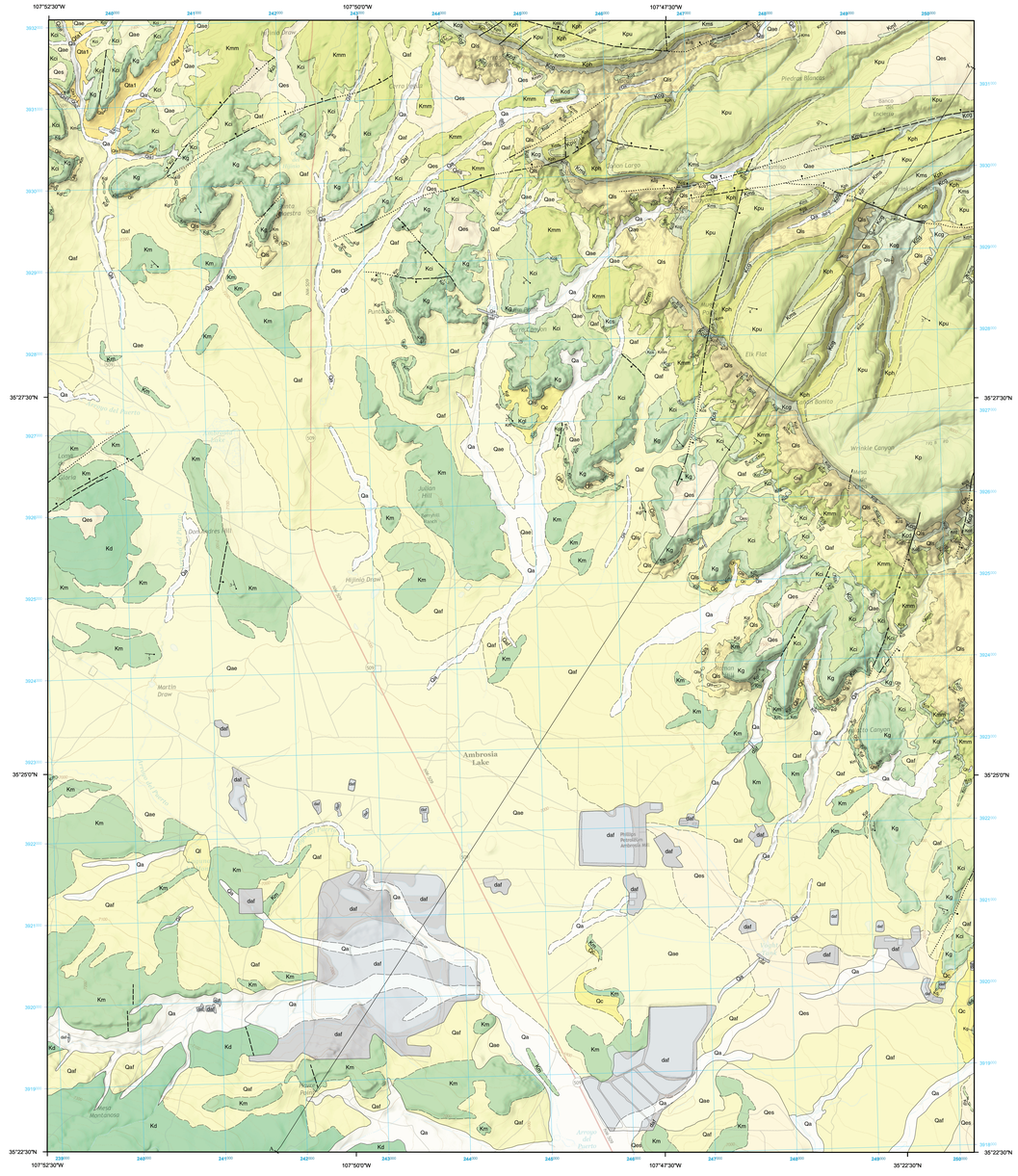

Base map from U.S. Geological Survey 1957, from photographs taken 1956, field checked in 1957, edited in 1980.
1927 North American datum, Polyconic projection, Reprojected to UTM projection – zone 13N
1000-meter Universal Transverse Mercator grid, zone 13, shown in red

Quadrangle Location

1:24,000

1 0.5 0 1 MILE

0.9 0.45 0 0.9 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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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 Ambrosia Lake 7.5-minute Quadrangle, McKinley County, New Mexico

June 2010

by
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New Mexico Bureau of Geology and Mineral Resources
Open-file Map Series

OFGM 203

Mapping of this quadrangle was funded by a matching-funds grant from the STATEMAP program of the National Cooperative Geologic Mapping Act, administered by the U. S. Geological Survey, and by the New Mexico Bureau of Geology and Mineral Resources, (Dr. Peter A. Scholle, *Geologic Mapping Program Manager*; Dr. J. Michael Timmons, *Director and State Geologist*).

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map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation.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.

