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Quaternary Fault and Fold Database of the United States

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Cuchillo Negro fault zone (Class A) No. 2104

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 2104, Cuchillo Negro 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 02:21 PM.**

Synopsis	Few studies address the Cuchillo Negro fault zone, although it forms conspicuous fault scarps on the Cuchillo surface, northwest of Truth or Consequences. It is comprised of a 10- to 13-km-wide by 33- to 35-km-long zone of north-trending intrabasin fault scarps preserved on high-level surfaces related to late Cenozoic filling of the northern Palomas Basin. The most recent movement on most of the faults in the zone is considered to be early late Pleistocene (100–130 ka) on the basis of fault scarp morphology and deformation of terraces along Cañada Alamosa.
Name comments	Machette (1987 #960) named this long, broad zone of faults for Cuchillo Negro Creek, a major east-flowing tributary that enters

	the Rio Grande just north of Truth or Consequences, New Mexico. The fault zone extends across the Cuchillo surface from the southern end of the San Mateo Mountains (north of Cañada Alamosa), south to Palomas Creek. Compiled fault includes Willow Springs fault of Cikoski and Koning (2013 #7354). **Fault ID:** Referred to as faults labeled 3 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1:24,000-scale maps of Cikoski and Koning (2013 #7354), Jochems (2015 #7356), Jochems and Koning (2015 #7348), and unpublished mapping by Jochems and Koning. Previously compiled from unpublished 1:24,000-scale mapping used to compile fig. 1 in Machette (1987 #960); four short scarps in the central and northern parts of the fault zone are retained from this original compilation at 1:250,000 scale. Some of the faults in this fault zone were shown on Maxwell and Oakman's (1990 #1145) 1:24,000-scale map of the Cuchillo 7.5-minute quadrangle; most of these faults are included in this compilation and have been updated using photogrammetric methods. 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 Cuchillo Negro fault zone is comprised primarily of north-trending, east- and west-dipping intrabasin normal faults in the central part of the Engle Basin, northwest of Truth or Consequences. The fault zone is about 10- to 13-km wide and 33- to 35-km long. The margins of the fault zone are defined by the Palomas Creek fault zone [2103] on the southwest and the Mud Springs fault [2101] on the east.
Length (km)	34 km.
Average strike	N10°E
Sense of	Normal

movement	Normal
Dip Direction	E; W *Comments:* Shown as high-angle faults on schematic cross section in Lozinsky (1987 #1268) and on cross section of Cikoski and Koning (2013 #7354).
Paleoseismology studies	
Geomorphic expression	The fault zone forms small but continuous, primarily west-facing scarps that oppose the gradient of the Cuchillo surface, block drainages and form small ponds, and thus are quite apparent on aerial photographs and from the air. The scarps in this zone are topographically subdued and are generally less than 5 m high, with the exception of one prominent 10- to 15-m-high scarp in the central part of the zone (Machette, 1987 #960). The scarp morphology suggests that the youngest movement on these relatively small scarps probably dates from late-middle Pleistocene to perhaps late Pleistocene time.
Age of faulted surficial deposits	These faults cut the Palomas gravel (upper part of the Palomas Formation), which forms the constructional Cuchillo surface. This surface was 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) suggests that this surface may be as old as 700–900 ka, thereby providing an older maximum limit on the deformation. Detailed mapping of Pleistocene terrace deposits along Cañada Alamosa has demonstrated warping or offset of four older terraces, indicating faulting before about 300 ka and after about 550 ka (McCraw and Williams, 2012 #7358). Additional mapping has shown that the faults do not deform Holocene (<12 ka) deposits along valley floors on the Cuchillo surface (Jochems and Koning, 2015 #7257).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Machette (1987 #960) suggested a late middle Pleistocene age (130–250 ka) to perhaps a late Pleistocene age for the fault scarps based on their subdued morphology. In retrospect, early late Pleistocene (100–130 ka) seems most likely for the time

	of most recent faulting.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip-rate category assigned based on the presence of less than 5- to 15-m-high fault scarps on a surface that stabilized 700–900 ka (Mack and others, 1993 #1020).
Date and Compiler(s)	2016 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#7354 Cikoski, C.T., and Koning, D.J., 2013, Geologic map of the Huerfano Hill quadrangle, Sierra County, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Geologic Map 243, scale 1:24,000. #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. #7348 Jochems, A.P., and Koning, D.J., 2015, Geologic map of the Williamsburg 7.5-minute quadrangle, Sierra County, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Geologic Map 250, 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.

#1145 Maxwell, C.H., and Oakman, M.R., 1990, Geologic map of the Cuchillo quadrangle, Sierra County, New Mexico: U.S. Geological Survey Geologic Quadrangle Map GQ-1686, 1 sheet, scale 1:24,000.

#7358 McCraw, D.J., and Williams, S.F., 2012, Terrace stratigraphy and soil chronosequence of Cañada Alamosa, Sierra and Socorro Counties, New Mexico, *in* Lucas, S.G., McLemore, V.T., Lueth, V.W., Spielmann, J.A., and Krainer, K., eds., Geology of the Warm Springs region: New Mexico Geological Society 63rd Field Conference, October 3–6, 2012, Guidebook, p. 475–490.