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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.

Sandia fault (Class A) No. 2037

Last Review Date: 2015-02-19

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

citation for this record: **Personius, S.F., and Haller, K.M., compilers, 2015, Fault number 2037, Sandia 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 02:23 PM.**

Synopsis	The Sandia fault forms the steep western flank of the Sandia Mountains, and the eastern margin of the Albuquerque-Belen basin in the vicinity of Albuquerque. Little geomorphic evidence of Quaternary faulting is found along the trace of the Sandia fault, but the presence of a steep mountain front and a few possible fault scarps on unconsolidated deposits indicates that the Sandia fault has probably been active in the Quaternary. One trenched fault scarp has been studied in detail. The concealed fault strands west of the main range front are mapped on the basis of subsurface well and geophysical data; they appear to offset upper Santa Fe Group sediments.

Name comments	The Sandia fault is series of structures responsible for most of the uplift of the west flank of the Sandia Mountains; various traces of the Sandia fault have been mapped by Ellis (1922 #1294), Kelley (1954 #1222; 1977 #1106), Kelley and Northrop (1975 #1308), Connell (1995 #1291), GRAM Incorporated and William Lettis and Associates, Inc. (1995 #1430), and Connell (1997 #1765). We include several north trending intrabasin fault strands that lie to the west of the main Sandia range front in this discussion of the Sandia fault.
County(s) and State(s)	SANDOVAL COUNTY, NEW MEXICO BERNALILLO COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Poor Compiled at 1:100,000 scale. *Comments:* Most published maps show the Sandia fault as dotted (concealed) along most of its trace; map traces are from Kelley and Northrop (1975 #1308), Connell (1995 #1291; written commun., 1997), GRAM Incorporated and William Lettis and Associates, Incorporated (1995 #1430), and Connell (1997 #1765).
Geologic setting	The Sandia fault forms part of the eastern margin of the Rio Grande rift and the Albuquerque basin in the vicinity of Albuquerque. Detailed gravity and magnetic data obtained in the late 1990s (Grauch, 1999 #7241; Grauch and others, 2002 #7242) shows the Sandia fault as the easternmost fault in a broad fault zone bounding the east side of the rhomboid-shaped Calabacillas subbasin (Connell, 2001 # 7239; Connell and others, 2001 # 7240; Connell, 2008 7454 Grauch and Connell, 2013 #7268). A gravity model shows the subbasin is an assymetric half graben that is 4–5 km deep adjacent to the Sandia fault (Grauch and Connell, 2013 #7268).
Length (km)	28 km.
Average strike	N4°E
Sense of movement	Normal
Dip	55° W.

	Comments: Dip measurements are from a shallow fault exposure just north of Tijeras Arroyo (Kelley and Northrop, 1975 #1308; Lambert and others, 1982 #1397).
Paleoseismology studies	Site 2037-1. McCalpin and Harrison (2006 #7237) document results from trenching one fault scarp (Tram Station sub-strand B) of four parallel scarps in the Sandia Heights embayment. The trench exposed evidence of one surface-rupturing earthquake with about 1.6 m of vertical displacement occurring about 53–67 ka based on infrared stimulated luminescence (IRSL) dating.
Geomorphic expression	The range front adjacent to the northern end of the Sandia fault, from Rincon Ridge south to Embudito Canyon (Domingo Baca segment of Connell, 1995 #1291) is deeply embayed; from Embudito Canyon south to Tijeras Canyon, the Sandia range front is steep, linear, and characterized by dissected faceted spurs and ridges. South of Tijeras Canyon to its intersection with the Tijeras-Cañoncito fault system [2033], the Sandia Range front is again embayed. A few small fault scarps have been mapped intermittently on middle Pleistocene alluvial-fan deposits at the northern and southern ends of the Sandia fault (Connell, 1995 #1291; GRAM Incorporated and William Lettis & Associates Incorporated, 1995 #1430; Gustafson, 1996 #1299), but most of the trace is buried by younger fan deposits. The intrabasin faults west of the main range front have little or no geomorphic expression (Connell, 1995 #1291; written commun., 1997).
Age of faulted surficial deposits	A few small scarps are preserved on middle Pleistocene alluvial fan deposits along the Sandia Mountain front (Connell, 1995 #1291; GRAM Incorporated and William Lettis & Associates Incorporated, 1995 #1430; Gustafson, 1996 #1299; Connell, 2008 7454), but most strands included in the Sandia fault only offset upper Santa Fe Group sediment (Connell, 1997 #1765; Connell, 2008 7454).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Dating of IRSL samples from the trench site leads to the conclusion that the timing of the most recent surface-rupture is likely about 53–67 ka (1-sigma age range, McCalpin and Harrison, 2006 #7237); however, the authors note that samples

