

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

Geologic Map of the Gallup West 7.5-Minute Quadrangle, Navajo Nation; McKinley **County, New Mexico**

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35°32'30"N

2.588 -100.5 -145 Late Jurassic 161.5 1800 Ma -



may not be shown due to recent development.

wells, buildings, roads, or other human-made structures. The New Mexico Bureau of Geology and Mineral Resources created the Open-File

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Correlation of Map Units





Explanation of Map Symbols

- Contact—The identity and existence are certain. The location is accurate where solid, approximate where dashed, and concealed where dotted.
- Gradational contact—The identity and existence are certain. The location is approximate where dashed and concealed where dotted.
- Unconformable contact—The identity and existence are certain. The location is accurate.
- Anticline–The identity and existence are certain. The location is accurate where solid, approximate where dashed, and concealed where dotted.
- Syncline—The identity and existence are certain. The location is accurate where solid, approximate where dashed, and concealed where dotted.
- Horizontal bedding.
- Inclined bedding—Showing strike and dip.
- Fluvial transport direction.
- Cross section line and label.

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map may be based on any of the following: reconnaissance field geologic mapping, a compilation of published and unpublished work, and photogeologic interpretation.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

Cross sections are constructed based upon the interpretations of the author made from geologic mapping and available geophysical and subsurface (drill hole) 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

Geologic Map Series to expedite the dissemination of these geologic maps and map data to the public as rapidly as possible while allowing for map revision as geologists continued to work in map areas. Each map sheet carries the original date of publication below the map and the latest revision date in the upper right corner. In most cases, the original publication date coincides with the date of delivery of the map product to the National Cooperative Geologic Mapping Program (NCGMP) as part of New Mexico's STATEMAP agreement. While maps are produced, maintained, and updated in an ArcGIS geodatabase, at the time of the STATEMAP deliverable, each map goes through cartographic production and internal review before uploading to the Internet. Even if additional updates are carried out on the ArcGIS map data files, citations to these maps should reflect this original publication date and the original authors listed. The views and conclusions contained in these map documents are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or

> Geologic Cross Section A-A' (No vertical exaggeration)

OUATERNARY Artificial fill (Recent)—Sand and gravel that af has been moved, excavated, or otherwise modified by humans for construction purposes.

Quaternary alluvium (Late Pleistocene to Holocene)-Well-exposed, poorly sorted, thinto thick-bedded, brown to pale-tan and yellowish, very fine- to coarse-grained, sometimes pebbly to cobbly, lenticular to tabular sand, silty sandstone, silt, and clayey silt. This unit covers extensive areas along modern valley bottoms and is well exposed along modern drainages where channels have commonly incised 3–15 m in modern times. May contain some eolian and, particularly, reworked eolian material. Commonly 5-10 m thick. Contacts for this map unit are mapped as "approximately located" due to poor exposure except along incised channels. Mapped where >1 m thick.

Older Quaternary alluvium (Pleistocene)-Qao Poorly exposed, loose to friable, reddish- to dark-brown, cobbly to sandy alluvium found it high topographic positions.

CRETACEOUS

Allison Member of the Menefee Formation (Late Cretaceous)—The Allison Member (named for Allison, NM; a small community located immediately west of Gallup and on the adjacent Gallup West Quadrangle) is most conspicuously composed of well-exposed, yellow- to brownish-weathering, moderately poorly to moderately well-sorted, quartz-rich, often feldspathic, carbonate-cemented, thin- to very thick-bedded, indistinctly cross-bedded to planar-bedded, friable, broadly lenticular-(individual sandstone bodies rarely exceed a half mile in outcrop length (O'Sullivan et al., 1972))—sandstone containing rare channel fills indicating probably northward and northeastward paleotransport. Sandstones sometimes contain rust-colored (ironstone?) concretions >1 m in diameter, particularly to the north of the map area where they are characteristic of some parts of this unit. The Allison Member also contains substantial proportions of less well exposed loose, fine grained sandstone, siltstone and shale. Coal comprises a relatively small proportion of the Allison Member and this has been used to distinguish it from the underlying Cleary Coal Member, with which it is gradational and/or interfingering. Coal beds in the Allison are generally less than 14 in. thick (Sears, 1925; Dillinger, 1990). Since coal beds are discontinuous and variable in thickness, this makes for a vaguely defined lower contact, and the position of this contact is not well constrained in the Gallup area (mapped contact is probably ± 30 m stratigraphically in many places). As near as possible we have tried to map this contact at the top of the last coal bed >14 in. within **Kmccg**. The Allison Member is at least 240 m thick on the Gallup West quadrangle but the top has been eroded and the unit is at least 600 m thick, regionally.

