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Quaternary Fault and Fold Database of the United States

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Southern Snake Range fault zone (Class A) No. 1433

Last Review Date: 2003-06-28

citation for this record: **Sawyer, T.L., Redsteer, M.H., and Haller, K.M., compilers, 2003, Fault number 1433, Southern Snake Range 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	The Southern Snake Range fault zone is composed of subparallel, northeast- and northwest-trending lineaments and down-to-the-east scarps that located along the east flank of the southern Snake Range and includes nearby piedmont scarps in southern Snake Valley. The faults are mapped as having scarps and lineaments, but were suggested in a geologic cross section for the Spring Mountain. Reconnaissance, photogeologic mapping and limited analysis of scarp morphology by and geologic mapping are the sources of data. Trench investigations and detailed studies of scarp morphology have not been completed.
Name comments	The name Southern Snake Range fault zone is from dePolo (1998 #2845); also referred to as the Snake Valley fault (Schell, 1981 #2843).

	Fault ID: Includes fault number 118 of Schell (1981 #2843).and faults LD8A and LD8B of dePolo (1998 #2845).
County(s) and State(s)	MILLARD COUNTY, UTAH WHITE PINE COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Location of fault in Utah based on Hintze and Davis (2002 #7314); other locations based on 1:250,000-scale maps of Schell (1981 #2843) and of Dohrenwend and others (1991 #287; 1992 #2480). Original 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 field verification. Mapping of Dohrenwend and others (1991 #287; 1992 #2480) from photogeologic analysis of 1:24,000-scale color aerial photography supplemented with 1:60,000-scale black-and-white aerial photography, transferred to 1:62,500-scale topographic maps and photographically reduced and transferred to 1:250,000-scale topographic maps, and subsequent 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.
Geologic setting	This north-striking zone of down-to-the-east normal faults forms prominent stepovers that bound the east flank of the southern Snake Range. Also included is a concealed fault mapped by Miller and others, (1995 #4404) on the Lehman Caves quadrangle. Exposed bedrock units the Snake Range include Late Proterozoic and Cambrian rocks as well as a Paleozoic sequence of miogeoclinal strata that was deposited on the western margin of north America. These units are metamorphosed and intruded by Jurassic granite. Sacramento Pass, a fault-bound depression east of Bald Mountain, is associated with the down-to-the-east movement of the unnamed group of faults. Tertiary rocks deposited within the depression include lava flows and tuffs, lacustrine limestone, and alluvial-fan deposits exposed along

	three down-to-the-east faults that cut and repeat the section (Miller and others, 1995 #4404). Old alluvial-fan deposits within this depression contain clasts with Miocene fission-track ages (Miller and others, 1989 #4405). These deposits are tilted, dissected and faulted, as a result of Miocene and younger extension (Miller and others, 1995 #4404). The most prominent structural feature is the northern Snake Range decollement that juxtaposes faulted Paleozoic and tertiary strata of the hanging wall against ductily attenuated metasedimentary and igneous rocks of the footwall (Gans and others, 1999 #4406). The Snake Valley fault is to the east of this structural feature, and coincides with a marked transition in the degree of incision of older Quaternary alluvial-fan sediments on the map of Spring Mountain quadrangle (Gans and others, 1999 #4407). In addition, the Little Horse Canyon quadrangle (Gans and others, 1999 #4406) and the Cove quadrangle (Miller and Gans, 1999 #4403) show discontinuities in lake-shoreline terrace deposits in the vicinity of faulting. The asymmetry of alluvial-fan sediment on these geologic quadrangles is also suggestive of recent deformation.
Length (km)	41 km.
Average strike	N27°E
Sense of movement	Normal *Comments:* (Dohrenwend and others, 1991 #287; 1992 #2480)
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	Mapped by Dohrenwend and others (1991 #287; 1992 #2480) as lineaments and by Schell (1981 #2843) as faults on sloping alluvial-fan sediment, coincident with a marked change in the degree of incision of these units. The fault trend is aligned with isolated outcrops of more resistant bedrock that protrude through Quaternary deposits. Schell (1981 #2843) estimated a maximum scarp height of 3.7 m.
Age of faulted surficial deposits	Jurassic, Miocene, and Quaternary deposits are offset. Several piedmont fault scarps are on deposits as young as late Pleistocene alluvial-fan and piedmont deposits (Dohrenwend and others, 1991 #287). One short piedmont fault scarp is shown to be on Holocene

	deposits (Dohrenwend and others, 1991 #287).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Schell (1981 #2843) constrains the age of faulting based on age estimate of units displaced. He considered the faulting to be Holocene (<10,000 years). Further detailed studies of scarp morphology or trench investigations need to be conducted to substantiate this young age estimate
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)	2003 Thomas L. Sawyer, Piedmont Geosciences, Inc. Margaret Hisa Redsteer, U.S. Geological Survey Kathleen M. Haller, 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. #287 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Lund 1° by 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2180, 1 sheet, scale 1:250,000. #2480 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Ely 1° by 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2181, 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.

#4407 Gans, P.B., Miller, E.L., and Lee, J., 1999, Geologic map of the Spring Mountain quadrangle, Nevada and Utah: Nevada Bureau of Mines and Geology Field Studies Map 18, scale 1:24,000.

#4406 Gans, P.B., Miller, E.L., Huggins, C.C., and Lee, J., 1999, Geologic map of the Little Horse Canyon quadrangle, Nevada and Utah: Nevada Bureau of Mines and Geology Field Studies Map 20, scale 1:24,000.

#7314 Hintze, L.F. and Davis, F.D., 2002, Geologic map of the Wah Wah Mountains North 30'x60' quadrangle and part of the Garrison 30'x60' quadrangle, southwest Millard County and part of Beaver County, Utah: Utah Geological Survey Map 182, scale 1:100,000.

#4403 Miller, E.L., and Gans, P.B., 1999, Geologic map of the Cove quadrangle, Nevada: Nevada Bureau of Mines and Geology Field Studies Map 22, 12 p. pamphlet, scale 1:24,000.

#4405 Miller, E.L., Gans, P.B., and Gleadow, A.J.W., 1989, Uplift history of the Snake Range metamorphic core complex, Basin and Range Province, USA, from apatite fission track data: Eos, Transactions of the American Geophysical Union, v. 70, p. 1309.

#4404 Miller, E.L., Grier, S.P., and Brown, J.L., 1995, Geologic map of the Lehman Caves quadrangle, White Pine County, Nevada: U.S. Geological Survey Geologic quadrangle Map GQ-1758, 1 sheet, scale 1:24,000.

#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.