Jump to Navigation

Quaternary Fault and Fold Database of the United States

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Northern Butte Valley fault (Class A) No. 1711

Last Review Date: 2000-06-28

citation for this record: **Rowley, P.C., and Anderson, R.E., compilers, 2000, Fault number 1711, Northern Butte Valley 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 02:26 PM.**

Synopsis	The northern Butte Valley fault is a north-northeast -striking down-to-the-west normal fault that is both a mid-valley fault in the basin beneath Butte Valley and a block-bounding fault zone defining the northwestern end of the Cherry Creek Range. Limited scarp morphology data suggests the most recent faulting occurred in the late Pleistocene. No other detailed studies have been conducted.
Name comments	Mapped and named the Butte Valley fault by Barnhard (1985 #428). Mapped by Schell (1981 #2843) as an unnamed, north-northeast-striking Pleistocene fault zone about 12 km long and including two adjacent parallel faults of indeterminate age. The fault passes along the western front of the northernmost Cherry Creek Range and extends southwest into the northernmost part of Butte Valley at The Narrows. Dohrenwend and others (1991 #286) noted additional scarps and extended the overall fault zone

	another 8 km to the north. **Fault ID:** Referred to as fault EK12 by dePolo (1998 #2845)
County(s) and State(s)	ELKO COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Mapped at 1:250,000 scale by Schell (1981 #2843), Barnhard (1985 #428), and Dohrenwend and others (1991 #286). The fault locations of Dohrenwend and others (1991 #286) are followed here. They were produced by analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic quadrangle maps enlarged to the scale of the photographs.
Geologic setting	The fault bounds the northernmost part of the Cherry Creek Range on the west and the basin beneath northernmost Butte Valley on the east. It is apparently a down-to-the-west normal fault. At its north end, it is expressed as two subparallel, north-striking faults. Butte Valley is narrow and the basin beneath it probably shallow, and apparently the fault is a lesser structure than that of a major range front fault (Dohrenwend and others, 1991 #286). At its south end, the fault splays and extends out into Butte Valley where it extends across the north end of the Taylor Peak fault [1707]. Dohrenwend and others (1991 #286) mapped the Northern Butte Valley fault partly as juxtaposing alluvium against bedrock and partly as forming scarps on Quaternary surficial deposits and/or erosion surfaces. The northern end is defined by a block-bounding fault that faces west and defines the north-northwest end of the Cherry Creek Range, which here bends from north-northwest to north-northeast. The Cherry Creek Range is a complexly faulted horst block of predominantly Paleozoic rock, and the main bounding fault (Steptoe Valley fault system [1272]) is on the eastern side of the range. The Butte Valley fault might be considered the north northeast continuation of the Medicine Range fault zone [1706].
Length (km)	17 km.
Average strike	N14°E

Sense of movement	Normal
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	Alluvial scarps along the fault face west-northwest as does the bedrock scarp of the northernmost Cherry Creek Range. The bedrock scarp is well defined in its central part and degrades toward the north and south. Near its north end, the main bedrock escarpment appears to step eastward and the fault is mapped as two subparallel north-striking faults (Dohrenwend, 1991 #286). Along its central part, there are no clearly defined aligned facets or basal facets. Instead, the bedrock escarpment is intricately incised and irregular. Barnhard (1985 #428) measured heights of as much as 5 m and scarp-slope angles of as much as 10? from alluvial scarps. He found no geomorphic evidence for Holocene movement and no field evidence for recurrent faulting. dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 171 m (134-195 m).
Age of faulted surficial deposits	Barnhard (1985 #428) noted that the scarps are formed on Quaternary alluvial and colluvial deposits and preserved only on stable (older) alluvial-fan surfaces. On the basis of photogeologic reconnaissance, Dohrenwend and others (1991 #286) interpreted the surficial deposits or erosion surfaces on which scarps are formed to be as young as late Pleistocene.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Presumably on the basis of similarity in location and age of deposits with the Medicine Range fault zone [1706], Schell (1981 #2843) interpreted the Northern Butte Valley fault as Pleistocene. On the basis of the morphology of nine scarp profiles, Barnhard (1985 #428) considered the scarps to be late Pleistocene (<130 ka). On the basis of photogeologic reconnaissance, Dohrenwend and others (1991 #286) considered the scarps to be formed on surficial deposits or erosion surfaces of late Pleistocene age.
Recurrence	

interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.312 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. In general, 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. However, 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 Peter C. Rowley, U.S. Geological Survey, Retired R. Ernest Anderson, U.S. Geological Survey, Emeritus
References	#428 Barnhard, T.P., 1985, Map of fault scarps formed in unconsolidated sediments, Elko 1° x 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1791, 1 sheet, scale 1:250,000. #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. #286 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Elko 1° by 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2179, 1 sheet, scale 1:250,000. #2843 Schell, B.A., 1981, Faults and lineaments in the MX Sitting Region, Nevada and Utah, Volume I: Technical report to U.S. Department of [Defense] the Air Force, Norton Air Force Base, California, under Contract FO4704-80-C-0006, November 6, 1981, 77 p.

Questions or comments?