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Quaternary Fault and Fold Database of the United States

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Jornada Draw fault, central section (Class A) No. 2056b

Last Review Date: 2015-12-21

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 2056b, Jornada Draw fault, central section, 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	**General:** The fault is marked by a series of low, subtle scarps on Quaternary deposits, by the eastward termination and offset of Tertiary bedrock units, and by tectonically induced physiography, such as playa lakes along the downthrown (eastern) side of the fault. No specialized studies have been conducted along the fault, although it is seen in several natural exposures. Soil development has been used to estimate the timing of most recent movement on the fault. **Sections:** This fault has 3 sections. Although originally defined as

	segments by Seager and Mack (1995 #963), their scheme was not supported by paleoseismic or geomorphic data nor were the limits of the segments defined. Therefore, we consider the parts of the fault to be sections for descriptive purposes.
Name comments	**General:** Named by Seager and Mack (1995 #963) for the fault's apparent control of the course of Jornada Draw, an ephemeral stream that drains the axial portion of the southern Jornada del Muerto. The fault extends south-southeast from near Engle to south of the Point of Rocks Hills, a distance of about 64 km. A similarly located unnamed fault was shown by Woodward and others (1978 #986) on a regional map of the Rio Grande rift, but subsequent studies of the sub-alluvial geology showed that the existence of that fault was based on mistaken interpretations (Seager and Mack, 1995 #963). Seager and Mack (1995 #963) suggested three segments for the fault, but this scheme is not supported by paleoseismic or geomorphic data nor were the limits of the segments defined; therefore they are referred to here as sections. **Section:** Referred to as the central segment of the Jornada Draw fault by Seager and Mack (1995 #963). This part of the fault extends from the north side of Prisor Hill (at the Aleman Ranch headquarters) to the south side of the Point of Rocks Hills at the Sierra/Doña Ana County line.
County(s) and State(s)	DONA ANA COUNTY, NEW MEXICO SIERRA COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* General trace of the fault shown on 1:125,000-scale map of Seager and others (1987 #627). More detailed (1:24,000) mapping of the central section has been completed by Seager (1995 #1748, 2002 #7296, 2005 #7297). Fault location is from these maps coupled with photogrammetric placement of its trace in some locations.
Geologic setting	The Jornada Draw fault forms the boundary between two major late Tertiary structural blocks; it appears to have accommodated growing structural relief between the eastward-tilted Caballo Mountains horst on the west and the broad, shallow Jornada del

	Muerto syncline (pre-Quaternary) on the east. On the basis of drill-hole information (Seager and others, 1987 #627), it appears that early Tertiary rocks are offset as much as 305–564 m along the fault. Although most of the displacement apparently occurred in Pliocene time, its most recent movement probably was in the middle Pleistocene. A late Pliocene (?) basaltic cinder cone is offset along the northern section of the fault and Quaternary offset locally is more than 30 m.
Length (km)	This section is 26 km of a total fault length of 62 km.
Average strike	N17°W (for section) versus N33°W (for whole fault)
Sense of movement	Normal *Comments:* Seager and Mack (1995 #963) show this as a normal fault.
Dip Direction	NE *Comments:* Seager and Mack (1995 #963) suggested that the fault may have an east-dipping listric geometry on the basis of gentle (1°) west-dipping strata that could represent reverse drag on the fault.
Paleoseismology studies	
Geomorphic expression	This section of the fault is characterized by remnants of once more extensive bedrock exposures (Prisor, Upham, and Point of Rocks Hills) on the footwall (west) side of the fault. In general, the position of the fault is obscured by piedmont-slope and alluvial-fan surfaces that cross the fault with only subtle (small) breaks in slope, although the course of the fault probably controls Jornada Draw. Seager (2002 #7296, 2005 #7297) mapped two mostly concealed strands of the fault between Prisor Hill and the Point of Rocks Hills. Bedrock exposures in the Upham Hills place Uvas Basaltic Andesite against older Bell Top Formation sediment and volcaniclastic deposits of the Palm Park Formation (Seager, 2002 #7296); however, no offset of localized Quaternary deposits is reported. No measurements of scarp heights or offset were mentioned by Seager and Mack (1995 #963).
Age of faulted surficial	The piedmont-slope deposits are probably related to constructional surfaces of the Camp Rice and Palomas

deposits	Formations, which are as young as 700–900 ka (Mack and others, 1993 #1020).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* In as much as this section has few piedmont scarps on the Cuchillo or La Mesa surfaces, the minimum time for fault movement is probably best characterized as early to possibly middle Pleistocene. Thus, we classify the fault as Quaternary.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* A low slip rate is inferred from slip rates estimated for adjacent sections of the fault, and from the lack of moderately large (10- to 30-m-high) scarps. Seager and Mack (1995 #963) argued that the fault's net offset (and perhaps its younger displacement pattern) mimics the structural relief along the Caballo Mountains horst, and thus slip (and slip rates) might be greatest in the central section. Nevertheless, the Quaternary slip rate for this fault is most likely less than 0.2 mm/yr, especially for the past 400 k.y.
Date and Compiler(s)	2015 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#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. #1748 Seager, W.R., 1995, Geologic map of the Upham 7.5-minute quadrangle, Sierra County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Open-File Digital Geologic Map OF-GM 205, scale 1:24,000. #7296 Seager, W.R., 2002, Geologic map of the Upham Hills 7.5-minute quadrangle, Sierra and Doña Ana Counties, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Geologic Map 113, scale 1:24,000.

	#7297 Seager, W.R., 2005, Geologic map of the Prisor Hill 7.5-minute quadrangle, Sierra County, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Geologic Map 114, scale 1:24,000. #963 Seager, W.R., and Mack, G.H., 1995, Jornada Draw fault—A major Pliocene-Pleistocene normal fault in the southern Jornada Del Muerto: New Mexico Geology, v. 17, no. 3, p. 37–43. #627 Seager, W.R., Hawley, J.W., Kottlowski, F.E., and Kelley, S.A., 1987, Geology of east half of Las Cruces and northeast El Paso 1° x 2° sheets, New Mexico: New Mexico Bureau of Mines and Mineral Resources Geologic Map 57, 3 sheets, scale 1:125,000. #986 Woodward, L.A., Callender, J.F., Seager, W.R., Chapin, C.E., Gries, J.C., Shaffer, W.L., and Zilinski, R.E., 1978, Tectonic map of Rio Grande rift region in New Mexico, Chihuahua, and Texas, *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, 1 pl., scale 1:1,000,000.