Correlation Of Map Units

Explanation Of Map Symbols

- Contact—dashed where inferred
- Fault—dashed where inferred, dotted where concealed
- Normal Fault—dashed where inferred, dotted where concealed
- Strike and dip of upright bedding
- A—A' Cross-section line

References

Santos, E. S., and Thaden, R. E., 1966, Geologic Map of the Ambrosia Lake quadrangle, McKinley County, New Mexico: U.S. Geological Survey Geologic Quadrangle GQ-515, one sheet 1:24,000 scale.

Santos, E. S., 1966, Geologic Map of the San Lucas Dam quadrangle, New Mexico: U.S. Geological Survey Geologic Quadrangle GQ-516, one sheet 1:24,000 scale.

Explanation Of Map Units

Quaternary

daf — **Disturbed and/or artificial fill**

Qa — **Stream alluvium** – Gravel, sand, and silty sand in stream channels.

Qae — **Primarily stream alluvium subjected to eolian processes** – Sand and silty sand occupying low-lying flat areas of deflation and eolian depostion on lee sides of bedrock hills and structures. Occasional gravel lag deposits.

Qaf — **Alluvial fan deposits** – Boulders, gravel, sand, and silty sand in alluvial fans debouncing primarily from San Mateo Mesa.

Ql — **Lacustrine deposits** – Silty clay, silt, silty sand, and fine-grained sand washed into and deposited within the ephemeral Laguna del Monte.

Qes — **Primarily eolian silt and sand subjected to sheetwash** – Eolian silt and fine-grained sand on upland benches and slopes which have been subjected to sheetwash fluvial action.

Qls — **Talus and landslide deposits** – Angular boulders and gravel occupying steep mesa-side slopes. Landslides are poorly sorted with a large fine-grained component and failure scarps are common.

Qc — **Colluvium** – Poorly sorted gravel, sand, and silty sand on slopes.

Stream terrace alluvium – Gravel, sand, and silty sand adjacent to stream channels, which have incised >1 m into the alluvium. Two levels recognized.

Qts1 — **First level**

Qts2 — **Second level**

Mesozoic

Kmf — **Menefee Formation** – Recessive unit of buff, mostly medium-grained arkosic sandstone with abundant shale, siltstone, coal, and coaly shale. Exposed only in the extreme NE corner of the map area (at least 50 m thick).

Kms — **Satan Tongue, Mancos Shale** – A somewhat recessive interval consisting of shale and siltstone with lesser medium- to thick-bedded, planar-laminated to low-angle cross-stratified, medium-grained arkosic sandstone. Sandstone typically displays sole marks and is slightly darker brown than those in the enveloping Point Lookout Sandstone. Inoceramid molluscan fossils are present in many localities but not consistently. Large portions of the unit in the north were mapped as Satan Tongue based on the discovery of the ammonite Placenticeras cumminsi and abundant clams at the south end of Elk Flat in a sequence laterally equivalent to what had previously been mapped as Satan farther northeast (Santos, 1966; Santos and Thaden, 1966). 0–35 m thick.

Kp — **Point Lookout Sandstone** – Cliff-forming fine- to coarse-grained, arkosic to subarkosic, and micaceous sandstone in amalgamated to medium- to thick-bedded, typically cross-stratified sets. Most of the sandstone is medium-grained and moderately well-sorted. Sets are mostly tabular and wedge-shaped, with lesser troughs. Cross-strata range from planar to weakly asymptotic. Mudchips and plant debris are common as are dark brown rusty concretions up to 30 cm. The map unit is divided into an upper part (**Kpu**) and a lower Hosta Tongue (**Kph**) where the Satan Tongue of the Mancos Shale intervenes. Thickness of the entire unit at least 150 m.

Kpu — **Upper Part** – In the north, a persistent marker bed mapped in the unit corresponds to the upper contact of the Satan Tongue as mapped by Santos and Thaden (1966) and Santos (1966). Thickness 100–120 m.

Kph — **Hosta Tonuge** – Marine tongue where the Satan Tongue of the Mancos Shale intervenes. Contains locally abundant inoceramid fossils. Thickness 45–60 m.

Kcg — **Gibson Coal Member, Crevasse Canyon Formation** – Recessive interval consisting of dark-gray to purplish-gray shale, carbonaceous mudstone, siltstone, and multiple <1 m thick coal beds. Sparse, discontinuous, arkosic, medium-grained sandstone beds up to 5 m thick are also present. A 2–3 m thick, buff, medium-grained sandstone that grades up into an oyster coquina is present locally at or near the top of the unit. This bed is similar to the Stray Sandstone (**Kcs**), a probable transgressive lag sequence that caps the Dilco Coal member (**Kci**). A probable hadrosaur (dinosaur) skeleton occurs in the upper part of the unit about 15 m below the oyster bed. 75–90 m thick.

Kcd — **Dalton Sandstone, Crevasse Canyon Formation** – Cliff-forming sandstone unit consisting of amalgamated medium- to thick-bedded, plane-bedded to massive, fine-to coarse-grained and granule quartzose (<5% feldspar) sandstone with sparse granitic lithic grains. Sparse ripple cross-lamination zones form bounding surfaces of some thick-bedded units. Rusty weathering intraclastic pebbles and pebble-rich intervals also define the bounding surface of some beds. 25–40 m thick.

