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Quaternary Fault and Fold Database of the United States

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La Cañada del Amagre fault zone (Class A) No. 2005

Last Review Date: 1996-09-11

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

citation for this record: **Kelson, K.I., and Personius, S.F., compilers, 1996, Fault number 2005, La Cañada del Amagre 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	The La Cañada del Amagre fault zone offsets upper Tertiary volcanic deposits derived from the Valles Caldera and rift-fill sediments in the Abiquiu embayment. The fault are identified primarily by field mapping, and herein include only faults with east-down displacements east of La Sotella Peak. The Lobato Mesa fault zone [2004] is located along the western side of La Sotella Peak and consists of faults having primarily west-down displacements. Together, the Lobato Mesa and La Cañada del Amagre fault zones form the western and eastern margins, respectively, of a north-trending horst in Tertiary volcanic and

	sedimentary rocks. No paleoseismic data are available for the La Cañada del Amagre fault zone at the time of this compilation.
Name comments	Faults within the La Cañada del Amagre fault zone were mapped, but not named, by Kelley (1954 #1222), Smith and others (1970 #1125), Kelley (1978 #1107), Machette and Personius (1984 #1113), Dethier and Manley (1985 #1432), Dethier and Martin (1984 #1092), and Manley and others (1987 #1119). Aldrich and Dethier (1990 #1085) also mapped some of these faults and referred to the more continuous features as the La Cañada del Amagre and Clara Peak faults. Wong and others (1995 #1155) refer to the faults in this zone as the La Cañada del Amagre-Clara Peak fault zone. For simplicity, this compilation refers to these faults collectively as the La Cañada del Amagre fault zone, and herein is defined as a 4- to 5-km-wide zone of east-down faults directly east of La Sotella Peak and north of Santa Clara Canyon. The fault zone is 7–11 km west of the town of Chili, and extends north from Arroyo de la Plaza Larga to the Rio Chama valley.
County(s) and State(s)	RIO ARRIBA COUNTY, NEW MEXICO
Physiographic province(s)	SOUTHERN ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* The trace of the La Cañada del Amagre fault zone is based on field mapping compiled at a scale of 1:125,000 (Smith and others, 1970 #1125; Kelley, 1978 #1107), at a scale of about 1:66,667 (Dethier and Martin, 1984 #1092), and at a scale of 1:24,000 (Dethier and Manley, 1985 #1432).
Geologic setting	The La Cañada del Amagre fault zone is located within the Abiquiu embayment of the Rio Grande rift, along the northern margin of the Jemez Mountains volcanic edifice. The fault zone may have a weak association with contemporary microseismicity (House and Hartse, 1995 #1160; Wong and others, 1995 #1155).
Length (km)	17 km.
Average strike	N4°W
Sense of movement	Normal

	Comments: Down-to-the-east normal dip separation of bedded volcanic rocks was noted by Smith and others (1970 #1125), Kelley (1978 #1107), Machette and Personius (1984 #1113), and Manley and others (1987 #1119). Aldrich and Dethier (1990 #1085) identified dextral offset of a vertical late Tertiary (10.6 Ma) volcanic dike, which might suggest a component of Quaternary lateral slip.
Dip Direction	E *Comments:* Surface and subsurface structural data are lacking for the La Cañada del Amagre fault zone. However, Baldridge and others (1994 #1175) noted that rift-margin faults in the Abiquiu embayment are high-angle planar normal faults that are distributed over a broad zone. Wong and others (1995 #1155) estimated a range in fault dip of 60–80° for the seismogenic crust, based on the large lateral offset observed by Aldrich and Dethier (1990 #1085), and deep structural interpretations for rift-related faults in the Albuquerque basin.
Paleoseismology studies	
Geomorphic expression	Prominent east-facing topographic scarps are present along the fault traces, in particular across mesas underlain by Lobato Basalt. Scarps on the basalt directly west of Clara Peak are as much as 80 m high, although there is little or no prominent topographic expression where the faults traverse underlying, less resistant rift-fill sediment of the Santa Fe Group.
Age of faulted surficial deposits	The La Cañada del Amagre fault zone displaces the 7.8 Ma Lobato Basalt, and Gardner and House (1987 #1097) referenced mapping by Dethier and Martin (1984 #1092) that suggests a 15-m-high scarp on early Pleistocene Bandelier Tuff.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* The timing of the most recent earthquake on the La Cañada del Amagre fault zone is unknown, but is probably Quaternary as the fault offsets the early Pleistocene Bandelier Tuff.

Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Aldrich and Dethier (1990 #1085) estimated 530 m of net slip across the La Cañada del Amagre fault based on offset of 10.6 Ma basalt dikes. Based on kinematic arguments, they inferred that all this slip occurred since 5 Ma, which suggests a low long-term slip rate. The rate is even lower if no hiatus is inferred. Wong and others (1995 #1155) assign a range in slip rate of 0.05 to 0.9 mm/yr using these data and the regional distribution of rates within the Rio Grande rift.
Date and Compiler(s)	1996 Keith I. Kelson, William Lettis & Associates, Inc. Stephen F. Personius, U.S. Geological Survey
References	#1085 Aldrich, M.J., Jr., and Dethier, D.P., 1990, Stratigraphic and tectonic evolution of the northern Española basin, Rio Grande rift, New Mexico: Geological Society of America Bulletin, v. 102, p. 1695-1705. #1175 Baldridge, W.S., Ferguson, J.F., Braile, L.W., Wang, B., Eckhardt, K., Evans, D., Schultz, C., Gilpin, B., Jiracek, G.R., and Biehler, S., 1994, The western margin of the Rio Grande rift in northern New Mexico—An aborted boundary?: Geological Society of America Bulletin, v. 105, p. 1538–1551. #1432 Dethier, D.P., and Manley, K., 1985, Geologic map of the Chili quadrangle, Rio Arriba County, New Mexico: U.S. Geological Survey Miscellaneous Field Studies Map MF-1814, 1 sheet, scale 1:24,000. #1092 Dethier, D.P., and Martin, B.A., 1984, Geology and structure along the northeast Jemez Mountains, New Mexico, *in* Baldridge, W.S., Dickerson, P.W., Riecker, R.E., and Zidek, J., eds., Rio Grande rift—Northern New Mexico: New Mexico Geological Society, 35th Field Conference, October 11-13, 1984, Guidebook, p. 145-150. #1097 Gardner, J.N., and House, L., 1987, Seismic hazards investigations at Los Alamos National Laboratory, 1984-1985: Los Alamos National Laboratory Report LA-11072-MS, 76 p. #1160 House, L., and Hartse, H., 1995, Seismicity and faults in

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