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.

Hot Springs fault zone (Class A) No. 1312

Last Review Date: 1999-03-24

citation for this record: **Adams, K., and Sawyer, T.L., compilers, 1999, Fault number 1312, Hot Springs 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 02:15 PM.**

Synopsis	This moderately short nearly continuous zone has range-front faults bounding entire west front of the Monte Cristo Mountains and east front of Black Hills, and has piedmont and intrabasin faults in Gabbs Valley west of the Black Hills and of Fissure Ridge and on piedmont slope of the northern Monte Cristo Mountains; the 1954 Fairview Peak earthquake reportedly ruptured most of the short faults north of the border between Mineral and Nye counties. Some of the faults are expressed as northeast- and southwest-facing scarps on upper Quaternary alluvial and Holocene basin-fill deposits at Black Hills and to the west, and along the southern Monte Cristo Mountains. The fault bounding the east front of the Black Hills exhibits right-oblique-normal displacement of a Mesozoic granodiorite pluton. Reconnaissance photogeologic mapping and bedrock mapping of the faults are the sources of data. Trench investigations and detailed studies of scarp morphology have not been completed.

Name comments	Refers to a group of faults mapped by Slemmons (1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map), Dohrenwend (1982 #2481; 1982 #2870), Stewart and others (1982 #2873), Ekren and Byers (1984 #2902; 1986 #2906; 1986 #2907), and Bell (1984 #105) along west side of the Monte Cristo Mountains, in Gabbs Valleys, and along both sides of the Black Hills; dePolo (1998 #2845) referred to it as the Hot Springs fault zone. **Fault ID:** Refers to WL31 (Hot Springs fault zone) of dePolo (1998 #2845).
County(s) and State(s)	NYE COUNTY, NEVADA MINERAL COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Locations chiefly based on 1:250,000-scale maps by Dohrenwend (1982 #2481; 1982 #2870) from photogeologic analysis of 1:58,000-nominal-scale color-infrared photography and from mapping by Ekren and Byers (1986 #2906; 1986 #2907). Some faults on floor of Gabbs Valley are based on unpublished 1:250,000-scale Quaternary fault map of Slemmons (1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map); mapping from analysis of 1:60,000-scale AMS photography transferred to mylar overlay on a 1:250,000-scale topographic map using proportional dividers.
Geologic setting	This moderately short nearly continuous zone has range-front faults bounding entire west front of the Monte Cristo Mountains and east front of Black Hills, and has piedmont and intrabasin faults in Gabbs Valley west of the Black Hills and of Fissure Ridge and on piedmont slope of the northern Monte Cristo Mountains (Slemmons, 1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map; Dohrenwend, 1982 #2481; 1982 #2870; Stewart and others, 1982 #2873; Bell, 1984 #105; Ekren and Byers, 1984 #2902; 1986 #2906; 1986 #2907); the 1954 Fairview Peak earthquake reportedly ruptured most of the short faults north of the Mineral

	and Nye county line (Bell, 1984 #105). The fault bounding the east side of the Black Hills exhibits right-oblique-normal displacement of a Mesozoic granodiorite pluton (Ekren and Byers, 1986 #2907).
Length (km)	25 km.
Average strike	N26°E
Sense of movement	Normal *Comments:* Not studied in detail; normal sense of movement from Dohrenwend (1982 #2481) and Ekren and Byers (1986 #2906; 1986 #2907), and right-oblique-normal displacement from Ekren and Byers (1986 #2907) based on offset of a Mesozoic granodiorite pluton.
Dip Direction	W; NW; SE
Paleoseismology studies	
Geomorphic expression	Some faults are expressed as northeast- and southwest-facing scarps on upper Quaternary alluvial and Holocene basin-fill deposits at Black Hills, west of the hills, and along the southern Monte Cristo Mountains (Slemmons, 1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map; Dohrenwend, 1982 #2481). Faults on the floor of Gabbs Valley may be associated with northwest- and southeast-facing scarps (Ekren and Byers, 1986 #2906). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 73 m (61–85 m).
Age of faulted surficial deposits	Holocene; upper Pleistocene. Faults have been mapped in upper Quaternary alluvium along the west side of the Monte Cristo Mountains (Dohrenwend, 1982 #2481), in Holocene basin-fill deposits on the floor of Gabbs Valley, and juxtaposing Quaternary-Tertiary alluvium against Quaternary alluvium and (or) juxtapose Quaternary alluvium against Paleozoic bedrock at the north end of Fissure Ridge and on the east side of the Black Hills, respectively (Ekren and Byers, 1986 #2907).
Historic earthquake	Fairview Peak earthquake 1954
Most recent prehistoric	latest Quaternary (<15 ka)

deformation	*Comments:* Although timing of most recent paleoevent is not well constrained on the fault in this zone, a latest Quaternary time is suspected based on faults on the floor of Gabbs Valley that offset Holocene basin-fill deposits (Dohrenwend, 1982 #2870).
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 displacement rate of 0.171 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 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 low. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	1999 Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc.
References	#105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 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. #2481 Dohrenwend, J.C., 1982, Map showing late Cenozoic faults in the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-D, 1 sheet, scale 1:250,000. #2870 Dohrenwend, J.C., 1982, Surficial geologic map of the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-C, 1 sheet, scale 1:250,000.

	#2902 Ekren, E.B., and Byers, F.M., Jr., 1984, The Gabbs Valley Range—A well exposed segment of the Walker Lane in west-central Nevada, *in* Lintz, J., Jr., ed., Western geological excursions: Geological Society of America, Annual Meeting, Reno, Nevada, Guidebook, v. 4, p. 203-215. #2906 Ekren, E.B., and Byers, F.M., Jr., 1986, Geologic map of the Murphys Well, Pilot Cone, Copper Mountain, and Poinsettia Spring quadrangles, Mineral County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1576, scale 1:48,000. #2907 Ekren, E.B., and Byers, F.M., Jr., 1986, Geologic map of the Mount Annie NE, Mount Annie, Ramsey Spring and Mount Annie SE quadrangles, Mineral and Nye Counties, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1579, scale 1:48,000. #2873 Stewart, J.H., Carlson, J.E., and Johannesen, D.C., 1982, Geologic map of the Walker Lake 1° by 2° quadrangle, California and Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-A, scale 1:250,000.