

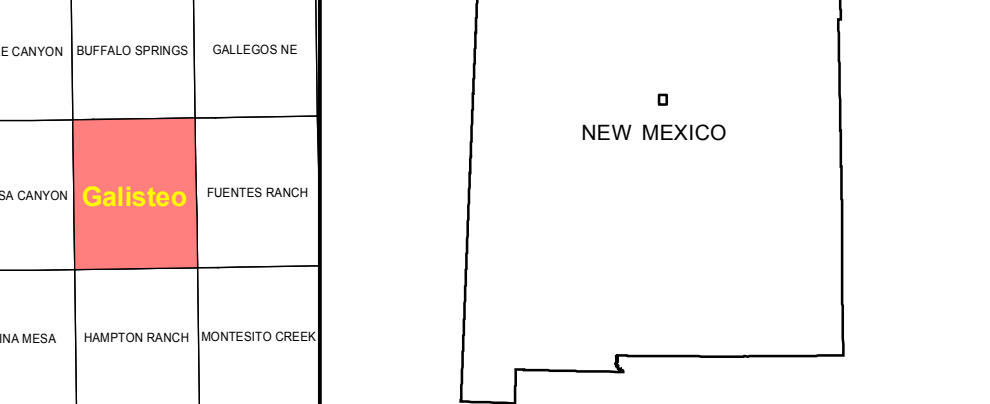
DESCRIPTION OF MAP UNITS

- Quaternary**
- Qa** Alluvium — Cobbles, sand, silt, and clay transported by seasonal flooding or in active channels. Coarser clasts are dominated by quartz and granitic material.
 - Qc** Colluvium/alluvium — Sand, silt and clay in abandoned stream channels, flood plains, and lower valley slopes.
 - Qd** Terrace gravel — Rounded pebbles and cobbles of Precambrian granite, commonly containing abundant epidote, granite pegmatite, massive and brittle schist, and Phanerozoic chert and sandstone in a sand or silt matrix. Terraces generally lie 20 to 40 ft above valley floors.
 - Qe** Colluvium — Unconsolidated sand, silt and clay deposits along upper hill slopes or broad, flat hill crests. A few meters in maximum thickness.
 - Qf** Pediment deposits — Cobble, pebble, sand and silt deposits lying upon remnants of an extensive surface cut to a former channel level of Galisteo Creek. Thickness generally less than 10 ft.
- Cenozoic**
- Ota** Ancha Formation — Buff to moderate orange pink and grayish pink, generally poorly sorted and poorly consolidated beds of sand, gravel and cobbles derived from Precambrian granites and metachert and Paleozoic sedimentary terranes in the Sangre de Cristo Mountains. Strongly cemented by calcite near Lamy. Thickness to 18 m (60 ft).
 - Otaa** Ancha or Tesuque channel — Calcite cemented (20% to 95%) arkose or arkosic limestone overlain by medium to very coarse grained arkosic sand and red silt. Contains numerous rod-shaped zones of calcite-cemented arkose, probably formed by precipitation from groundwater.
 - Ta** Sill/laccolith — Latite porphyry. Dark purplish-brown, porphyritic, mixture of plagioclase, potassium feldspar, titaniferous augite, titaniferous biotite, apatite, and magnetite in a glassy groundmass. Weathers dark brown. Thickness unknown. 32.5±1.1 Ma (Peters, 2001).
 - Tb** Galisteo Dike (micro-monzonite) — Dark gray fine grained, salt and pepper mixture of plagioclase, potassium feldspar, titan-augite, titaniferous biotite, apatite, and opaque grains in a glass groundmass. Weathers dark brown to grayish brown and stands as wall-like rampart. The dike, in map view, comprises many right-angled overlapping segments varying from 200-1200 ft in length and up to 18 ft thick. 26.55 Ma (Eisley, 2001).
 - Tc** Espinosa Volcanics — Buff, grayish purple and reddish brown beds of agglomerate, tuff, and volcanoclastic sandstone of intermediate composition and of alluvial fan and lahatic origin. Source areas are the Cerros Hills and Ortiz Mountains intrusive centers. Conformable with underlying Galisteo Formation. Compose approximately 1000 ft maximum thickness in quadrangle.
- Cenozoic**
- Tp** Galisteo Formation, upper unit — Tan to white, massively bedded, friable, well sorted, cross bedded sandstone and interbeds of red, rose, tan, and gray-green mudstone. Contains silicified logs to four ft diameter and 30 ft lengths. Thickness 346 ft in uranium drill hole #2-1 and 425 ft in drill hole 1-5.
- Paleozoic**
- Kc** Carlisle Shale — In ascending order the units consist of the Fairport Shale Member, the Semilla Sandstone Member, the Blue Hill Shale Member, the Juan Lopez member, a thin shale. Shale units are dark gray to black, thin laminated, and weather to a yellow-brown color.
 - Kd** This shale — Approximately 50 ft of calcareous Carlisle shale lies above the Juan Lopez Member, although the latter is in the mapping top for this study.
 - Kj** Juana Lopez Member — Regression R-1 of Molnar (1983). Brown-gray platy, interbedded fossiliferous quartz arenite, calcarenite (commonly composed of needle-like fragments of *Inoceramus* shells), calcareous gray shale and gray shale. Ratio of carbonate to sand varies greatly along strike. Forms low ridges. Abundantly fossiliferous with *Lophospira*, *Prionocyclus* sp., *Cretinoma appendicatus*, *Prionocyclus novomexicanus*, *Scaphites whiffletti*, and *Inoceramus perplexus*. The latter three fossils indicate an early Late Tertiary age. Thickness ~65 ft.
 - Kk** Blue Hill Member — Dark gray shale. Three zones of septarian concretions (1) weather to rubble. Enclosing shale rarely exposed. Thickness ~160 ft. Fossils include *Psycholites whiffletti* and *Cretolima appendicatus*.
 - Kl** Semilla Sandstone Member — Fine to very fine-grained, thin bedded, bedding-parallel, bioturbated quartz arenite and interbedded shale. Three to 10 ft thick. Generally poorly exposed. Contains abundant fossils including *Prionocyclus* sp., *Carota dalli*, and *Pima Kaufmanni*.
 - Km** Fairport Shale Member — Calcareous shale, bentonite, and minor limestone with concretions. Not exposed in quadrangle but approximately 188 ft thick in Ojo Hiedona Quadrangle to south.

