

DIGITAL MAPPING TECHNIQUES 2023

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Geologic Map Executive Summary

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Located in the east-central San Juan Basin, the area included in the “Geologic Map of the Cañon Largo Watershed on the Jicarilla Apache Nation, Rio Arriba and Sandoval Counties, New Mexico” occupies key locations for understanding the geologic history of the San Juan Basin. We refine previous mapping, which produced a robust geologic map of the bedrock geology of Paleogene sedimentary units of the area (Hobbs & Pearthree, 2021), and focus efforts on accurately mapping surficial units that occupy valley bottoms and plains within the map area and are undergoing infrastructure-altering erosion and sedimentation. This map includes parts of the central basin platform and Nacimiento Uplift-affected portions of the San Juan Basin, a broken-foreland structural basin formed during the Laramide Orogeny. The majority of the quadrangle is located on or near the San Juan Basin’s synclinal axis, leading to opposing shallow dip directions in bedrock units throughout most of the map area. Eocene siliciclastic sedimentary rocks comprise most of the bedrock in the map area. Three Oligocene trachybasalt dikes cover <1 km² (<0.4 mi²) in the northeastern map area. Loosely consolidated to unconsolidated Pleistocene deposits exist as sand sheets, stabilized eolian dunes, and valley-floor alluvium throughout the quadrangle. Holocene deposits include sheetwash alluvium and valley-floor alluvium throughout the map area and minor eolian dunes in the valleys of Cañon Largo and its larger tributaries.

The depositional history of the map comprises three broadly defined episodes. First, Paleogene deposition of fluvial siliciclastic sediments concurrent with the Laramide Orogeny produced the Nacimiento Formation and San Jose Formation, preserved in broad outcrops across the map. Second, Pleistocene and Holocene deposition of eolian sands produced the broad sand sheets which predominate in the western map area, while sheetwash and alluvial processes led to the gravels and sands that comprise the unconsolidated deposits found throughout the quadrangle’s valleys and canyon floors. Finally, modern geologic processes in the quadrangle are dominated by arroyo incision and the removal of earlier Quaternary sediments via erosion. The final episode and the processes therein are the primary cause for the *Study to Address Erosion and Sedimentation in the Cañon Largo Watershed on the Jicarilla Apache Nation, Rio Arriba and Sandoval Counties, New Mexico*, for which this geologic map and report were prepared.

Deformation structures in the map area that are mappable at the 1:50,000 scale include a fault in the southwestern map area and the broad syncline that defines the San Juan Basin axis, which bisects the map from north to south, defined in this map by the opposing dip directions on the east and west sides of the map.

Landforms in the quadrangle include plains, arroyos, canyons, and mesas. Vegetation includes that typical of US EPA Level III ecoregions 21d (Southern Rockies Foothill Woodlands and Shrublands), 21f (Sedimentary Mid-Elevation Forests), 22i (Arizona/New Mexico Plateau San Juan/Chaco Tablelands and Mesas), and 22n (Arizona/New Mexico Plateau Near-Rockies Valleys and Mesas; Griffith et al., 2006; USEPA, 2006).

Geologic Map of the Cañon Largo Watershed on the Jicarilla Apache Nation, Rio Arriba and Sandoval Counties, New Mexico

January 2023

by Kevin M. Hobbs and Kristin S. Pearce

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This and other map products are available for free download in both PDF and ArcGIS formats at:

<http://www.nmgs.gov>



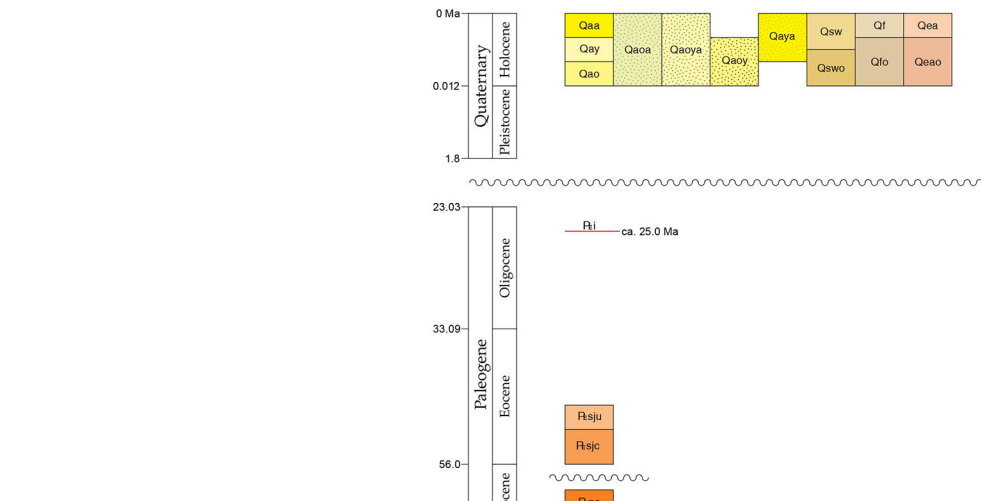
Digital layout and cartography by the NMBGMR Map Production Group:
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Comments to Map Users

