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.

West Lobo Valley fault zone, Mayfield section (Class A) No. 918c

Last Review Date: 1993-01-25

Compiled in cooperation with the Texas Bureau of Economic Geology

citation for this record: **Collins, E., compiler, 1993, Fault number 918c, West Lobo Valley fault zone, Mayfield 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 03:13 PM.**

Synopsis	**General:** This long fault zone consists of a distinct series of continuous and discontinuous range-front scarps. The zone has been mapped by many, including Twiss (1959 #861), Belcher and others (1977 #875), Muehlberger and others (1978 #854), Henry and others (1985 #866), Machette and Personius (unpublished field notes made available to Collins), and Collins and Raney (1993 #852). Reconnaissance studies of scarp morphology and mapping of faulted Quaternary deposits are the sources for fault data. No trench investigations have been conducted.

	Sections: This fault has 4 sections. Collins and Raney (1993 #852; 1994 #853) interpreted four fault sections on the basis of the fault's geometry, map pattern, and reconnaissance studies of offset data for the fault strands that compose the zone.
Name comments	**General:** Named by Collins and Raney (1993 #852) for fault's position along the west margin of Lobo Valley. Sections discussed herein include: Fay [918a], Neal [918b], Mayfield [918c], and Sierra Vieja [918d]. The entire fault zone has also been called the Mayfield fault by Muehlberger and others (1978 #854; 1985 #911) after its proximity to Mayfield Ranch however the West Lobo Valley name is more descriptive. Northern end of fault zone is about 10 km south of Van Horn; the zone extends south-southeastward along the eastern base of the Van Horn Mountains and Sierra Vieja to a point about 18 km southwest of Valentine. **Section:** Named the Mayfield fault by Twiss (1959 #861). Fault section extends from concave (to the east) part of Van Horn Mountains (about 8 km southwest of Lobo) southeastward to a point about 20 km northwest of Valentine. At its northern end, the Mayfield section is en echelon to the Neal section [918b]. At the southern end of the Mayfield section, the boundary with the Sierra Vieja section [918d] is a bedrock salient.
County(s) and State(s)	CULBERSON COUNTY, TEXAS JEFF DAVIS COUNTY, TEXAS
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Location based on 1:250,000-scale map compiled from reconnaissance and field mapping using 1:24,000-scale aerial photographs and topographic maps (Collins and Raney, 1993 #852). This fault has also been mapped by Twiss (1959 #861), Belcher and others (1977 #875), Muehlberger and others (1978 #854), Henry and others (1985 #866), and Machette and Personius (unpublished notes made available to Collins).
Geologic setting	Down-to-the-east range bounding fault zone that separates the Van Horn Mountains and Sierra Vieja (on the west) from Lobo Valley (basin). Collins and Raney (1993 #852; 1994 #853) determined that the throw is greater than 11 m on middle Pleistocene deposits along the southernmost section (Sierra Vieja

	[918d]) of the fault zone.
Length (km)	This section is 20 km of a total fault length of 60 km.
Average strike	N46°W (for section) versus N19°W (for whole fault)
Sense of movement	Normal *Comments:* At one locality, striations preserved in bedrock along the fault surface are parallel to the fault's dip. This observation, coupled with dip and basin topography, suggests that the sense of movement has been normal (Collins and Raney, 1993 #852).
Dip	70°–80° NE *Comments:* Striations preserved on bedrock along the fault plane are parallel to the fault's dip, implying pure dip-slip movement (Collins and Raney, 1993 #852).
Paleoseismology studies	
Geomorphic expression	Most of the fault''s trace is expressed as a relatively continuous single-slope-angle scarp with maximum angles between 18° and 23° and heights between 4 and 7 m. Bedrock is shallow and locally at the surface on the upthrown fault block.
Age of faulted surficial deposits	Quaternary. Middle Pleistocene deposits are offset vertically as much as 6 m (Collins and Raney, 1993 #852). Relationships between post middle Pleistocene deposits and the fault have not been determined.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The approximate age of the youngest known faulted deposits was estimated from calcic soil development (Collins and Raney, 1993 #852). Middle Pleistocene deposits having a stage IV calcic soil are offset, whereas some young (Holocene) terraces are unfaulted. The amount of offset of middle Pleistocene deposits (6 m) suggests several middle Pleistocene or younger paleoevents. More work is needed to determine if upper Pleistocene and Holocene deposits are faulted. Machette and Personius (unpublished notes made available to Collins) reported that the

