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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.

Derry Hills fault (Class A) No. 2086

Last Review Date: 2016-01-12

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

citation for this record: **Machette, M.N., and Jochems, A.P., compilers, 2016, Fault number 2086, Derry Hills fault, 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 02:22 PM.**

Synopsis	This west-trending normal fault bounds uplifted blocks of Paleozoic and Tertiary rocks (on the north) that are associated with the southern end of the Caballo Mountains block. The fault forms part of the eastern margin of the Palomas Basin, an eastward-tilted, sediment-filled half-graben. The Derry fault cuts Quaternary and Tertiary deposits of the Camp Rice Formation and a younger sequence of Quaternary piedmont-slope deposits related to the upper Camp Rice Formation. No detailed studies address the fault's Quaternary history.
Name comments	The eastern part of the fault was originally named the Woolfer fault by Kelley and Silver (1952 #1072). Seager and Mack (1991

	#1263) used the term Derry Hills fault because the fault bounds the southwest margin of these hills. However, the name “Derry fault” has been used more frequently and more recently used (Seager and Mack, 1998 #1258; Seager and Mack, 2003 #7347) and is thus retained here. The fault extends from about 3 km north-northeast of Derry (Seager and Mack, 1998 #1258), southeast to a point about 2.5 km northeast of Salem, New Mexico. Seager and others (1982 #626) included the Woolfer fault of Kelley and Silver (1952 #1072) as an eastward extension of the Derry fault.
County(s) and State(s)	DOÑA ANA COUNTY, NEW MEXICO SIERRA COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Fault trace from 1:24,000-scale maps of Seager and Mack (1991 #1263; 1998 #1258) combined with accurate placement using photogrammetric methods. The map of Kelley and Silver (1952 #1072) showed a fault bounding the Derry Hills unconnected to the Woolfer fault south of Round Mountain.
Geologic setting	This down-to-the-southwest normal fault bounds uplifted blocks of Paleozoic and Tertiary rocks that are associated with the southern Caballo Mountains block. The fault was probably initiated in the Miocene; it cuts Tertiary and Quaternary deposits of the Santa Fe Group and most facies of the Camp Rice Formation (Pliocene to Quaternary). At the fault's eastern end, it splits into two branches. The eastern branch (Woolfer fault of Kelley and Silver, 1952 #1072) places Paleozoic rock on the uplifted (northern) block against Tertiary sedimentary rock, but displays no evidence of Quaternary movement (Seager, oral commun., 1996). The southern branch displaces most facies of the Camp Rice Formation including the fluvial facies and is considered herein as a separate fault, the Black Hills fault [2085]. Both the northern and southern ends of the fault are concealed beneath late Quaternary alluvium, and thus the fault may be considerably longer than shown on the map.
Length (km)	10 km.
Average strike	N59°W

Sense of movement	Normal *Comments:* Shown as high-angle normal fault on cross-sections of Kelley and Silver (1952 #1072). Seager and Mack (1991 #1263) reported dips of 60° and 65° east of Interstate Highway 25 on the Garfield 7.5-minute quadrangle.
Dip	60–65° SW
Paleoseismology studies	
Geomorphic expression	The Derry fault forms a prominent topographic escarpment, most of which is a fault-line scarp on bedrock. This escarpment is most prominent where resistant Paleozoic rocks are preserved on the uplifted fault block, such as in the Derry Hills and Round Mountain. However, the fault forms a smaller scarp on Tertiary rocks and Quaternary sediment of the Camp Rice Formation. Conversely, the fault is buried by middle (?) to late Pleistocene alluvium at many localities. Although there have been no detailed studies of the height or morphology of the fault scarps, the larger scarps are clearly the result of numerous faulting events.
Age of faulted surficial deposits	Pliocene and Quaternary sediment of the Camp Rice Formation are offset by the fault. The fluvial facies and fanglomerate facies of the Camp Rice Formation are juxtaposed against Tertiary bedrock. The fluvial facies was being deposited until 700–900 ka (Mack and others, 1993 #1020) and thus may be of early Pleistocene age along the fault. Piedmont-slope deposits of middle (?) to late Pleistocene age are not offset according to detailed mapping of Seager and Mack (1991 #1263).
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Early Pleistocene deposits are offset by repeated faulting events as evidence by scarps formed on sediment of the Camp Rice Formation. The youngest (piedmont gravel) unit in the Camp Rice is faulted, suggesting movement as young as 700–900 ka. No movement appears to have occurred in the late Pleistocene, but middle Pleistocene offset is possible.
Recurrence	

interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip rates are inferred from the lack of late Pleistocene movement (<130 ka) and the apparent small size of scarps in deposits that are probably no younger than 700 ka.
Date and Compiler(s)	2016 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#1072 Kelley, V.C., and Silver, C., 1952, Geology of the Caballo Mountains: University of New Mexico Publications in Geology 4, 286 p., 9 pls. #1020 Mack, G.H., Salyards, S.L., and James, W.C., 1993, Magnetostratigraphy of the Plio-Pleistocene Camp Rice and Palomas formations in the Rio Grande rift of southern New Mexico: American Journal of Science, v. 293, p. 49–77. #1263 Seager, W.R., and Mack, G.H., 1991, Geology of Garfield quadrangle, Sierra and Doña Ana Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources Bulletin 128, 2 pls., scale 1:24,000. #1258 Seager, W.R., and Mack, G.H., 1998, Geology of McLeod Tank quadrangle, Sierra and Doña Ana Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources Geologic Map 77, 2 sheets, scale 1:24,000. #7347 Seager, W.R., and Mack, G.H., 2003, Geology of the Caballo Mountains, New Mexico: New Mexico Bureau of Geology and Mineral Resources Memoir 49, 136 p. #626 Seager, W.R., Clemons, R.E., Hawley, J.W., and Kelley, R.E., 1982, Geology of northwest part of Las Cruces 1° x 2° sheet, New Mexico: New Mexico Bureau of Mines and Mineral Resources Geologic Map 53, 3 sheets, scale 1:125,000.