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.

Pilot Range faults (Class A) No. 1599

Last Review Date: 1998-09-30

citation for this record: **Oswald, J.A., Sawyer, T.L., Rowley, P.C., Black, B.D., and Hecker, S., compilers, 1998, Fault number 1599, Pilot Range faults, 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 02:36 PM.**

Synopsis	This poorly understood, discontinuous zone of normal faults bounds the western front of the Pilot Range. The northern and southern parts of the fault are separated by a 10-km-long gap, over which the fault makes a 5-km-wide right step. The northern part of the fault bounds the west front of the northern Pilot Range and forms fault scarps on early to middle Pleistocene alluvium and has range-front faults that juxtapose Quaternary alluvium against bedrock. The southern part extends from west of Pilot Peak south to the southern end of the range, and is expressed as a range-front fault juxtaposing Quaternary alluvium against bedrock.
Name comments	Refers to faults mapped by Slemmons (1964, unpublished Wells 1? X 2? sheet), Dohrenwend and others (1991 #290), and Miller and others (1982 #2869). Originally named the Pilot Range fault

	by Hecker (1993 #642); subsequently named the Pilot Creek Valley fault zone by dePolo (1998 #2845). We elect to use the earliest established name herein because the more recent name was used earlier for the fault on the west side of Pilot Creek Valley. This fault extends from Crystal Cave in the northern Pilot Range southward along the western range front to the southern end of the range nearly 5 km south of 41? N latitude (Dohrenwend and others (1991 #286). **Fault ID:** Referred to as fault number WE17 (Pilot Creek Valley fault zone) by dePolo (1998 #2845) and part of fault number 6-11 (Pilot Range faults) by Hecker (1993 #642).
County(s) and State(s)	ELKO COUNTY, NEVADA BOX ELDER COUNTY, UTAH
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Location based on 1:24,000-scale preliminary geologic mapping of Miller and others (1982, 1990) and Miller and Lush (1991), and 1:250,000-scale mapping of Dohrenwend and others (1991); small-scale mapping by photogeologic analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic quadrangle maps enlarged to scale of the photographs. Location based on 1:24,000-scale preliminary geologic map of Miller and others (1982 #2869; 1990 #4474), Miller and Lush (1991 #4473), and 1:250,000-scale map of Dohrenwend and others (1991 #290).
Geologic setting	Discontinuous, down-to-the-west, right-stepping, normal fault bounding the western front of the Pilot Range against the basin beneath Pilot Creek Valley. The Pilot Range bounds the western edge of the Great Salt Lake Desert in northwestern Utah. The northern and southern parts of the fault are separated by a 10 km gap, over which the fault makes a 5-km-wide right step.
Length (km)	40 km.
Average strike	N2°W
Sense of movement	Normal

	Comments: (Miller and others, 1982 #2869; dePolo, 1998 #2845)
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	The northern part of the fault is expressed by rounded and barely recognizable scarps on early to middle Pleistocene piedmont-slope deposits adjacent to the range front between Hogans Alley north to Regulator Canyon, and by Quaternary alluvium juxtaposes against bedrock along the range-front fault (Miller and others, 1982 #2869; 1990 #4474; Dohrenwend and others, 1991 #290). North of the scarps, aligned springs and topographic lineaments suggest a probable buried Quaternary(?) fault that may form the western margin of elevated Tertiary and Quaternary deposits. Well-rounded scarps on Pleistocene older alluvium and abundant fault-aligned springs extend from west of Parson Springs to the southern end of the section (Miller and others, 1982 #2869). The southern part of the fault juxtaposes Quaternary alluvium against bedrock (Miller and others, 1982 #2869; Dohrenwend and others, 1991 #290).
Age of faulted surficial deposits	Early to middle Pleistocene. Faults displace alluvium interpreted from photogeologic mapping to be early to middle Pleistocene in age (Dohrenwend and others, 1991 #290). Faults adjacent to and south of Parson Springs displace Pleistocene alluvium and alluvial-fan deposits (Miller and others, 1982 #2869; 1990 #4474; Miller and Lush, 1991 #4473).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Timing of the most recent event is not well constrained; Dohrenwend and others (1991 #290; 1996 #2846) suggested a Quaternary age based on reconnaissance photogeologic studies. A southern fault trace displaces alluvium of probable Holocene age forming 2- to 3-m-high scarps (Miller and Lush, 1991).
Recurrence interval	
Slip-rate	Less than 0.2 mm/yr

category	*Comments:* No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.01 mm/yr for the fault based on the presence of scarps on alluvium and the absence of basal facets. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) support a low slip rate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	1998 John A. Oswald, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc. Peter C. Rowley, U.S. Geological Survey, Retired Bill D. Black, Utah Geological Survey Suzanne Hecker, U.S. Geological Survey
References	#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. #290 Dohrenwend, J.C., McKittrick, M.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Wells 1° by 2° quadrangle, Nevada, Utah, and Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-2184, 1 sheet, scale 1:250,000. #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. #2846 Dohrenwend, J.C., Schell, B.A., Menges, C.M., Moring, B.C., and McKittrick, M.A., 1996, Reconnaissance photogeologic map of young (Quaternary and late Tertiary) faults in Nevada, *in* Singer, D.A., ed., Analysis of Nevada's metal-bearing mineral resources: Nevada Bureau of Mines and Geology Open-File Report 96-2, 1 pl., scale 1:1,000,000. #642 Hecker, S., 1993, Quaternary tectonics of Utah with emphasis on earthquake-hazard characterization: Utah Geological Survey Bulletin 127, 157 p., 6 pls., scale 1:500,000.

	#4473 Miller, D.M., and Lush, A.P., 1991, Geologic map of the Pilot Peak quadrangle, Box Elder County, Utah, and Elko County, Nevada: Utah Geological and Mineral Survey Open-File Report 208, 9 p., 1 pl., scale 1:24,000. #2869 Miller, D.M., Lush, A.P., and Schneyer, J.D., 1982, Preliminary geologic map of Patterson Pass and Crater Island NW quadrangles, Box Elder County, Utah, and Elko County, Nevada: U.S. Geological Survey Open-File Report 82-834, 2, scale 1:24,000. #4474 Miller, D.M., Lush, A.P., and Schneyer, J.D., 1990, Geologic map of the Patterson Pass quadrangle, Box Elder County, Utah, and Elko County, Nevada: Utah Geological and Mineral Survey Open-File Report 172, 56 p., 1 pl., scale 1:24,000.