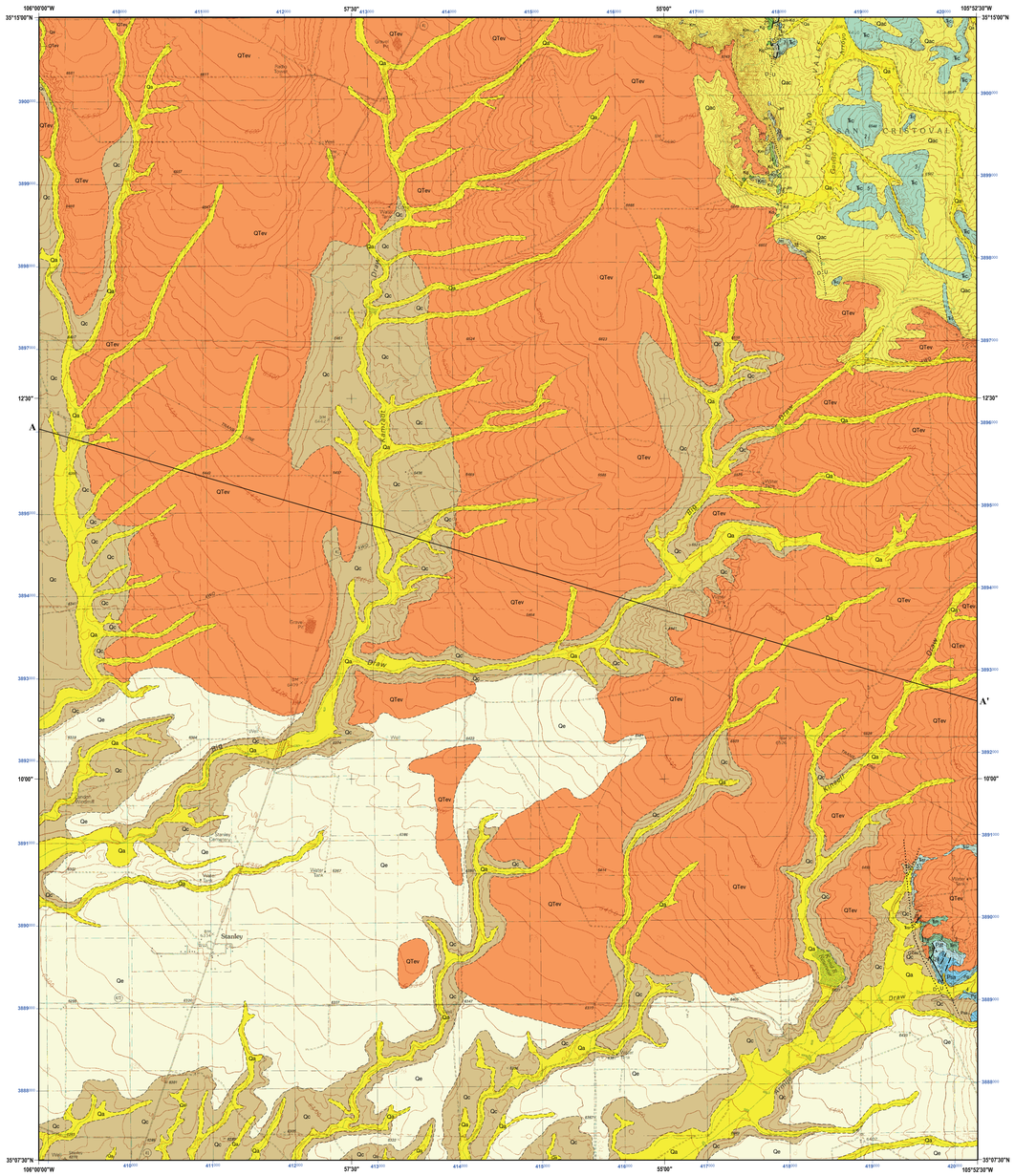

Base from U.S.Geological Survey 1984, from photographs taken 1976 and field checked in 1976.
Map edited in 1984. Base projected from NAD83 to NAD27
1927 North American datum, UTM projection – zone 13
1000- meter Universal Transverse Mercator grid, zone 13, shown in red

1:24,000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

Magnetic Declination
May 2004
10° 15' East
At Map Center

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, Director and State Geologist*, Dr. J. Michael Timmons, *Geologic Mapping Program Manager*).

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This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu

Geologic map of the Stanley quadrangle, Santa Fe County, New Mexico.

