Section of Rhyolite Tuff of Grants Ridge (unit *Tgrt*), La Jara Mesa by John R. Lawrence



Northeast-viewing photo from Sta. 26 showing middle bedded tuff facies (Tgrt 2) made up of complexly intercalated tuff beds, including air-fall, surge deposits and reworked tuffaceous sandstone layers. Note 5-ft Jacobs staff for scale. Photo by J. R. Lawrence.

MESOZOIC

Cretaceous

Menefee Formation

Kmf — **Menefee Formation, Cleary Coal Member** — Interbedded shales, siltstones, fine to medium grained sandstones, mudstones, and thin coals. Generally forms low-relief topography or forms landslides around the margins of the basalt-capped La Jara Mesa. The contact with the underlying Point Lookout Sandstone is sharp and the top of the unit is not exposed. This unit is the regressive equivalent of the Gibson Coal Member of the Crevasse Canyon Formation but within the map area is everywhere separated from it by the transgressive sands of the Point Lookout sandstone. The top of the unit is not exposed, but a minimum thickness is at least 90 m.

Point Lookout Sandstone

Kpl — **Point Lookout Sandstone** — Light gray and reddish brown to buff medium to fine-grained cross bedded sandstone. This cliff-forming sandstone caps Jesus Mesa. Nodular concretions (approximately 1 cm diameter) and larger (50 cm diameter) hematite concretions are common at the top of the unit. Outside of the map area, this unit is divided into a lower and upper part by the presence of the Satan Tongue of the Mancos Shale, which isn't present locally. The exposed thickness is between 25 and 50 m.

Crevasse Canyon Formation

Kcg — **Gibson Coal Member** — Interbedded black to brown siltstone, thin to medium bedded tan, golden-yellow, brown, and greenish gray sandstone, and black coal. The sandstones are composed of well to moderately sorted, very fine- to medium-grained angular to subrounded quartz grains with < 10% mafic minerals and <1% clay (litharenite). The sandstone beds are cross-bedded, ranging from trough cross-beds to large-scale, low amplitude planar cross-beds. Ripple marks are locally preserved. Mud clast conglomerates frequently occur at the base of the sandy intervals. Bioturbation is rare. Petrified wood fragments are common; logs up to 10 cm in diameter and 0.5 m long are locally preserved. Elliptical to spherical fractured siderite to goethite concretions with calcite (or more rarely, barite) filling the fractures, are present throughout the unit. The coal beds are generally < 0.5 m thick. The lower contact is gradational with the underlying Dalton Sandstone Member; the top unconformably overlain by *Kpl*. The exposed thickness is between 55 and 75 m.

Kcd — **Dalton Sandstone Member** — Forms two prominent cliffs, a lower yellowish- orange cliff and an upper white cliff with an intervening short slope (doublet). The basal sandstone near the contact with the underlying Mulatto Tongue of the Mancos shale (*Kmm*) often has thin beds containing abundant pelecypod casts and molds. The carbonate-cemented basal sandstone is composed of well-sorted, very fine-grained angular quartz grains with < 5% mafic minerals and <1% clay. The weakly cemented upper sandstone consists of well sorted, fine-grained, angular to subrounded quartz grains with <1% lithics and 7 to 10% feldspar. The upper and lower contacts are gradational with the overlying and underlying units, *Kcg* and *Kmm*, respectively. Maximum exposed thickness is ≤25 m.

Kcs — **Stray Sandstone Member** — Forms two prominent reddish-orange cliffs with an intervening short slope (doublet). On a fresh surface, this medium-bedded, planar cross- bedded sandstone is white to yellowish gray. This sandstone is composed of well to moderately sorted, very fine- to medium-grained angular quartz grains with < 1% mafic minerals and <1% clay. The top of the Stray sandstone is a thin (<1 m) conglomerate with pebbles to cobbles of quartzite, chert, and quartz. The upper and lower contacts are gradational with the overlying *Kmm* and the underlying *Kcdc*. Very limited exposure in the extreme SW corner of the map area. Maximum exposed thickness is ≤ 25 m.

Kcdc — **Dilco Coal Member** — Interbedded black to brown siltstone, thin to medium bedded tan, brown, and olive-green sandstone, and black coal. The sandstones are composed of well to moderately sorted, very fine- to fine-grained angular quartz grains with < 5% mafic minerals, 1 to 5% muscovite, and 1-5 % potassium feldspar altered to clay. The sandstones are cross-bedded to ripple laminated. Elliptical to spherical fractured siderite to goethite concretions, with calcite (or more rarely, barite) filling the fractures, are present throughout the unit. The coal beds are < 0.5 m thick and are usually in the lower part of the unit. The upper and lower contacts are gradational with the overlying *Kcs* and the underlying main body of the Gallup Sandstone, *Kgm*. The exposed thickness is between 25 and 40 m.

