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Quaternary Fault and Fold Database of the United States

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West Lobo Valley fault zone, Neal section (Class A) No. 918b

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 918b, West Lobo Valley fault zone, Neal 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 03:12 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and others (1977 #875), Muehlberger and others (1978 #854), Henry and others (1985 #866), Machette and Personius (unpublished field notes made available to Collins), and Collins and Raney (1993 #852).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 Neal fault by Twiss (1959 #861). Section extends from the Southern Pacific Railroad crossing at U.S. Highway 90 southwestward to the concave-to-the-east bend in the Van Horn Mountains. The Neal section is en echelon to the Fay [918a] and Mayfield [918c] sections.
County(s) and State(s)	CULBERSON 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 results of aerial photograph 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 data 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 18 km of a total fault length of 60 km.
Average strike	N11°E (for section) versus N19°W (for whole fault)
Sense of movement	Normal *Comments:* Not studied in detail; sense of movement inferred from topography.
Dip Direction	E; SE *Comments:* Probably high angle as determined from analogy with other Quaternary faults in area.
Paleoseismology studies	
Geomorphic expression	North part of fault section consists of several short en echelon scarps having heights of about 2.2 m and maximum scarp-slope angles as steep as 8°. The main continuous fault at the base of the Van Horn Mountains has a very distinct scarp with maximum slope angles ranging between 14° and 22° and heights ranging between 1.6 and 4.8 m. On the upthrown block, bedrock is shallow and locally exposed at the surface (Collins and Raney, 1993 #852).
Age of faulted surficial deposits	Quaternary. Middle Pleistocene alluvium is offset at least 5 m vertically. Alluvium of possible upper Pleistocene to Holocene age is offset vertically at least 1 m (Collins and Raney, 1993 #852).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Approximate age of youngest known faulted deposits was estimated from calcic soil development (Collins and Raney, 1993 #852). Upper Pleistocene to Holocene (?) deposits, which have a stage II calcic soil, are vertically offset 1 m. Some young (Holocene) arroyo terraces are unfaulted, although more work is needed to determine fault cross-cutting relationships of older Holocene deposits.
Recurrence interval	60–125 k.y. (<500 ka)

	Comments: Collins and Raney (1993 #852) estimated that the average recurrence interval for large surface ruptures since middle Pleistocene may be as great as 60–125 k.y. This 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 5 m of measured throw on middle Pleistocene deposits.
Slip-rate category	Less than 0.2 mm/yr *Comments:* Average vertical-displacement rate since middle Pleistocene time is low based on 5 m of throw on middle Pleistocene (130–500 ka) deposits (Collins and Raney, 1993 #852).
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.