A graphic map displays information on the distribution, nature, orientation, and age relationships of rock and structural features. Geologic maps provide information on the distribution, nature, orientation, and age relationships of rock and structural features. Geologic maps provide information on the distribution, nature, orientation, and age relationships of rock and structural features. Geologic maps provide information on the distribution, nature, orientation, and age relationships of rock and structural features.

The New Mexico Bureau of Geology and Mineral Resources created the Open File Report Series to expedite the dissemination of the scientific geologic map and map data. The Open File Report Series is a series of reports that allow the map review as geologists continue to work on map areas. Each map sheet contains the original data of publication before the map and the latest revision data in the upper right corner. In most cases, the original publication date coincides with the date of delivery of the map product per the contract obligation. While maps are produced, maintained, and updated as an Open File Report, the data on these maps should reflect the original publication date and the original author's intent. The views and conclusions contained in these maps 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



Quaternary Anthropogenic Units

Q1 - Alluvial deposits to ca. 6.1 ka - Accumulation of clay, silt, and sand in the floodplain adjacent to ca. 6.1 ka - Deposited ground and soil dump areas exposed where the original topography or geomorphic expression is obscured or significantly altered. Includes a 20 to 30 ft (6-9 m) soil incision facility on Highway 57 on the north side of Cañon Largo. Where present, these deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo.

Valley-Floor Units

Q2 - Alluvial deposits to ca. 1.8 ka - Deposited ground and soil dump areas exposed where the original topography or geomorphic expression is obscured or significantly altered. Includes a 20 to 30 ft (6-9 m) soil incision facility on Highway 57 on the north side of Cañon Largo. Where present, these deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo.

Fan Deposits

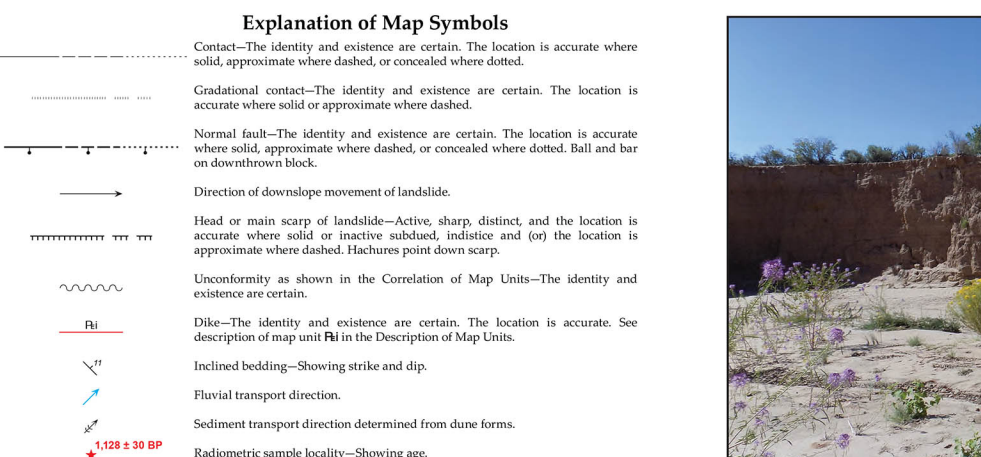
Q3 - Alluvial deposits to ca. 1.8 ka - Deposited ground and soil dump areas exposed where the original topography or geomorphic expression is obscured or significantly altered. Includes a 20 to 30 ft (6-9 m) soil incision facility on Highway 57 on the north side of Cañon Largo. Where present, these deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo.