Gallup Sandstone

Kgm — **Main body** — Yellowish gray, white, or golden yellow, medium to thick-bedded, cross-bedded sandstone. The sandstone consists of moderately sorted, fine to very fine-grained angular to subrounded quartz grains with < 5% mafic minerals, 1 to 2% muscovite, plant debris, and potassium feldspar altered to clay (10 to 30%). Often the sandstone beds are bioturbated with ~1.0 cm diameter cylindrical, vertically oriented burrows. Carbonaceous shale is intercalated with the sandstone. Locally contains fossiliferous (*Innocermid*) beds near the top. Faint, very low angle trough cross beds occur locally in sets less than 0.25 m thick, with azimuth of 010 ° (northerly flow). Beds are primarily planar-tabular or laminated. The lower contact is gradational with *Kmm* and the upper contact is gradational with *Kcdc*. Maximum exposed thickness is ≤ 30 m.

Kgu — **Upper tongue** — White medium-bedded, cross-bedded to tabular sandstone that is locally capped by well-cemented, fractured, brown-weathering, planar crossbedded sandstone. The brown sandstone is carbonate cemented; the weakly cemented white sandstone does not react to hydrochloric acid. The sandstone consists of well-sorted, fine-grained angular quartz grains with < 5% mafic minerals and potassium feldspar altered to clay (15 to 25%). The white arkosic sandstone has no muscovite, but the brown capping sandstone has trace amounts of muscovite and biotite. Hematitic concretions and stained surfaces occur throughout unit. The upper and lower contacts are gradational with *Km*. Maximum exposed thickness is ≤ 7 m.

Kgl — **Lower tongue** — White medium-bedded, cross-bedded to tabular sandstone that is locally capped by well-cemented, fractured, brown-weathering, planar cross-bedded sandstone. The brown sandstone is carbonate cemented; the weakly cemented white sandstone does not react to hydrochloric acid. The sandstone consists of well-sorted, fine-grained angular quartz grains with < 5% mafic minerals and potassium feldspar altered to clay (10 to 15%). The white subarkosic sandstone has no muscovite, but the brown capping sandstone has trace amounts of muscovite. The top of unit is locally conglomeratic with sandstone clasts and sharks teeth. The upper and lower contacts are gradational with Mancos Shale. Only exposed in the far southwest corner of the map area with a maximum exposed thickness of ≤ 5 m.

Mancos Shale

Kmm — **Mulatto Tongue** — Golden yellow, thin-bedded, tabular to ripple-laminated sandstone and black shale. Moderately to well sorted, very fine-grained angular to very well-rounded quartz grains with < 1% mafic minerals, ~1% muscovite, and abundant clay (~30%). Coarse to very coarse sandstone beds near the basal contact with the Stray Sandstone and lenses of conglomerate with well-rounded pebbles of black and white chert and black quartzite are locally present. Upper and lower contacts are gradational with *Kcd* and *Kcdc* (or *Kcs* where present). Maximum exposed thickness is ≤120 m.

Km — **Main body** — Black to dark brown shale and silty shale intercalated with finely laminated to cross-bedded thinly bedded sandstone. The sandstones are wellsorted, fine-grained quartz arenites. Upper and lower contacts are gradational. Small tongues of Main Mancos are interbedded within the Gallup Sandstone units. Maximum exposed thickness of Main Mancos beneath *Kgm* is ≤50 m.

Kd — **Dakota Formation, undivided** —Alternating sandstones and shales of Dakota Formation and Mancos Shale. Very limited exposure in the extreme SW corner of the map forms a thin sandstone doublet and is probably the Twowells Member. Maximum exposed thickness locally is about 13 m (see Owen and Owen, Jr., 2003 for further regional detail).

