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Quaternary Fault and Fold Database of the United States

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Buffalo Creek fault zone (Class A) No. 1192

Last Review Date: 2000-09-26

citation for this record: **Lidke, D.J., compiler, 2000, Fault number 1192, Buffalo Creek 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 02:17 PM.**

Synopsis	This north-striking fault zone is characterized mostly by a series of left-stepping, range-front faults that juxtapose bedrock of the Desatoya Mountains against Quaternary piedmont-slope deposits of the valley of Buffalo Creek and west margin of the Desatoya Mountains. West-facing scarps are locally present and formed directly west of the range front faults. Most of the fault zone is a series of major, down-to-the-west, range front faults. The west-facing direction of the associated scarps also implies principally down-to-the-west offset along the fault zone. There is evidence for at least one Quaternary faulting event that is probably no older than late Pleistocene, and perhaps as young as Holocene. The fault zone has not been studied in detail and little is actually known with certainty about its nature, character, and movement history. The principal sources of data consist of geologic mapping, reconnaissance photogeologic mapping, and reconnaissance geomorphic study of fault scarps and basal fault

	facets.
Name comments	Refers to north-striking fault zone mapped by Barrows (1971 #4361) and Dohrenwend and others (1992 #283) along the southwestern flank of the Desatoya Mountains. Barrows (1971 #4361) mapped and referred to this fault as the Buffalo Creek fault. dePolo (1998 #2845) later portrayed and referred to this fault as the central part, of three parts, of the Eastern Edwards Creek Valley fault system. The north and south parts of the Eastern Edwards Creek Valley fault system are described as faults 1991 and 1189, respectively. The name used here, Buffalo Creek fault zone, is a slight modification of Barrow's (1971 #4361) usage. The fault zone extends from about Edwards Creek Valley south along the southwestern flank of the Desatoya Mountains to about Road Canyon. **Fault ID:** Refers to fault that dePolo (1998 #2845) portrayed and labeled MI4B, the middle part of his "Eastern Edwards Creek Valley fault system."
County(s) and State(s)	CHURCHILL COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Location is from 1:250,000-scale map of Dohrenwend and others (1992 #283) that shows mapping based on photogeologic analysis of 1:58,000-nominal-scale, color-infrared photography that was transferred directly to 1:100,000-scale topographic maps enlarged to the scale of the photographs. The 1:100,000-scale fault maps were reduced and compiled at 1:250,000-scale for final publication.
Geologic setting	The Buffalo Creek fault zone forms the southwestern flank of the Desatoya Mountains, an eastward-tilted structural block that consists of Tertiary volcanic rock and late Tertiary to Cretaceous plutonic rock (Barrows, 1971 #4361; Willden and Speed, 1974 #3645). This north-striking zone of faults is partly marked by a series of left-stepping range front faults that show down-to-the-west offset of Tertiary bedrock of the Desatoya Mountains against Quaternary piedmont slope deposits of the Edwards Creek Valley

	(Dohrenwend and others, 1992 #283). Although most of the scarps along and west of the range front faults are west-facing, a few east-facing scarps on piedmont-slope deposits west of the range-front faults may reflect local antithetic faults and graben features (Dohrenwend and others, 1992 #283). Barrows (1971 #4361) discussed evidence for middle Miocene ancestry and activity along the fault zone that is based on the apparent discontinuity of Miocene lacustrine sediment across the fault zone. Stratigraphic relations across the range front faults as well as the predominant west-facing direction of the scarps imply mostly down-to-the-west; offset along the fault zone that probably reflects some continued Quaternary uplift of the Desatoya Mountains relative to the adjacent valley of Buffalo Creek. The fault zone has not been studied in detail and other insights and estimates that concern Quaternary offset amounts and slip rates have not been reported.
Length (km)	27 km.
Average strike	N10°E
Sense of movement	Normal *Comments:* Not specifically reported; however, the down-to-west range front faults and the predominantly westerly facing direction of scarps suggest mostly down-to-the-west offsets, which in this extensional regime probably reflects principally normal dip-slip movement along westerly dipping faults.
Dip Direction	W *Comments:* Not reported; probably steep, based on dip measurements of other Quaternary faults in localities nearby and elsewhere in the Basin and Range Province.
Paleoseismology studies	
Geomorphic expression	Fault zone is expressed by a series of down-to-the-west, range front faults along the southwestern flank of the Desatoya Mountains and some scarps on piedmont-slope deposits of the Edwards Creek Valley. A few east-facing scarps, which includes a scarp and an associated down-to-the-east fault along the western flank of Eastgate Hills, are locally present and may define antithetic faults and grabens along the fault zone. dePolo (1998

	#2845) reported a maximum preferred basal facet height of 195 m (171–219 m).
Age of faulted surficial deposits	Based on reconnaissance photogeologic mapping, Dohrenwend and others (1992 #283) assigned ages as young as late Pleistocene to faulted Quaternary deposits along the fault zone. At one locality assigned, with indicated uncertainty, faulted deposits of late Pleistocene to Holocene age.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The timing of the most recent prehistoric faulting event is not tightly constrained. Reconnaissance photogeologic mapping by Dohrenwend and others (1992 #283) indicates that the most recent prehistoric faulting event is probably no older than late Pleistocene (<130 ka), and it might be as young as late Pleistocene to Holocene (<30 ka).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.361 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term average. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is of a lesser magnitude. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	2000 David J. Lidke, U.S. Geological Survey
References	#4361 Barrows, K.J., 1971, Geology of the southern Desatoya Mountains, Churchill and Lander Counties, Nevada: Los Angeles, University of California, unpublished Ph.D. dissertation, 348 p., 1 pl., scale 1:24,000.

	#2845 dePolo, C.M., 1998, A reconnaissance technique for estimating the slip rate of normal-slip faults in the Great Basin, and application to faults in Nevada, U.S.A.: Reno, University of Nevada, unpublished Ph.D. dissertation, 199 p. #283 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Millett 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2176, 1 sheet, scale 1:250,000. #3645 Willden, R., and Speed, R.C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, 95 p.