Jump to Navigation

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.

Palomas Creek fault (Class A) No. 2103

Last Review Date: 2016-02-15

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 2103, Palomas Creek 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.**

Synopsis	The Palomas Creek fault zone has been studied on a reconnaissance basis and six topographic profiles have been collected for morphometric analysis. The main fault forms down-to-the-east, north-trending intrabasin scarps that are preserved on the Cuchillo surface, a nearly featureless high-level surface related to the culmination of filling of the Palomas Basin. The fault zone lies west and southwest of the broader Cuchillo Negro fault zone [2104]. The most recent movement on the Palomas Creek fault zone is considered to be of late middle Pleistocene age (i.e., 130–250 ka).
Name	Machette (1987 #960) named this prominent fault zone for

comments	Palomas Creek, a major east-flowing tributary that enters the Rio Grande southwest of Truth or Consequences, New Mexico. Previously referred to as the Palomas Creek fault in this compilation, it is now referred to as a "fault zone" to better reflect the numerous small scarps that are subparallel to the southern part of the main fault strand. This strand extends across the Cuchillo surface from Palomas Creek on the north to Las Animas Creek on the south. **Fault ID:** Referred to as fault 4 on fig. 1 in Machette (1987 #960).
County(s) and State(s)	SIERRA COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* The location of the fault is mapped at 1:24,000 scale using 1:24,000-scale map of Jochems (2015 #7356) and unpublished mapping by Jochems and Koning. Previously compiled from unpublished 1:24,000-scale mapping used to compile fig. 1 in Machette (1987 #960). Some of the faults are also shown in a generalized manner on the 1:100,000-scale map of Harrison (1993 #1226).
Geologic setting	The Palomas Creek fault zone is west and southwest of the Cuchillo Negro fault zone [2104] about 16 km west of Truth or Consequences. The fault zone is located between the eastern margin of the Black Mountains and the Mud Spring Mountains and is within the Palomas Basin, an east-tilted half graben (Lozinsky, 1987 #1268). The main fault strand displays unusual scissors-type motion, being down-to-the-east on the northern part and down-to-the-west on the southern part. This geometry is probably the result of the two intersecting faults rather than the product of lateral movement.
Length (km)	27 km.
Average strike	N3°E
Sense of movement	Normal

Dip Direction	E; W *Comments:* Shown as high-angle faults on schematic cross section in Lozinsky (1987 #1268) and in cross section of Jochems (2015 #7356).
Paleoseismology studies	
Geomorphic expression	North of Palomas Creek the fault zone consists of nearly continuous east-facing scarps on the Cuchillo surface; one scarp striking toward the northwest in the northern part of the Williamsburg NW 7.5-minute topographic quadrangle is up to 6 m in height (Jochems, 2015 #7356). Machette (1987 #960) presented morphometric data from more representative fault scarps to argue that they are nearly in equilibrium with the surrounding piedmont. Six profiles were collected across these scarps to analyze their morphology. The measured scarps are 1.9–3.5 m high and have maximum scarp-slope angles of about 2°–4° to the west, whereas the adjacent piedmont slope has an eastward slope of 0.75°–1.5° (Machette, 1987 #960, fig. 7). These scarps are more degraded than those of the 100-ka Santa Rita fault in southern Arizona, which led Machette to suggest that the fault scarps are probably of late-middle Pleistocene age (130–250 ka). No other studies (such as trenching) have been conducted along the Palomas Creek fault. South of Palomas Creek, the main fault scarp is less conspicuous where it crosses a dissected portion of the Cuchillo surface. From a point about 3.5 km south of Salado Creek (a Palomas Creek tributary), south to Seco Creek, the fault forms a distinct west-facing scarp less than 5 m to almost 10 m high. The southern part of the main fault forms west-facing scarps that oppose the gradient of the Cuchillo surface, and thus are quite apparent on aerial photographs and from the air. For convenience, numerous small scarps that lie to the southwest of the southern end of the main strand of the fault are included with this fault zone description. However, three additional discrete fault scarps farther south and east, beyond Seco Creek, are discussed separately as unnamed faults west of Caballo Reservoir [2105] in this compilation.
Age of faulted surficial	The main fault cuts the upper part of the Palomas Formation, which forms the constructional Cuchillo surface. This surface was

deposits	considered to be middle Pleistocene (400–500 ka) by Lozinsky (1986 #1073) and Machette (1987 #960), but more recent studies by Mack and others (1993 #1020) suggested that this surface may be as old as 700–900 ka, thereby providing an older maximum limit on the deformation. Detailed mapping of Quaternary deposits in drainages on the Cuchillo surface has demonstrated that neither the main nor subsidiary faults deform Holocene (<12 ka) deposits (Jochems and Koning, 2015 #7357).
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Machette (1987 #960) suggested a late middle Pleistocene age (130–250 ka) for the fault scarps based on their subdued morphology. However, younger movement may be present but undetected.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip-rate category assigned based on fault scarps (<5–10 m high) formed on a surface that stabilized 700–900 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	#1226 Harrison, R.W., Lozinsky, R.P., Eggleston, T.L., and McIntosh, W.C., 1993, Geologic map of the Truth or Consequences 30 x 60-minute quadrangle (1:100,000 scale): New Mexico Bureau of Mines and Mineral Resources Open-File Report 390, 19 p. pamphlet, 1 sheet, scale 1:100,000. #7356 Jochems, A.P., 2015, Geologic map of the Williamsburg NW 7.5-minute quadrangle, Sierra County, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Geologic Map 251, scale 1:24,000. #7357 Jochems, A.P., and Koning, D.J., 2015, Holocene stratigraphy and a preliminary geomorphic history for the Palomas Basin, south-central New Mexico: New Mexico Geology, v. 37, p. 77–88.

	#1268 Lozinsky, R.P., 1987, Cross section across the Jornada del Muerto, Engle, and northern Palomas Basins, south-central New Mexico: New Mexico Geology, v. 9, p. 55-57 and 63. #1073 Lozinsky, R.R., 1986, Geology and late Cenozoic history of the Elephant Butte area, Sierra County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Circular 187, 40 p., 2 pls. #960 Machette, M.N., 1987, Preliminary assessment of Quaternary faulting near Truth or Consequences, New Mexico: U.S. Geological Survey Open-File Report 87-652, 40 p. #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.