JURASSIC

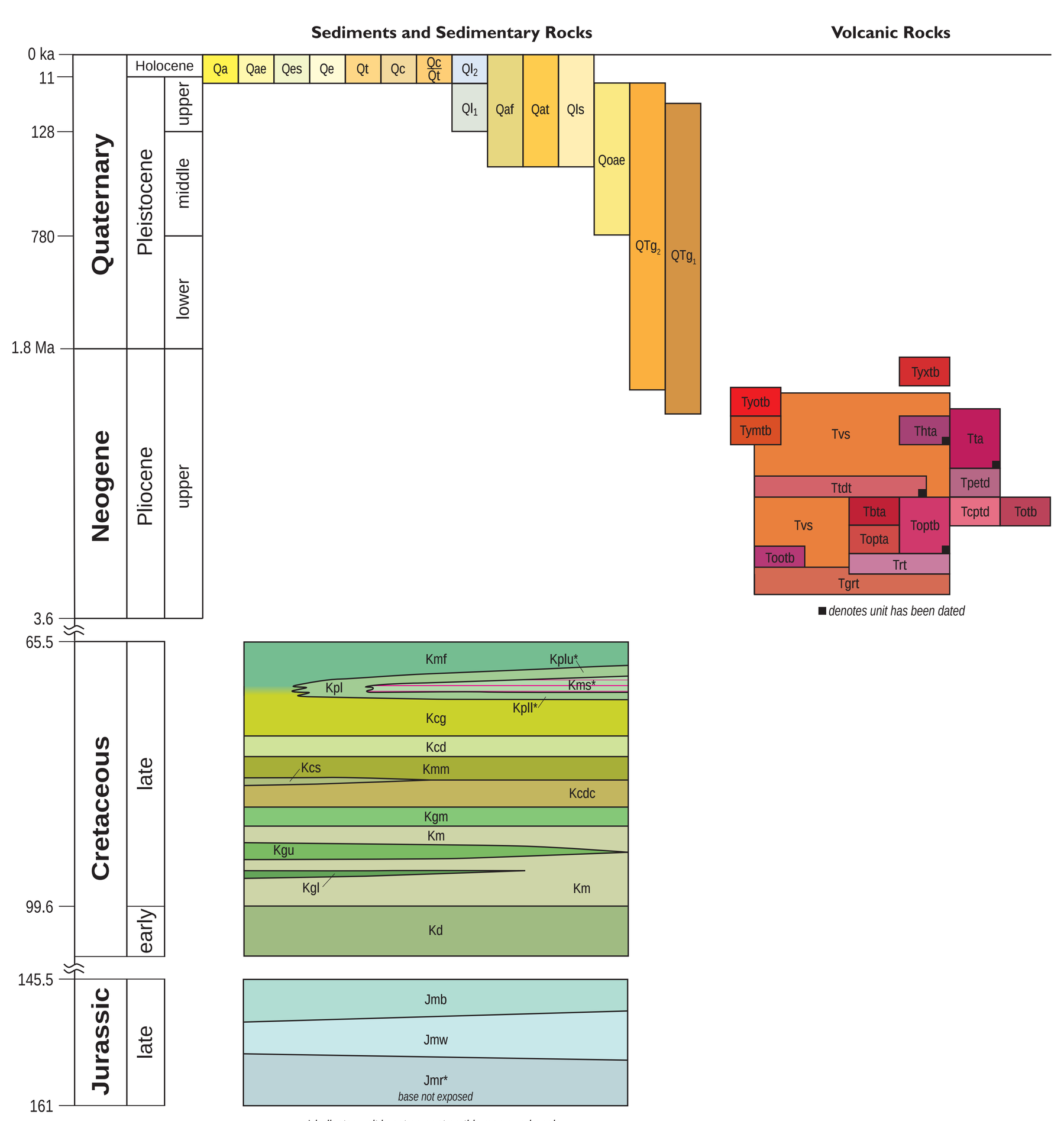
Morrison Formation

J — **Jurassic (and older) rocks, undifferentiated** — Jurassic rocks including those of the Morrison Formation, Todilto Formation, and Entrada Sandstone and underlying Paleozoic or Proterozoic rocks; thickness not known and depth to basement not known. (cross sections only)

Jmb — **Morrison Formation, Brushy Basin Member** — Grayish green mudstone interbedded with thin lenticular beds of light gray to yellowish gray fine to medium grained sandstone. Very limited exposure in the extreme SW corner of the map. Maximum exposed thickness locally is about 10 m.

Jmw — **Morrison Formation, Westwater Canyon Member** — Light gray and yellowish gray and light red fine to medium grained sandstones interbedded with thin greenish gray mudstones. Very limited exposure in the extreme SW corner of the map. Maximum exposed thickness locally is about 30 m.

