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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.

Kawich-Hot Creek Ranges fault zone (Class A) No. 1355

Last Review Date: 1998-06-30

citation for this record: **Sawyer, T.L., and Anderson, R.E., compilers, 1998, Fault number 1355, Kawich-Hot Creek Ranges 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 02:05 PM.**

Synopsis	This long zone of down-to-the-east normal faults bounds east front of the north-trending Kawich Range and east front of the north-northeast-trending Hot Creek Range. This fault overlaps and appears to connect with the southern part of an unnamed fault zone [1356]. Reconnaissance photogeologic mapping of tectonic geomorphic features, bedrock mapping, and limited analysis of scarp morphology are the sources of data.
Name comments	Refers to faults mapped by Ekren and others (1973 #2936), Schell (1981 #2844), John (1987 #2935), and by Dohrenwend (1992 #289; 1996 #2846). Schell (1981 #2844) named the northern part of the fault zone the Hart Hills fault and the southern part the Hot Creek-Reveille fault, which is the name adopted by Piety (1995 #915). dePolo (1998 #2845) named the entire fault zone the

	Kawich-Hot Creek Ranges fault system, which is retained herein. The fault zone extends from the southern end of the Kawich Range along the front of that range and of the Hot Creek Range and continues into northern Hot Creek Valley north of Moores Station. **Fault ID:** Refers to faults 48 and 50 on Plates A7 and A8 in Schell (1981 #2844), fault HCR of Piety (1995 #915), and fault T16A and T16B of dePolo (1998 #2845).
County(s) and State(s)	NYE COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Location based on 1:250,000-scale maps of Schell (1981 #2844), 1:250,000-scale map of Dohrenwend and others (1992 #289), and unpublished map of the Tonopah 1:250,000-scale map by Dohrenwend published at 1:100,000-scale by Dohrenwend and others (1996 #2846). Mapping by Schell (1981 #2843; 1981 #2844) based on photogeologic analysis of primarily 1:24,000-scale color aerial photography supplemented with 1:60,000-scale black-and-white aerial photography, transferred by inspection to 1:62,500-scale topographic maps and photographically reduced and directly transferred to 1:250,000-scale topographic maps, and subsequent field verification. Mapping by Dohrenwend and others (1996 #2846) based on 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.
Geologic setting	This long zone of down-to-the-east range-bounding normal faults separates the Hot Creek Range from Hot Creek Valley and the Kawich Range from Reveille Valley. It defines a major element of north-trending structure and physiography in this region of the Basin and Range. Cornwall (1972 #1482) indicates that the stratigraphic throw across this fault is nearly 460 m.
Length (km)	110 km.
Average strike	N6°E

Sense of movement	Normal *Comments:* A normal sense of movement has been reported (Ekren and others, 1973 #2936; Schell, 1981 #2844; John, 1987 #2935); however the linearity and orientation of northeast-striking part of the fault and the distributed horsetail-splay pattern may suggest a possible lateral component of motion.
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	This major range front fault is primarily expressed by juxtaposed Quaternary alluvium against bedrock and eroded but extensive scarps on Quaternary deposits, and scarps and (or) lineaments on Tertiary rocks (Schell, 1981 #2844; Reheis, 1992 #1604; Dohrenwend, 1996 #2846). Kleinhampl and Ziony (1985 #2851, pg. 25 and Figure A17) reported that the en echelon arrangement of subparallel scarps between Empire Canyon and Old Dominion Canyon appeared to have developed during settlement or compaction of basin-fill sediment during movement on a concealed master fault in underlying bedrock. Schell (1981 #2844) reported a maximum scarp height of 134 m, apparently on late Tertiary or Quaternary deposits, and a maximum slope angle of 27°. The location(s) and the nature of materials underlying the scarp(s) were not specified; the location(s) is likely north of Rawhide Mountain where the fault is prominently expressed. dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 256 m (226–280 m).
Age of faulted surficial deposits	Late Pleistocene (Schell, 1981 #2844; Dohrenwend and others, 1996 #2846), early to middle Pleistocene (Dohrenwend and others, 1996 #2846), and Quaternary alluvium (based on mapping by Ekren and others, 1973 #2936; and age assignment of Kleinhampl and Ziony, 1985 #2851; John, 1987 #2935).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The timing of most recent event is not well constrained, and the two published sources do not concur. Schell (1981 #2844) suggested a Holocene time based on scarp morphology. Dohrenwend and others (1996 #2846) suggested a

	late Pleistocene time based on a reconnaissance photogeologic study. We assign herein the most conservative age as suggested by reconnaissance photogeologic mapping of Dohrenwend and others (1996 #2846).
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.525 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. Even though, the late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) indicate young movement. There exists no data to indicate recurrent movement in the latest Quaternary. In fact, Schell (1981 #2844) indicates that deposits younger than 15 ka are not faulted. Nevertheless, the 0.2–1.0 mm/yr slip-rate category has been assigned to this fault, due to the high slip rate assigned by dePolo (1998 #2845).
Date and Compiler(s)	1998 Thomas L. Sawyer, Piedmont Geosciences, Inc. R. Ernest Anderson, U.S. Geological Survey, Emeritus
References	#1482 Cornwall, H.R., 1972, Geology and mineral deposits of southern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 77, 49 p., 1 pl., 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. #289 Dohrenwend, J.C., Schell, B.A., McKittrick, M.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Goldfield 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2183, 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.

#2936 Ekren, E.B., Hinrichs, E.N., Quinlivan, W.D., and Hoover, D.L., 1973, Geologic map of the Moores Station quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-756, scale 1:48,000.

#2935 John, D.A., 1987, Geologic map of parts of the Morey and Fandango Wilderness study areas, Nye County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1847, scale 1:62,500.

#2851 Kleinhampl, F.J., and Ziony, J.I., 1985, Geology of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99A, 172 p.

#915 Piety, L.A., 1995, Compilation of known and suspected Quaternary faults within 100 km of Yucca Mountain, Nevada and California: U.S. Geological Survey Open-File Report 94-112, 404 p., 2 pls., scale 1:250,000.

#1604 Reheis, M.C., 1992, Aerial photographic interpretation of lineaments and faults in late Cenozoic deposits in the Cactus Flat and Pahute Mesa 1:100,000 quadrangles and the western parts of the Timpahute Range, Pahranagat Range, Indian Springs, and Las Vegas 1:100,000 quadrangles, Nevada: U.S. Geological Survey Open-File Report 92-193, 14 p., 3 pls., scale 1:100,000.

#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.

#2844 Schell, B.A., 1981, Faults and lineaments in the MX Siting Region, Nevada and Utah, Volume II: 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, 29 p., 11 pls., scale 1:250,000.

Questions or comments?