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Quaternary Fault and Fold Database of the United States

As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the interactive fault map.

Quebraditas fault zone (Class A) No. 2072

Last Review Date: 2015-12-14

Compiled in cooperation with the New Mexico Bureau of Geology & Mineral Resources

citation for this record: **Machette, M.N., and Jochems, A.P., compilers, 2015, Fault number 2072, Quebraditas fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 12/14/2020 02:23 PM.**

Synopsis	Backsliding (extension) on this former Laramide reverse fault zone has resulted in a high, nearly continuous fault-line escarpment on Precambrian and Paleozoic rocks. Evidence for Quaternary movement is recorded by small isolated scarps (less than 5 percent of the fault's length) on alluvial-fan deposits derived from the adjacent fault-line escarpment. Also, south of Rociada and Manuelitas Creek, a graben has formed by downdropping on several splays of the fault zone. East of the fault zone, Pliocene gravels (which formed El Valle pediment) are now uplifted as much as 190 m above stream level, indicating a long Quaternary record of deformation. No detailed studies have been conducted to refine the timing or amount of offset recorded by the

	isolated Quaternary scarps along the length of the fault zone.
Name comments	This fault zone was named by Baltz and O'Neill (1986 #1714) for Las Quebraditas Valley, a northeast-trending strike valley that is formed by the Quebraditas fault zone. As mapped by Baltz and O'Neill (1986 #1714), the fault zone extends from the Sapello River on the south, north and northeast along the Quebraditas Valley to Rito Cebolla, a small stream that drains the Cebolla Valley.
County(s) and State(s)	MORA COUNTY, NEW MEXICO SAN MIGUEL COUNTY, NEW MEXICO
Physiographic province(s)	SOUTHERN ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Trace from 1:24,000-scale geologic mapping by Baltz and O'Neill (1984 #1713) and O'Neill (1986 #1714), which was transferred to 1:250,000-scale topographic base map for digitization. The location of the fault was digitized at 1:24,000 scale using photogrammetry to accurately map its trace from these maps.
Geologic setting	Backsliding (extension) on former Laramide reverse faults (e.g., Quebraditas, Thunder Ranch, and Hermit Peak faults) has resulted in a large continuous fault-line escarpment on Precambrian and Paleozoic rocks (Baltz and O'Neill, 1986 #1714). The Quebraditas fault zone is the source of a prominent strike valley. Down-to-the-west movement on the fault zone has caused at offset on the base of the bedrock channels of the Sapello River and Rito Cebolla, thereby damning the back valleys and causing substantial aggradation of the back valleys and connecting strike valley. The timing of this offset is unknown, but gravels that rest on a Pliocene erosion surface (pediment) are now uplifted as much as 190 m (620 ft) above modern stream levels on the eastern side of the fault zone (Baltz and O'Neill, 1990 #1671).
Length (km)	15 km.
Average strike	N30°E
Sense of movement	Normal

	Comments: Fault was created as a Laramide reverse fault, but was reactivated in Quaternary time as a normal fault (Baltz and O'Neill, 1990 #1671).
Dip Direction	NW *Comments:* No dips are shown on map, but on cross section C of Baltz and O'Neill (1984 #1713) and cross sections B and D of Baltz and O'Neill (1986 #1714) the fault zone is shown as having a high to moderate angle in the subsurface. They show the fault zone curving (less dip) with depth and merging with thrust faults of Laramide age.
Paleoseismology studies	
Geomorphic expression	Down-to-the-west Cenozoic movement on the fault zone has formed a high, nearly continuous fault-line escarpment on Precambrian and Paleozoic rocks, and small isolated scarps (less than 5 percent of length) on alluvial-fan deposits derived from the adjacent fault-line escarpment. However, in the area south of Rociada and Manuelitas Creek, a golf course was constructed on a Quaternary graben that has formed by downdropping on the several splays of the fault zone. These faults are mostly concealed, but they form subtle scarps on old and medial alluvial-fan deposits (Pleistocene). A water well in the Golf Course graben penetrated almost 300 ft (90 m) of Quaternary sediment (Baltz and O'Neill, 1990 #1671). The central part of the Sapello Valley is water logged and swampy, probably because of subsurface damming by young faults near the west end of Manuelitas Creek gap, a situation similar to that seen along the El Oro fault [2050] in the Mora Valley. No morphometric analyses of the isolated scarps or graben-bounding fault scarps have been made to better identify the most recent movement on the faults.
Age of faulted surficial deposits	Fault offsets locally derived alluvial-fan deposits of Pleistocene age. Baltz and O'Neill's (1984 #1713; 1986 #1714) units Qfm, middle (?) Quaternary, and Qfo, middle (?) to early Quaternary, are offset by the fault, whereas younger deposits, probably middle (?) to late Pleistocene, bury the trace of the fault. No detailed studies of soil development or radiometric dating have been conducted in order to refine the age of faulted and unfaulted deposits. However, the above age estimates are based on the compiler notes from mapping of Quaternary deposits in this and

	the adjacent quadrangles to the north (Baltz and O'Neill, 1984 #1713). East of the fault zone along Manuelitas Creek, gravel that rests on a Pliocene erosion surface (El Valle pediment) has been uplifted as much as 190 m above modern stream level.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Based on offset alluvial-fan deposits of probable middle to early Quaternary age, discontinuous (buried) nature of scarps, large offsets of subsurface channels of streams that cross the fault zone (Baltz and O'Neill, 1984 #1713), and substantial uplift of Pliocene gravels east of the fault zone.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* The late Quaternary slip rate must be low (<0.2 mm/yr) based on the discontinuous nature and small size of scarps, whereas earlier, late Pliocene to early (?) Quaternary, slip may have occurred at a higher rate.
Date and Compiler(s)	2015 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#1713 Baltz, E., and O'Neill, J.M., 1984, Geologic map and cross sections of the Mora River area, Sangre de Cristo Mountains, Mora County, New Mexico: U.S. Geological Survey Miscellaneous Investigations Map I-1456, 2 sheets, scale 1:24,000. #1714 Baltz, E., and O'Neill, J.M., 1986, Geologic map and cross sections of the Sapello River area, Sangre de Cristo Mountains, Mora and San Miguel Counties, New Mexico: U.S. Geological Survey Miscellaneous Investigations Map I-1575, 2 sheets, scale 1:24,000. #1671 Baltz, E.H., and O'Neill, J.M., 1990, Third-day road log, from Angel Fire to Las Vegas, via Black Lake, Guadalupita, Mora, Rociada and Sapello, *in* Bauer, P.W., Lucas, S.G., Mawer, C.K., and McIntosh, W.C., eds., Tectonic development of the

	southern Sangre de Cristo Mountains, New Mexico: New Mexico Geological Society, 41st Field Conference, September 12-15, 1990, Guidebook, p. 67-92.