CORRELATION OF MAP UNITS



EXPLANATION OF MAP SYMBOLS

- A ⊢⊣ A' — Location of geologic cross section.
- Geologic contact. Solid where exposed or known, dashed where approximately known, dotted where concealed or inferred.
- Normal fault, showing dip and dip direction of the fault plane; ball-and-bar on downthrown side. Solid where exposed, dashed where approximately known.
- Concealed, dominantly dip-slip fault showing relative sense of movement.
- Strike and dip of inclined joints.
- Vertical joints.
- Strike and dip of bedding.
- Inclined flow foliation or layering, showing dip in igneous rocks.
- Volcanic vent.
- Area of volcanic spatter.
- Arrows show directions of down slope movement within a landslide or slump block deposit.
- Upper San Mateo geomorphic surface.
- Lower San Mateo geomorphic surface.
- Spring.
- B00906 — Water-supply well, including number supplied by the New Mexico Office of the State Engineer.

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.

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Geologic map of the San Mateo quadrangle, Cibola and McKinley Counties, New Mexico.

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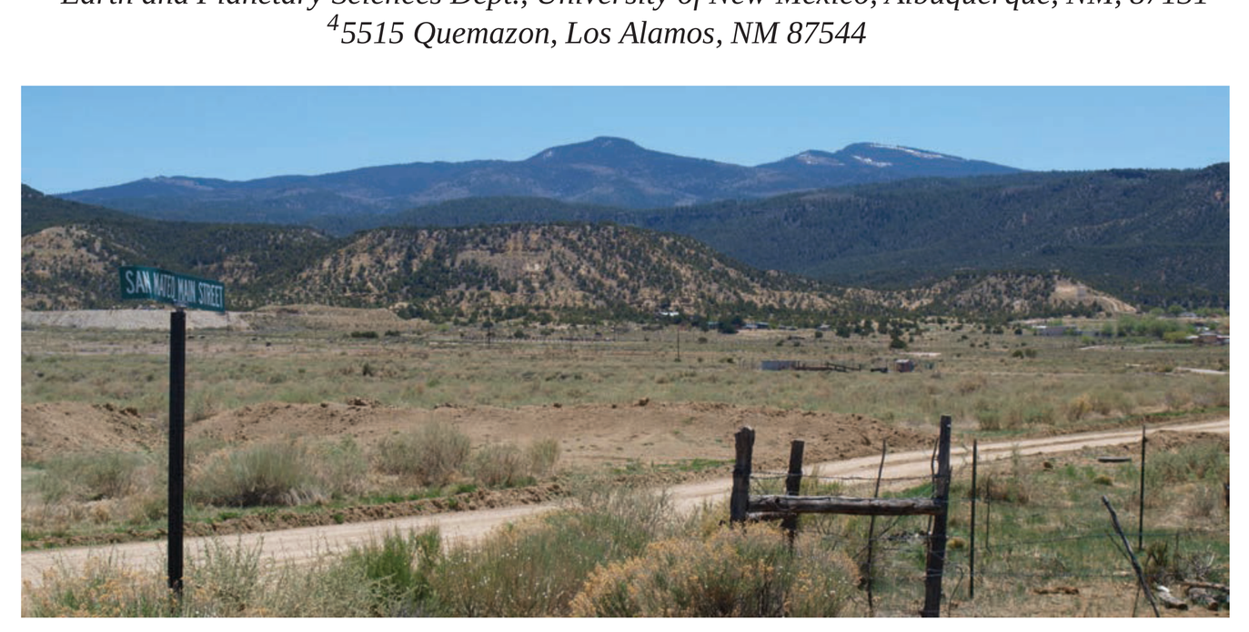
David J. McCraw, Adam S. Read [1], John R. Lawrence[2], Fraser Goff [3] and Cathy J. Goff [4]

[1] *New Mexico Bureau of Geology & Mineral Resources, 801 Leroy Place, Socorro, NM 87801*
[2] *Lawrence GeoServices Ltd. Co., 2321 Elizabeth St. NE, Albuquerque, NM 87112*
[3] *Earth and Planetary Sciences Dept., University of New Mexico, Albuquerque, NM, 87131*
[4] *5515 Quemazon, Los Alamos, NM 87544*



San Mateo Main Street. Mount Taylor mine tailings seen in distance behind sign. Cretaceous Menefee Formation rocks in mid distance beveled by the Upper San Mateo geomorphic surface. Beyond that are San Mateo Creek gravels atop lower ridge in photo left, as well as landslide deposits and the volcanics of La Jara Mesa. Mount Taylor is on the skyline. Photo by D. J. McCraw.

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

[575] 835-5490

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