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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.

Engle Lake fault (Class A) No. 2060

Last Review Date: 2015-12-14

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

citation for this record: **Machette, M.N., and Jochems, A.P., compilers, 2015, Fault number 2060, Engle Lake 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 02:22 PM.**

Synopsis	The fault is marked by a series of low, subtle scarps on early Quaternary deposits and a larger (25 m? high) scarp on a late Pliocene basalt flow. It causes tectonically induced physiography, such as backtilted Quaternary surfaces, and has playa lakes along the downthrown (eastern) side of the fault. It forms the eastern margin of the Central horst, an uplifted Neogene fault block cored by Cretaceous rocks. No specialized studies have been conducted along the fault, although it has been seen in several natural exposures.
Name comments	The Engle Lake fault was named by Mack and Seager (in press #1262) for Engle Lake, an ephemeral lake (playa) located about 2

	km southwest of Engle, New Mexico. The fault extends south and southeast from the latitude of Cedar Lake, to the west side of Engle Lake. It is parallel to the Jornada Draw fault [2056], which has similar characteristics.
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:* Trace of the fault shown on the 1:24,000-scale map of Mack and Seager (1993 #1262). The location of the fault was digitized at 1:24,000 scale using photogrammetry to accurately map its trace from this map.
Geologic setting	The Engle Lake fault forms the eastern margin of the Central horst, an uplifted Neogene fault block cored by Cretaceous rocks. The western margin of the horst is formed by the Main-Central fault (not documented as Quaternary), which may link southward with the Jornada Draw fault [2056]. The Engle Lake fault may have as much as 330 m of stratigraphic offset in Cretaceous rock, and appears to deform Pliocene to Pleistocene sediment of the Palomas Formation as much as 15 m.
Length (km)	9 km.
Average strike	N12°W
Sense of movement	Normal *Comments:* Inferred from regional extension related to the Rio Grande rift and from dips measured on faults of similar age and orientation in the region.
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	The fault is characterized by small subtle scarps on piedmont-slope deposits that form the Cuchillo surface, which is the constructional top of the Palomas Formation. On the northern part of the fault, there is a larger (25 m?) scarp on a late Pliocene

	basalt flow, as determined from inspection of the Engle 7.5-minute topographic map (Mack and Seager, 1993 #1262). Near Engle Lake, both the piedmont-slope deposits and the Cuchillo surface are tilted west-southwest 1°–3°(?). Mack and Seager (1993 #1262) report as much as 15 m of stratigraphic separation on the early(?) Pleistocene Cuchillo surface, although the fault is shown on their maps as entirely concealed beneath this surface. Engle Lake appears to be an axial playa on the hanging wall dip slope, adjacent to (east of) the fault.
Age of faulted surficial deposits	The fault displaces Cretaceous bedrock, Pliocene to early Pleistocene basin-fill deposits of the Palomas Formation, and the 700–900 ka (Mack and others, 1993 #1020) constructional Cuchillo surface. There is no evidence that late Pleistocene and Holocene deposits are disturbed by the fault.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Mack and Seager (1993 #1262) indicated that the piedmont scarps are clearly younger than the Cuchillo surface (900–700 ka in Mack and others, 1993 #1020) and suggested that the faulting may be as recent as late Pleistocene. However, because deformation is only documented for the Cuchillo surface, the most recent faulting event is herein considered to be younger than 750 ka.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip-rate category assigned based on 15 m scarps on the Cuchillo surface (900–700 ka) as reported by Mack and Seager (1993 #1262).
Date and Compiler(s)	2015 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#1262 Mack, G., and Seager, W.R., 1993, Geologic map of the Engle quadrangle, Sierra County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Open-File Geologic Map OF-GM 207, scale 1:24,000.

	#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.