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Quaternary Fault and Fold Database of the United States

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Southwestern Warm Springs Valley fault (Class A) No. 1659

Last Review Date: 1999-03-25

citation for this record: **Adams, K., and Sawyer, T.L., compilers, 1999, Fault number 1659, Southwestern Warm Springs 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 02:35 PM.**

Synopsis	This distributed zone of predominately north- to northwest-striking faults consists of: (1) range-front faults bounding northwest side of the Pah Rah Range along southwest edge of Warm Springs Valley, southeast side of Dogskin Mountain, northeast side of Warm Springs Mountain, and east side of a small granitic hill north of Warm Springs Mountain; (2) short northwest- and northeast-striking intra basin and piedmont faults in southern Warm Springs Valley; and (3) a northwest-striking intermontane fault in the Pah Rah Range near Right Hand Canyon. Because of similar strike and close proximity, faults at the northern end of this group may be related to the Honey Lake [1639] and Warm Springs Valley fault zones [1605] to northwest and may be related to faults in an unnamed group of faults [1660] in the southern Pah Rah Range. Reconnaissance photogeologic mapping and regional geologic mapping are the sources of data.

	Trench investigations and detailed studies of scarp morphology have not been conducted.
Name comments	Refers to faults mapped by Slemmons (1968, unpublished Reno 1? X 2? sheet), Bonham (1969 #2999), Bell (1984 #105), Greene and others (1991 #3487), Nitchman (1991 #2552), and Nitchman and Ramelli (1991 #2551) in Warm Springs Valley on west side, on east side of southern part of the valley, and near south end of valley. dePolo (1998 #2845) referred to it as the Southwestern Warm Springs Valley fault. **Fault ID:** Refers in part to fault R8 (Southwestern Warm Springs Valley fault) of dePolo (1998 #2845).
County(s) and State(s)	WASHOE COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault locations are based primarily on 1:250,000-scale maps of Bell (1984 #105) and Slemmons (1968, unpublished Reno 1? X 2? sheet). Mapping by Bell (1984 #105) is from photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale aerial photography of selected areas, several low-altitude aerial reconnaissance flights, and field reconnaissance of major structural and stratigraphic relationships. Mapping by Slemmons (1968, unpublished Reno 1? X 2? sheet) is from analysis of 1:60,000-scale AMS photography transferred to mylar overlaid onto a 1:250,000-scale topographic map using proportional dividers. Additional faults located from 1:250,000-scale regional bedrock mapping of Bonham (1969 #2999) and 1:62,500-scale mapping of Nitchman (1991 #2552).
Geologic setting	This distributed zone of predominately north- to northwest-striking faults consists of: (1) range-fronts bounding the northwest side of the Pah Rah Range on the southwest side of Warm Springs Valley, the southeast side of Dogskin Mountain, the northeast side of Warm Springs Mountain, and the east side of a small granitic hill north of Warm Springs Mountain; (2) short northwest and northeast-striking intra basin and piedmont faults in southern

	Warm Springs Valley; and (3) a northwest-striking intermontane fault in the Pah Rah Range near Right Hand Canyon (Bonham, 1969 #2999; Bell, 1984 #105; Nitchman, 1991 #2552). Because of similar strike and close proximity, faults at northern end of this group may be related to the Honey Lake [1639] and Warm Springs Valley fault zones [1605] to northwest and may be related to faults in an unnamed group of faults [1660] in the southern Pah Rah Range.
Length (km)	28 km.
Average strike	N15°W
Sense of movement	Normal *Comments:* (Bonham, 1969 #2999; Nitchman, 1991 #2552)
Dip Direction	NE; SW; S
Paleoseismology studies	
Geomorphic expression	Range-front faults juxtapose Quaternary alluvium against Tertiary and older bedrock and are expressed as abrupt range-front escarpments (Bonham, 1969 #2999); northeast-facing scarps are present at the range front on the north side of Warm Springs Mountain (Slemmons, 1968, unpublished Reno 1? X 2? sheet, Nitchman, 1991 #2552). The intra basin and piedmont faults in southern Warm Springs Valley are expressed as south-, west-, and east-facing scarps on Quaternary alluvium and Tertiary sedimentary rocks (Slemmons, 1968, unpublished Reno 1? X 2? sheet, Bonham, 1969 #2999; Nitchman, 1991 #2552). These faults are also expressed as a northwest-trending narrow graben and adjacent horst located a few kilometers southeast of Curnow Canyon along the Pah Rah range front (Slemmons, 1968, unpublished Reno 1? X 2? sheet, Nitchman, 1991 #2552). The intermontane fault at Right Hand Canyon is expressed by a minor northeast-facing topographic escarpment and northwest-trending linear drainage, and bounds a small basin filled with Quaternary alluvium (Bonham, 1969 #2999), suggesting young movement.
Age of faulted surficial deposits	latest Quaternary; Quaternary; Tertiary. Faults in this zone displace Quaternary alluvium and juxtapose it against Tertiary volcanic rocks (Slemmons, 1968, unpublished Reno 1? X 2? sheet, Bonham, 1969 #2999). Mapping by Slemmons (1968,

	unpublished Reno 1? X 2? sheet) suggest latest Quaternary deposits are faulted, which is possible considering the geomorphic position of Quaternary lake deposits faulted along west side of Warm Springs Valley that Bonham (1969 #2999) mapped; i.e. they occur below the highstand of pluvial Lake Lahontan (at ~13 ka, Adams, 1997 #3003).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* The timing of the most recent event is not well constrained. Scarps mapped by Slemmons (1968, unpublished Reno 1:250,000-scale map) indicate possible young movement based on their location with respect to the position of the highstand of pluvial Lake Lahontan (at ~13 ka, Adams, 1997 #3003). Dohrenwend and others (1996 #2846) do not map those scarps, and only show short , possibly quaternary fault in this area. The assigned age category is based on the sole published source.
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 0.01 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)	1999 Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc.
References	#3003 Adams, K.D., 1997, Late Quaternary pluvial history, isostatic rebound, and active faulting in the Lake Lahontan basin, Nevada and California: Reno, University of Nevada, unpublished Ph.D. dissertation, 169 p. #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.

#2999 Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 70, 140 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.

#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.

#3487 Greene, R.C., Stewart, J.H., John, D.A., Hardyman, R.F., Silberling, N.J., and Sorensen, M.L., 1991, Geologic map of the Reno 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2154-A, scale 1:250,000.

#2552 Nitchman, S.P., 1991, Warm Springs fault zone: Nevada Bureau of Mines and Geology Fault Evaluation Report , 3 p., scale 1:62,500.

#2551 Nitchman, S.P., and Ramelli, A.R., 1991, Freds Mountain fault: Nevada Bureau of Mines and Geology Evaluation Report, 7 p., 2 scarp profiles, scale 1:62,500.