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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.**

## Loma Blanca fault (Class A) No. 2112

**Last Review Date: 2016-03-30**

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

***citation for this record:*** **Personius, S.F., and Jochems, A.P., compilers, 2016, Fault number 2112, Loma Blanca 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 02:21 PM.**

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| **Synopsis** | The Loma Blanca fault offsets sediment of the Sierra Ladrones Formation and middle to upper Pleistocene alluvium. Along the central part of the fault, terrace gravel (approximately 120 ka) of the Rio Salado is offset about 5 m. At the north end of the Loma Blanca fault, late Pleistocene alluvium is offset 0.5–7 m and middle Pleistocene alluvium is offset 5–10 m. These relations indicate recurrent Quaternary movements. The Loma Blanca fault is marked by a 2- to 5-m-wide calcium carbonate and manganese cemented hanging-wall damage zone in a 5-km long stretch between Arroyo Chanthe and the Rio Salado. U-Th geochronology of syntectonic calcite veins in the cemented hanging wall damage zone yield an average slip recurrence |

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| | interval of 40±6 ka over the time period of 550–150 ka, punctuated by a pronounced cluster of slip activity approximately 430 k.y. ago. |
| **Name comments** | The Loma Blanca fault is sub-parallel to and basinward (east) of the Loma Pelada fault [2113]. Parts of the Loma Blanca fault were mapped by Kelley (1954 #1222; 1977 #1106), but the fault was mapped in detail and named by Machette (1978 #1400). Machette (1982 #1401) and Machette and McGimsey (1983 #1024) conducted fault scarp studies at several localities along the Loma Blanca fault. Williams and others (in review #7476) conducted detailed structural and diagenetic studies of the Loma Blanca fault and conducted U-Th geochronology analyses to constrain fault movement history during the Quaternary.<br><br>**Fault ID:** Fault number 10 of Machette (1982 #1401) and fault number 9 of Machette and McGimsey (1983 #1024). |
| **County(s) and State(s)** | SOCORRO COUNTY, NEW MEXICO |
| **Physiographic province(s)** | BASIN AND RANGE |
| **Reliability of location** | Good<br>Compiled at 1:24,000 scale.<br><br>*Comments:* The fault trace is from 1:24,000 scale mapping by Machette (1978 #1400) and Connell and McCraw (2007 #7475). |
| **Geologic setting** | The Loma Blanca fault is located on the piedmont slope flanking the eastern side of the Sierra Ladrones . It is an intrabasin normal fault, synthetic to the Loma Pelada fault [2113], which forms the active margin of the Socorro Basin in this area. |
| **Length (km)** | 23 km. |
| **Average strike** | N1°W |
| **Sense of movement** | Normal |
| **Dip Direction** | E<br><br>*Comments:* Connell and McCraw (2007 #7475) give dip measurements of 62–66° toward the east on the westernmost of |