Kmm — **Mulatto Tongue Mancos Shale** – Dominantly olive-gray shale with lesser siltstone beds and laminae, the Mulatto also contains up to 20% thin- to medium-bedded, fine- to coarse-grained subarkosic sandstone. At least two sandstone-rich intervals up to 20 m thick are present along with several mollusk bearing micritic limestone beds. Shark teeth are abundant in some of the shale-rich sequences. 115–125 m thick.

Kcs — **Stray sandstone, Crevasse Canyon Formation** – Informal unit of the local usage that, where present, defines the top of the Dilco Coal Member. The Stray consists of a coarsening-upward sequence of tabular-planar cross-stratified, medium- to thick-bedded quartzose sandstone (<10% feldspar) that culminates in a granule sandstone to pebble conglomerate with abundant oyster shell fragments. 0–15 m thick.

Kci — **Dilco Coal Member, Crevasse Canyon Formation** – Recessive unit characterized by sequences of thin- to medium-bedded, mostly tabular, brownish sandstone beds with >40% shale, siltstone, and laminated coaly shale interbeds. Sandstone beds contain abundant mud-chips, wood chips, and carbonaceous debris. 45–65 m thick.

Kg — **Upper Gallup Sandstone** – Cliff-forming sandstone consisting of amalgamated medium- to thick-bedded, cross-stratified, fine- to medium-grained, and subarkose with abundant white mica up to 1.5 mm. Cross-stratification in the upper part, especially, is wedge to trough-shaped with asymptotic laminae that are locally high-angle (>25 degrees) and suggestive of eolian deposition. The unit is locally divided into upper and lower parts separated by a thin- to medium-bedded recessive marker bed. Cross-stratification in the lower part is typically more tabular- planar to wedge-planar, and lower angle (<15 degrees), suggestive of marine, shore-face deposition. Inoceramid fossils are present locally in the lower part. 50–70 m thick.

Kgl — **Lower Gallup Sandstone** – An amalgamated, medium- to thick-bedded, wedge-planar to tabular-planar cross-stratified, fine- to medium-grained moderately well-sorted, calcareous, subarkosic sandstone occurs within the main body of the Mancos Shale (**Km**) about 50 m below the base of the Upper Gallup Sandstone. 5–20 m thick.

Km — **Mancos Shale, main body** – Shale, siltstone, and minor thin- to medium-bedded, fine- to medium-grained calcereous arkosic sandstone. Sparse, thin, ripple cross-laminated limestone (calcarenite) beds are also locally present. The shale is commonly gypsiferous. Molluscan shell fragments are locally abundant. 220–250 m thick.

Kd — **Dakota Sandstone** – Medium- to thick-bedded quartzose sandstone, typically strongly cemented and laced with quartz veinlets. The sandstone occurs in amalgamated, typically tabular-planar to tabular-weakly asymptotic cross-stratified sets. 45–55 m thick.

Units in Schematic Diagram B

Lower part of Mancos Shale – Shown in schematic diagram B. only.

Kmc —

Kmb —

Kma —

Jmb — **Brushy Basin Member** – Shown in schematic diagram B. only.

Morrison Formation

Jmwu — **Mudstone tongue of Jmwu** – Shown in schematic diagram B. only.

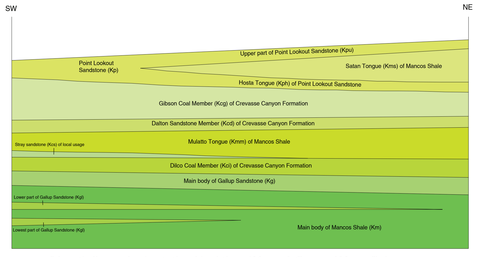
Jmw — **Westwater Canyon Member** – Shown in schematic diagram B. only.

Jmr — **Recapture Member** – Shown in schematic diagram B. only.

Jcs — **Cow Springs Sandstone** – Shown in schematic diagram B. only.

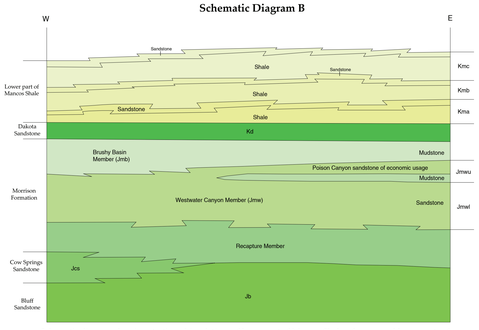
Jb — **Bluff Sandstone** – Shown in schematic diagram B. only.

Schematic Diagram A



Schematic diagram showing stratigraphic relations of Mesaverde Group and Mancos Shale.

Schematic Diagram B



Schematic diagram showing stratigraphic relations of lower part of Mancos Shale, of upper and lower parts of Westwater Canyon Member of the Morrison Formation, and Cow Springs Sandstone,

Geologic Cross-section A-A′