	yielded ages in reverse stratigraphic order. Evidence for younger movement also exists at the southern end of the Sandia fault near Arroyo del Coyote, where GRAM Incorporated and William Lettis and Associates, Incorporated (1995 #1430) mapped short fault scarps and described a fault exposure in middle to late Pleistocene alluvial fan deposits, and at the northern end of the Sandia fault where Connell (1995 #1291) mapped short fault scarps on middle Pleistocene fan deposits.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Even though the paleoseismic record reported by McCalpin and Harrison, 2006 #7237) does not include a closed interval, they speculate the rate of vertical displacement on this fault is within the assigned slip-rate category.
Date and Compiler(s)	2015 Stephen F. Personius, U.S. Geological Survey Kathleen M. Haller, U.S. Geological Survey
References	#1291 Connell, S.D., 1995, Quaternary geology and geomorphology of the Sandia Mountains piedmont, Bernalillo and Sandoval Counties, central New Mexico: Riverside, University of California, unpublished M.S. thesis, 414 p., 3 pls. #1765 Connell, S.D., 1997, Cenozoic geology of the Tijeras 7.5-minute quadrangle, Bernalillo County, central New Mexico: New Mexico Bureau of Mines and Mineral Resources Open-File OF-425, 11 p. pamphlet, 1 sheet, scale 1:24,000. #7239 Connell, S.D., 2001, Stratigraphy of the Albuquerque basin, Rio Grande rift, central New Mexico—A progress report, *in* Connell, S.D., and 8 others, Stratigraphy and tectonic development of the Albuquerque basin, central Rio Grande rift—Field trip guidebook for the Geological Society of America, Rocky Mountain–South-Central Section Meeting, Albuquerque, New Mexico: New Mexico Bureau of Mines & Mineral Resources Open-File Report 454B, p. A-1–A-26. #7454 Connell, S.D., 2008, Geologic map of the Albuquerque-Rio Rancho metropolitan area and vicinity, Bernalillo and Sandoval Counties, New Mexico: New Mexico Bureau of

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#7240 Connell, S.D., Love, D.W., Lucas, S.G., Koning, D.J., Derrick, N.N., Maynard, S.R., Morgan, G.S., Jackson-Paul, P.B., and Chamberlin, R., 2001, Stratigraphy and tectonic development of the Albuquerque basin, central Rio Grande rift—Field trip guidebook for the Geological Society of America, Rocky Mountain–South-Central Section Meeting, Albuquerque, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Report 454A, 56 p.

#1294 Ellis, R.W., 1922, Geology of the Sandia Mountains: University of New Mexico Bulletin 108, Geology Series, v. 3, no. 4, p. 44.

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#1299 Gustafson, H., 1996, Tectonic geomorphology of the Sandia Mountains and eastern piedmont of the Albuquerque basin, New Mexico [abs.]: New Mexico Geology, v. 18, no. 2, p. 45.

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#1106 Kelley, V.C., 1977, Geology of Albuquerque basin, New Mexico: New Mexico Bureau of Mines and Mineral Resources Memoir 33, 60 p., 2 pls.

#1308 Kelley, V.C., and Northrop, S.A., 1975, Geology of Sandia

	Mountains and vicinity, New Mexico: New Mexico Bureau of Mines and Mineral Resources Memoir 29, 136 p., 4 pls., scale 1:48,000. #1397 Lambert, P.W., Hawley, J.W., and Wells, S.G., 1982, Supplemental road-log segment III-S—Urban and environmental geology of the Albuquerque area, *in* Grambling, J.A., and Wells, S.G., eds., Albuquerque Country II: New Mexico Geological Society, 33rd Field Conference, November 4-6, 1982, Guidebook, p. 97-124. #7237 McCalpin, J.P., and Harrison, J.B.J., 2006, Paleoseismicity of the Sandia fault zone, Albuquerque, New Mexico: Final technical report to U.S. Geological Survey, under Contract 02HQGR006, 37 p.