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| | two synthetic strands in the La Joya NW 7.5-minute topographic quadrangle. Further south in the San Acacia 7.5-minute quadrangle, structure contours indicate steeper dips of 75–85° (Williams and others, in review #7476). |
| **Paleoseismology studies** | Syntectonic calcite veins and sand injectites localized within the hanging wall damage zone record episodic, pore fluid pressure driven seismic faulting (Williams and others, in review #7476)). U-Th analyses of these veins indicates a time-dependent slip system (see "Recurrence interval") |
| **Geomorphic expression** | The Loma Blanca fault is well expressed due in part to calcite cementation in its central part and by fault scarps on surficial deposits north of Rio Salado (Machette, 1978 #1400; Machette and McGimsey, 1983 #1024; Williams and others, in review #7476). The fault forms intermittent scarps along two synthetic strands at its northern end at Cañada Colorado near the northern boundary of the Sevilleta National Wildlife Refuge (Connell and McCraw, 2007 #7475). The fault is also composed of two synthetic strands that meet at a soft-link relay 0.5 km north of the fault's intersection with the Arroyo Chanthe. |
| **Age of faulted surficial deposits** | No detailed fault studies have been conducted, but Machette (1978 #1433; 1982 #1401) and Machette and McGimsey (1983 #1024) conducted reconnaissance fault scarp studies at several localities along the Loma Blanca fault. They measured or estimated offsets of 2–10 m on late Pleistocene alluvial deposits and 5–22 m on middle Pleistocene alluvial deposits. For instance, Machette (1978 #1433) measured offset of 6 m of a Rio Salado terrace deposit with an estimated soil age of 120 ka. |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | late Quaternary (<130 ka)<br><br>*Comments:* Kelley (1977 #1106, fig. 23) described the scarps at the north end of the Loma Blanca fault as late Holocene in age on the basis of no quantitative data, whereas scarp morphology data of Machette (1982 #1401) and Machette and McGimsey (1983 #1024) indicated that the most recent movement on the fault is older than 15 ka. This inference is further supported by U-Th analyses of syntectonic calcite veins in the hanging wall damage zone, the youngest of which yielded ages of about 150 ka (R.T. |

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| | Williams personal commun.). |
| **Recurrence interval** | U-Th analyses of syntectonic calcite veins yielded average recurrence intervals of40 ±6 ka for the time period of 550–150 ka (R.T. Williams personal commun.). However, these intervals are punctuated by a pronounced increase in slip recurrence about 430 ka. Recurrence intervals at that time may have been as short as 2–12 ka. |
| **Slip-rate category** | Less than 0.2 mm/yr<br><br>*Comments:* Machette (1982 #1401) and Machette and McGimsey (1983 #1024) measured or estimated offsets of 2–10 m in late Pleistocene (<130 ka) alluvial deposits and 5–22 m in middle Pleistocene (<750 ka) alluvial deposits. |
| **Date and Compiler(s)** | 2016<br>Stephen F. Personius, U.S. Geological Survey<br>Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources |
| **References** | #7475 Connell, S.D., and McCraw, D.J., 2007, Preliminary geologic map of the La Joya NW quadrangle, Socorro County, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Geologic Map 140, scale 1:24,000.<br><br>#1222 Kelley, V.C., 1954, Tectonic map of a part of the upper Rio Grande area, New Mexico: U.S. Geological Survey Oil and Gas Investigations Map OM-157, 1 sheet, scale 1:190,080.<br><br>#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.<br><br>#1400 Machette, M.N., 1978, Geologic map of the San Acacia quadrangle, Socorro County, New Mexico: U.S. Geological Survey Geologic quadrangle Map GQ-1415, 1 sheet, scale 1:24,000.<br><br>#1433 Machette, M.N., 1978, Late Cenozoic geology of the San Acacia-Bernardo area, *in* Hawley, J.W., ed., Guidebook to Rio Grande rift in New Mexico and Colorado: New Mexico Bureau of Mines and Mineral Resources Circular 163, p. 135-137.<br><br>#1401 Machette, M.N., 1982, Quaternary and Pliocene faults in the La Jencia and southern part of the Albuquerque-Belen basins, |

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| | New Mexico—Evidence of fault history from fault-scarp morphology and Quaternary geology, *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. 161-169.<br><br>#1024 Machette, M.N., and McGimsey, R.G., 1983, Map of Quaternary and Pliocene faults in the Socorro and western part of the Fort Sumner 1° x 2° quadrangles, central New Mexico: U.S. Geological Survey Miscellaneous Field Studies Map MF-1465-A, 12 p. pamphlet, 1 sheet, scale 1:250,000.<br><br>#7476 Williams, R.T., Goodwin, L.B., Mozley, P.S., in review, Diagenetic controls on the evolution of fault-zone architecture and permeability structure: Implications for episodicity of fault-zone fluid transport in extensional basins: Geological Society of America Bulletin. |