EXPLANATION OF MAP SYMBOLS

- Location of geologic cross-section.
- Geologic contact. Solid where exposed or known, dashed where approximately known, dotted where concealed or inferred.
- Normal fault, half-and-half on downthrown side. Solid where exposed, dashed where approximately known, dotted where concealed.
- Dip of fault or dike.
- Trace of axial plane of anticline, dashed where approximately known, dotted where concealed, plunging if arrow at the end of line shows direction of plunge.
- Trace of axial plane of syncline, dashed where approximately known, dotted where concealed, plunging if arrow at the end of line shows direction of plunge.
- Trace of axial plane of monocline, dashed where approximately known, dotted where concealed, plunging if arrow at the end of line shows direction of plunge.
- Complement zones.
- Strike and dip of bedding.
- Strike and dip of flow foliation.
- Location and plunge direction of petrified log.
- Well drill hole.

Base map from U.S. Geological Survey 1956, from photographs taken 1950, field checked in 1964, edited in 1966. Polyconic projection, 1627 North American datum. Prepared by 1957 North American datum, UTM projection — zone 12N. 1000-meter Universal Transverse Mercator grid, zone 13, shown in red.



QUADRANGLE LOCATION

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 (OFM), due to high demand for current geologic map data in those 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 30 (GM) series. This final version will receive a new GM number and will supersede this preliminary open-file geologic map.



Preliminary geologic map of the Galisteo quadrangle, Santa Fe County, New Mexico.