May 2007

by

Bruce Allen

New Mexico Bureau of Geology and Mineral Resources, 2808 Central Ave. SE, Albuquerque, NM 87106

New Mexico Bureau of Geology and Mineral Resources
Open-file Geologic Map 143

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.

U / D Fault showing relative sense of movement. Solid where exposed or known, dashed where approximately known, dotted where concealed or inferred.

Inclined bedding showing degrees of dip.

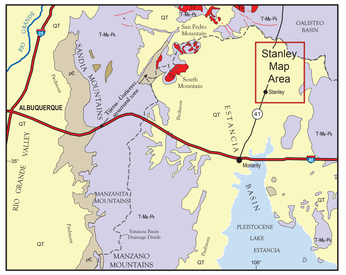
COMMENTS TO MAP USERS

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.

DESCRIPTION OF MAP UNITS



Regional generalized geology and physiography surrounding the Stanley 7.5-minute quadrangle.

Unconsolidated Quaternary and Late Tertiary Deposits

Qa **Valley-floor alluvium (Holocene)** — Silt, sand, clay, and gravel underlying modern drainages and floodplains. Deposits are inset into older alluvial deposits (units *QTev* and *Qac*), and interfinger with younger deposits of units *Qc*, *Qe*, and *Qac* along drainage foot slopes. Generally less than 3 m thick.

Qc **Alluvial, colluvial, and eolian deposits mantling side slopes of drainages and terraces (Holocene to upper Pleistocene?)** — Derived from erosion of older alluvium (*QTev*), and from sources of eolian silt and sand. Includes unmapped deposits of unit *QTev*, and interfingers with valley-floor alluvium (*Qa*) along drainage foot slopes. Estimated thickness is 5 m or less.

Qe **Eolian, alluvial, and colluvial deposits, southern portion of map area (Holocene to upper Pleistocene?)** — Wind-deposited silt and sand, augmented and modified by alluvial processes. Includes unmapped patches of older alluvium (unit *QTev*) that are present at or very near the surface. South of the map area, these deposits are up to 4 m thick or more; accumulations are thinner within the map area.

Qac **Undivided alluvium, colluvium, and residuum underlain at relatively shallow depth by bedrock in the northern Galisteo valley (northeast corner of map area)(Holocene to middle Pleistocene?)** — Predominantly silt, sand, and clay grading into relatively coarse-grained deposits along valley backslopes. Unit consists of older valley-floor deposits and younger inset fills. Includes residuum on relatively flat-laying areas derived from weathering of underlying bedrock. Also includes areas of unmapped bedrock exposure. Thickness ranges from a meter or less over bedrock highs, to an estimated 5 m or more along trunk drainages. Estimated thickness is 4 m or less.

QTev **Alluvium of the ancestral Estancia valley (lower Pleistocene ? to Pliocene ?)** — Gravel, sand, silt and clay derived largely from fluvial systems that headed in uplands to the west and north. Deposits unconformably overlie bedrock. Unit is present at or very near the surface over large areas along the northern and eastern margins of the northern Estancia topographic basin, and is buried elsewhere by younger, generally finer-grained deposits. Coarse-grained clasts are dominantly igneous porphyries and Paleozoic-Mesozoic sedimentary rocks derived from uplands to the west and northwest (e.g., Ortiz, San Pedro, and South Mountains). Pink granitic clasts, probably derived from the Sangre de Cristo Mountains, are also present, and in some areas gravel clasts consisting of (Pennsylvanian?) limestone are abundant. Clast ratios are locally variable. Although igneous porphories are generally the dominant clast lithology, some deposits consist of >50 % granitic clasts, while others contain >50 % limestone clasts. The deposits are generally unconsolidated; however, the basal meter or more of the unit, where it is exposed, is commonly a calcite-cemented conglomerate. Soils on the deposits exhibit well-developed pedogenic carbonate horizons. Incision and stripping of the unit has resulted in the development of terraces and deposition of inset fills, which are included in the map unit. Thickness ranges from a few meters in stripped remnants along the northern and eastern margins of the Estancia Basin, to perhaps 80 meters in the southwestern part of the map area where it covered by a thin eolian-alluvial mantle.