Cleary Coal Member of Menefee ⁹ Formation and Gibson Member of Crevasse Canyon Formation, undivided (Late Cretaceous)—The Cleary Coal Member of the Menefee Formation and Gibson Member of Crevasse Canyon Formation cannot be divided south and west of the pinch out of the Point Lookout Sandstone, which occurs approximately 12 mi northeast of Gallup (O'Sullivan et al, 1972). This Member is composed of a diverse suite of swamp and fluvial sediments. Sandstones are yellowish- to brownish-weathering, very fine- to coarse-grained, lenticular, and poorly to well-sorted. Shale and siltstone are also present and are generally poorly exposed.



Kmfa

Coal Carbon Rd.

Kmccg

See Description of Map Units for details.

The top of this unit is mapped as near as possible to the stratigraphically highest coal bed >14 in. thick (see description of Allison Member). Dillinger (1990) reports coal beds up to 6 ft thick in the Clearly Coal Member, but coal bed thicknesses are highly variable in the region (e.g. O'Sullivan, et al, 1972), and coal beds are not laterally extensive. Thickness ranges from about 50 to 90 m.

Bartlett Barren Member of Crevasse Canyon Formation (Late Cretaceous)—The Bartlett Barren Member is composed of mostly poorly exposed, reddish, pinkish, greenish and brownish silt, sandy silt and clayey silt and sandstone. Sandstones are poorly to moderately exposed, loose to friable, thin- to thick-bedded, very fine- to medium-grained, and carbonate-cemented. Interpreted as the landward equivalent of the Gibson/Clearly Members (see above).

Dilco Member of Crevasse Canyon Formation (Late Cretaceous)—Mostly poorly exposed, light- to dark-gray and brown, thinto thick-bedded, friable shale and siltstone and poorly to well-exposed, thin- to thick-bedded, very fine- to medium-grained, poorly to well-sorted sandstone. The lowest ≈60 ft of the Dilco Member is a distinctive, pinkish, feldspathic sandstone interpreted as a braided stream deposit (Anderson, 1990).

Gallup Sandstone (Late Cretaceous)-Well-exposed, very fine- to medium-grained, well-sorted, cross-bedded, thin to thick-bedded, cliff-forming sandstone. Although this unit is locally known as 'the pink sandstone' according to Sears (1925), in the map area it does not always exhibit this characteristic color, although some of the overlying sandstones of the lower Crevasse Canyon Formation do. Composed of transgressive/regressive marine and marginal marine sandstones with uncommon silty/shaly and coal beds. The upper part of the Gallup Sandstone is sometimes mapped separately as the Torrivio Sandstone, which is distinctive for its pinkish color and the presence of feldspar (Thacker, 2024). Because the characteristic pinkish color is not prominent in the limited exposures on the Gallup West quadrangle we have included the Torrivio Sandstone with the main body of the Gallup Sandstone here.

Mancos Shale (Late Cretaceous)—Poorly exposed, black- to pale-grey, thin-bedded to laminated shale and thick-bedded, yellowish to light-grey sandstone. The Mancos has very limited exposures on the Gallup West quadrangle.

CROSS SECTION ONLY Dakota Sandstone (Late Cretaceous)— Marine sandstone and shale. Approximately 50 m thick.

Rocks older than the Dakota Sandstone Morrison Formation (Jurassic)—Terrestrial sandstone, siltstone, and shale. Approximately 120–200 m thick.

Older basement rocks, undivided (pre-Late **Jurassic)**—Middle Jurassic through Proterozoic rocks. For descriptions of individual units see Hackman and Olson (1977) and Dillinger (1990).

skyline the Allison Member of the Menefee Formation (**Kmfa**). The Allison Member covers much of the quadrangle.