May 1999
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 (driftless) 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 this 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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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

- Kn** Niobrara Formation — Comprised of upper (Kn2) and lower (Kn1) shale units and an intervening sandstone/sandy-shale (Kns). Fossils defined by Vanate (2003).
 - Knd** Upper shale member — Santa Tongue of the Mancos Shale. Medium gray, calcareous shale, weathers olive-brown. Contains abundant concretions to three feet diameter. Gradational to the Paint Lookout Sandstone. Poorly exposed, mostly in arroyos. Contains *Cordilleran mulleri*, *Cretosmia plethorhina*, *Cladoceras undulatum*. The thickness, based on cross section, is approximately 300 ft.
 - Kns** Sandstone member — Cano Tongue of the Mancos Shale. Combined Host-Dillon Member. Multicolored, tan, and El Verde Sandstone of the Mancos Shale, based upon fossil identification of Vanate (2003). Regression R-1 of Molnar (1983). Light olive-gray, even bedded, fine-grained, thin-bedded, bioturbated, ripple marked, calcareous quartz arenite and interbedded yellowish-gray siltstone. Weathers to a low, broad, rounded ridge covered by sandstone chips. Thickness approximately 400 ft in cross section. *Plectoceras quadrifidum* (Roemer), *P. pseudocostatum* (Johnson), *P. planum* (Hayati), *Turritella aff. Coddiana*, *Gyroides conradi*, *Deussia novomexicana*, *Psycholites merriami*.
 - Knl** Lower shale member — Montezuma Shale Member of Mancos Shale. Medium gray, calcareous shale, weathers olive-brown. Poorly exposed, mostly in arroyos. Thickness approximately 250 ft based on cross section.
 - Ko** Carlisle Shale — In ascending order the units consist of the Fairport Shale Member, the Semilla Sandstone Member, the Blue Hill Shale Member, the Juan Lopez member, a thin shale. Shale units are dark gray to black, thin laminated, and weather to a yellow-brown color.
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 - Km** Fairport Shale Member — Calcareous shale, bentonite, and minor limestone with concretions. Not exposed in quadrangle but approximately 188 ft thick in Ojo Hiedona Quadrangle to south.
- MESAVERTÉ GROUP**
- Km** Divided into two formations. The thickness decreases northward due to regional erosion surface.
- CRETACEOUS ROCKS**
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- MANCOS GROUP**
- Kn** Niobrara Formation — Comprised of upper (Kn2) and lower (Kn1) shale units and an intervening sandstone/sandy-shale (Kns). Fossils defined by Vanate (2003).
- JURASSIC ROCKS**
- Jm** Morrison Formation — Upper portion of the section is white, kaolin-bearing sandstone (Jackpile) underlain by green, gray and maroon mudstone, interbedded tan and light red-brown sandstone, and lenses of tan and white pebbly conglomerate. Sandstone is fine grained, subangular to subrounded quartz and minor chert and feldspar. Bedding is platy to massive and cross beds are common. Thickness undetermined.
- SAN RAFAEL GROUP**
- A** Tullahoma Formation — Light gray-brown limestone laminated and cemented with feld odor on fresh surface. Overlain by thin bedded, dark-gray limestone containing red Jasper nodules. Thickness 40-50 ft (Booth 1977).
 - Pa** Entrada Formation — Rose buff and white, cross-bedded, quartz arenite. Extremely friable. Thickness approximately 100 ft in Ojo Hiedona Quadrangle to south. Only the upper few feet are exposed in quadrangle.
- TRIASSIC ROCKS**
- CHINLE GROUP**
- Tc** Red-orange, dark brown, purplish gray and green, thick bedded mudstone, buff to dark red brown, cross bedded sandstone and limestone pebble conglomerate. Incomplete section exposed along western margin of Gloria Mesa. Thickness in subsurface approximately 1850 ft.
- Map units exposed only in cross sections are omitted due to space limitations, but are described in the accompanying report. References cited are found in the report as well.

GEOLOGIC CROSS SECTIONS