Bedrock Units

Note: Bedrock units are exposed in the map area in the northeast corner and along the east margin in sec. 28, T10E, R11N. In both areas exposed bedrock units are faulted and complete sections of individual formations are not available. Formation thicknesses are estimates based on recent mapping on adjacent quadrangles to the north and west of the map area (e.g., Lisenbee, 2000), and reports on the geology of the northern Estancia Basin (e.g., Johnpeer et al., 1987; Broadhead, 1997). The structural distribution of bedrock units, as well as the thickness of overlying fill, are generalized and based on limited subsurface information. More detailed discussions of the rock units described below are provided by Kelley and Northrop (1975), Lucas and others (1999a, 1999b), and Myers (1973).

Given uncertainties in the thicknesses of bedrock units, coupled with a paucity of subsurface information, it is felt that delineation of formation-rank units on the cross section is unwarranted. Therefore, bedrock units on the cross section are differentiated by geologic system.

Mesozoic Era

Cretaceous System
(K on cross section)

Km **Mancos Shale, undivided (Upper Cretaceous)** — Marine shale, siltstone, sandstone, and limestone. Represented in the map area by the lowermost part of the Mancos Shale, including the basal Graneros Shale (poorly exposed, dark gray shale with minor sandstone beds and calcareous concretions near the base, ~50 m thick) and the Greenhorn Limestone (locally subdivided - see below). Younger, overlying deposits of the lower part of the Mancos shale, including dark gray to olive gray shale and yellowish brown, calcareous siltstone and sandstone, are poorly exposed in small drainage cuts and in isolated hillslope exposures to the east of outcrops of the Greenhorn limestone in the map area.

Kg **Greenhorn Limestone (Upper Cretaceous)** — Decimeter-scale interbeds of resistant, ledge-forming light gray limestone and dark gray shale. Exposures up to ~6 m thick are present in the map area.

Kd **Dakota Sandstone (Upper Cretaceous)** — Marine to marginal marine sandstone. Brown to yellowish brown and gray on weathered surfaces. Generally bioturbated, but cross-stratified beds are present in some exposures. Unit appears to be thin (a few meters thick), with no thick interbeds of shale, but the few exposures present in the map area may represent incomplete slivers of Dakota between faults.

Jurassic System
(J on cross section)

Jm **Morrison and Summerville Formations (undifferentiated) (upper Jurassic)** — Largely terrestrial sandstone, siltstone, and mudstone. The Morrison Formation in the map area includes, in ascending order, the Salt Wash Member (pale yellowish brown sandstone), Brushy Basin Member (poorly exposed mudstone with lesser siltstone and sandstone), and the Jackpile Member (white to pinkish white, relatively friable sandstone). The underlying Summerville Formation consists of interbedded mudstone and siltstone grading up to more resistant sandstone beds near the top. The base of the Summerville Formation locally contains a thin, relatively resistant, light gray sandy limestone bed, and an abundance of red siliceous nodules. Due to poor exposure and structural complications, a composite thickness for these units is difficult to estimate, but may be less than the 220 m assumed for the cross section.

Jet **Todilto and Entrada Formations (undifferentiated) (middle Jurassic)** — The Todilto formation is represented in the map area by ~2 m of dark gray to brownish gray, delicately interlaminated limestone and thinner sapropelic layers. Exposures of the upper few meters of the underlying Entrada Formation consist of light yellowish brown, generally structureless, friable sandstone. The Todilto Formation is generally the more resistant of the two formations in the map area. A cumulative thickness of 25 m for the Todilto and Entrada Formations is assumed in the accompanying cross section.

Triassic System
(Tr on cross section)

Tc **Chinle Group, undivided (Upper Triassic)** — Terrestrial red beds dominated by reddish brown , purple, and gray mudstone and shale, with reddish brown sandstone, siltstone, and minor pebble conglomerate. The upper part of the Chinle Group underlies much of the northeastern corner of the map area at shallow depth, where exposures are largely limited to resistant, reddish brown sandstone beds. Small drainage-cut exposures to the west of the fault system in sec. 28, T11N, R10E contain purple and dark gray shale that may pertain to older deposits of the upper Chinle Group. A total thickness of 390 m is assumed in the cross section.

Tsr **Santa Rosa Sandstone (lower part of Chinle Group) (Upper Triassic)** — Yellowish brown, cross-stratified sandstone, with minor thin interbeds of reddish brown and olive gray mudstone and shale. Basal ~10 m of unit is exposed along the western margin of the map area.

Tem **Moenkopi Formation (Middle Triassic)** — Reddish gray to reddish brown, cross-stratified sandstone with lesser interbeds of siltstone and mudstone. A drainage-cut just east of the map area, in sec. 21, T11N, R10E exposes ~1.5 m of reddish purple mudstone with carbonate nodules between the uppermost Moenkopi Formation and basal Santa Rosa Sandstone. Assumed to be 35 m thick for cross section.