	most recent surface ruptures occurred in the late Pleistocene to possibly early Holocene on the basis of their morphometric analyses.
Recurrence interval	50–100 k.y. (<500 ka) *Comments:* Not studied in detail. Collins and Raney (1993 #852) estimated that the average recurrence interval for large surface ruptures since middle Pleistocene may be as great as 50–100 k.y. Their recurrence interval is based on (a) their estimate of the number of large-displacement (1- to 2-m) surface ruptures since middle Pleistocene time, (b) the assumption that faulted middle Pleistocene deposits are approximately 250–500 ka, and (c) approximately 7.5 m of measured (cumulative) throw on middle Pleistocene deposits, which are cut by two closely spaced, subparallel strands of the fault.
Slip-rate category	Less than 0.2 mm/yr *Comments:* Average slip rate since middle Pleistocene is approximately less than or equal to 0.05 mm/yr (Collins and Raney, 1993 #852) based 7.5 m of throw on middle Pleistocene deposits. Youngest middle Pleistocene time (130 ka) was used to estimate average slip rate. If one uses 250–500 ka for the age of the deposits, the average slip rate could be slower.
Date and Compiler(s)	1993 E.W. Collins, Bureau of Economic Geology, The University of Texas at Austin
References	#875 Belcher, R.C., Goetz, L.K., and Muehlberger, W.R., 1977, Map B—Fault scarps within Quaternary units in West Texas, *in* Goetz, L.K., ed., Quaternary faulting in Salt Basin graben, West Texas: The University of Texas at Austin, unpublished M.S. thesis, 1 pl., scale 1:500,000. #852 Collins, E.W., and Raney, J.A., 1993, Late Cenozoic faults of the region surrounding the Eagle Flat study area, northwestern trans-Pecos Texas: Technical report to Texas Low-Level Radioactive Waste Disposal Authority, under Contract IAC(92-93)-0910, 74 p. #853 Collins, E.W., and Raney, J.A., 1994, Impact of late Cenozoic extension on Laramide overthrust belt and Diablo Platform margins, northwestern trans-Pecos Texas, *in* Ahlen, J., Peterson, J., and Bowsher, A.L., eds., Geologic activities in the

	90s: New Mexico Bureau of Mines and Mineral Resources Bulletin 150, p. 71-81. #866 Henry, C.D., Gluck, J.K., and Bockoven, N.T., 1985, Tectonic map of the Basin and Range province of Texas and adjacent Mexico: The University of Texas at Austin, [Texas] Bureau of Economic Geology Miscellaneous Map 36, 1 sheet, scale 1:500,000. #854 Muehlberger, W.R., Belcher, R.C., and Goetz, L.K., 1978, Quaternary faulting in trans-Pecos Texas: Geology, v. 6, p. 337-340. #911 Muehlberger, W.R., Beleher, R.C., and Goetz, L.K., 1985, Quaternary faulting in Trans-Pecos Texas, *in* Dickerson, P.W., and Muehlberger, W.R., eds., Structure and tectonics of Trans-Pecos Texas: West Texas Geological Society Publication 85-81, p. 21. #861 Twiss, P.C., 1959, Geology of Van Horn Mountains Texas: The University of Texas at Austin, [Texas] Bureau of Economic Geology Geologic quadrangle Map 23, 1 sheet, scale 1:48,000.