Mixed Eolian-Alluvial Units

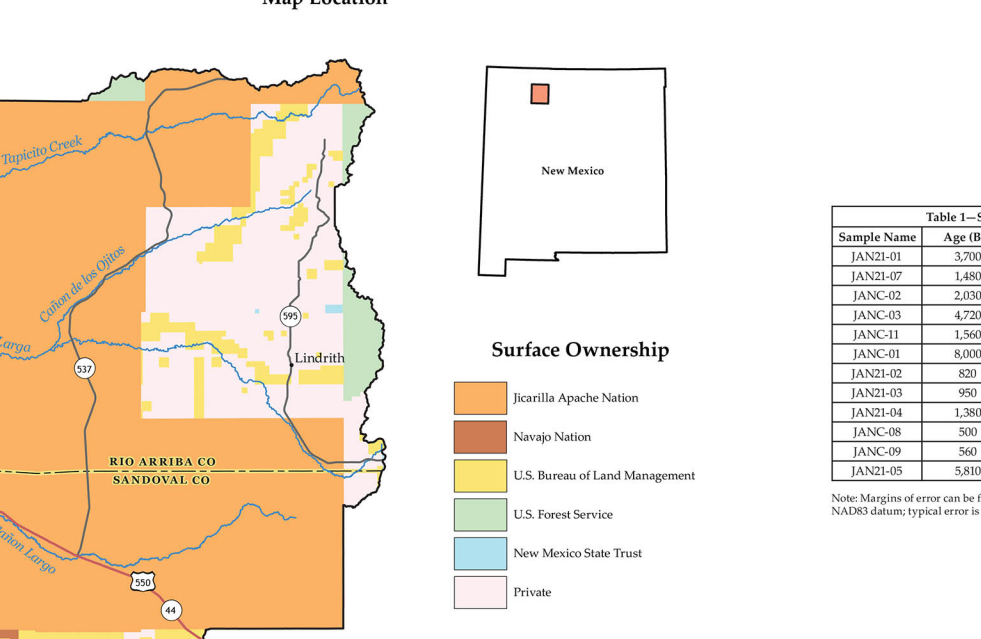
Q4 - Alluvial deposits to ca. 1.8 ka - Deposited ground and soil dump areas exposed where the original topography or geomorphic expression is obscured or significantly altered. Includes a 20 to 30 ft (6-9 m) soil incision facility on Highway 57 on the north side of Cañon Largo. Where present, these deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo.

Surficial Units Not Confined to Valley Floors

Q5 - Alluvial deposits to ca. 1.8 ka - Deposited ground and soil dump areas exposed where the original topography or geomorphic expression is obscured or significantly altered. Includes a 20 to 30 ft (6-9 m) soil incision facility on Highway 57 on the north side of Cañon Largo. Where present, these deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo. These deposits are associated with the Cañon Largo.



Map Location



Sample Name	Section	Latitude (N)	Longitude (W)	Map Unit
LAN21-01	3.70	34.94441	107.70787	Q10
LAN21-02	3.70	34.94441	107.70787	Q10
LAN21-03	3.70	34.94441	107.70787	Q10
LAN21-04	3.70	34.94441	107.70787	Q10
LAN21-05	3.70	34.94441	107.70787	Q10
LAN21-06	3.70	34.94441	107.70787	Q10
LAN21-07	3.70	34.94441	107.70787	Q10
LAN21-08	3.70	34.94441	107.70787	Q10
LAN21-09	3.70	34.94441	107.70787	Q10
LAN21-10	3.70	34.94441	107.70787	Q10
LAN21-11	3.70	34.94441	107.70787	Q10
LAN21-12	3.70	34.94441	107.70787	Q10
LAN21-13	3.70	34.94441	107.70787	Q10
LAN21-14	3.70	34.94441	107.70787	Q10
LAN21-15	3.70	34.94441	107.70787	Q10
LAN21-16	3.70	34.94441	107.70787	Q10
LAN21-17	3.70	34.94441	107.70787	Q10
LAN21-18	3.70	34.94441	107.70787	Q10
LAN21-19	3.70	34.94441	107.70787	Q10
LAN21-20	3.70	34.94441	107.70787	Q10
LAN21-21	3.70	34.94441	107.70787	Q10
LAN21-22	3.70	34.94441	107.70787	Q10
LAN21-23	3.70	34.94441	107.70787	Q10
LAN21-24	3.70	34.94441	107.70787	Q10
LAN21-25	3.70	34.94441	107.70787	Q10
LAN21-26	3.70	34.94441	107.70787	Q10
LAN21-27	3.70	34.94441	107.70787	Q10
LAN21-28	3.70	34.94441	107.70787	Q10
LAN21-29	3.70	34.94441	107.70787	Q10
LAN21-30	3.70	34.94441	107.70787	Q10

Map Name: Geologic Map of the Cañon Largo Watershed on the Jicarilla Apache Nation, Rio Arriba and Sandoval Counties, New Mexico
Map Scale: 1:50,000
Map Date: January 2023
Map Author: Kevin M. Hobbs and Kristin S. Pearce
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