Paleozoic Erathem

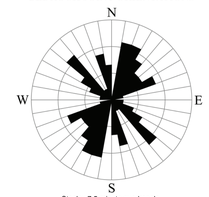
Permian System
(P on cross section)

Pat **Artesia Group (Middle Permian - Guadalupian)** — Reddish brown to orange mudstone, siltstone, and sandstone, with minor, pale-colored, dolomitic limestone beds. Evaporitic gypsum beds were not observed in the map area. Approximately 5-10 m of unit is exposed in the map area..

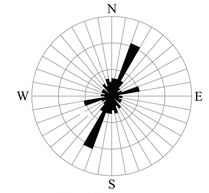
Psa **San Andres Formation (Lower to Middle Permian - Leonardian-Guadalupian)** — Light gray to pale-colored limestone and dolomitic limestone, with poorly exposed interbeds of reddish brown and gray mudstone and siltstone. Less than 10 m is exposed in the map area.

Pg **Glorieta Sandstone (Lower Permian - Leonardian)** — Yellowish brown to gray, thick bedded to structureless quartz sandstone. Exposures up to several meters in thickness are present in the map area.

BEDROCK JOINT ORIENTATIONS



Stanley 7.5-minute quadrangle,
NE Corner
n=46



Stanley 7.5-minute quadrangle,
Sec. 28, T11N, R10E
n=76

Yeso and Abo Formations (not exposed in map area) (Lower Permian (Wolfcampian-Leonardian) — Terrestrial to marginal marine deposits of the Yeso Formation in the region consist of brown to weak red sandstone and mudstone, with thick intervals of anhydrite and minor limestone beds. The underlying terrestrial Abo Formation consists of reddish brown mudstone, siltstone, and sandstone. A total thickness of 570 m for all Permian strata is assumed along the western side of the quadrangle. The cross section depicts the Permian sequence thinning to the east, where it is assumed that a northern extension of the Ancestral Rocky Mountain-Pedernal landmass existed.

Pennsylvanian System
(P on cross section)

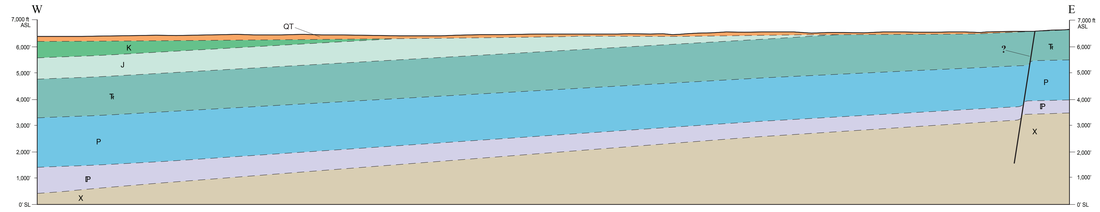
Madera Group and Sandia Formations (not exposed in map area) (Middle to Upper Pennsylvanian) — Pennsylvanian strata in the area consist of marine and marginal marine carbonates and siliciclastics of the Sandia Formation and overlying Madera Group. A thin (up to 10s of meters) sequence of limestone and shale deposited during the Mississippian (?) may be present between the Sandia Formation and Proterozoic crystalline rocks. Assumed total thickness 300 m in western part of map area; depicted on the cross section as thinning to the east and an assumed northern extension of the Ancestral Rocky Mountain-Pedernal landmass.

Paleozoic Erathem

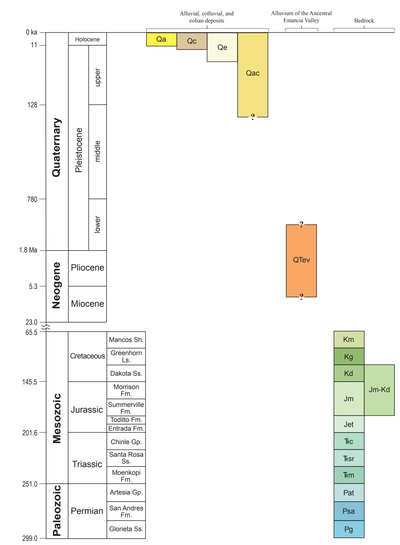
(X on cross section)

Proterozoic crystalline rocks (not exposed in map area).

GEOLOGIC CROSS SECTION



CORRELATION OF MAP UNITS



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