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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.**

## Sheep Basin fault (Class A) No. 1115

**Last Review Date: 1999-04-05**

***citation for this record:*** **Anderson, R.E., compiler, 1999, Fault number 1115, Sheep Basin 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 02:18 PM.**

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| **Synopsis** | The main Sheep Basin fault appears to be at the west and northwest base of the Sheep Range and to be a down-to-the-west range-margin fault, but a second fault at the west base of Mule Deer Ridge is included. The Sheep Range is not significantly tilted, so it is not known if the west-margin (Sheep Basin) fault is the principle structure controlling uplift of the range. A precipitous range front and scarps along the north part in the Las Vegas 1:250,000-scale map indicate an active fault, and an early report shows a 34-m-high scarp formed on an alluvial fan. To the south, the active faulting appears to diverge from the main range toward the western base of Mule Deer Ridge. A fault probably exists at the western margin of the main range between Mule Deer Ridge and the Sheep Range, but it is of small total displacement and, on the basis of unpublished mapping, may not have been active during the Quaternary. In that area, it does not cut middle to early Pleistocene deposits. The fault at the western base of |

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| | Mule Deer Ridge is buried by late Pleistocene and middle Pleistocene deposits, so its earlier Quaternary history is unknown. That fault is not included in this compilation. At its north end in the Caliente 1:250,000-scale map, the fault bends to the northeast, but it is not known if it connects with the Maynard Lake fault [1122]. |
| **Name comments** | Name used by Piety (1995 #915) for a fault first named by Guth (1990 #1520). dePolo (1998 #2845) refers to the fault as the Western Sheep Range fault zone. The fault extends along the western and northwestern base of the Sheep Range and includes a second fault at the western base of Mule Deer Ridge.<br><br>**Fault ID:** Fault referred to as SB by Piety (1995 #915) and LV3 by dePolo (1998 #2845). |
| **County(s) and State(s)** | CLARK COUNTY, NEVADA<br>LINCOLN COUNTY, NEVADA |
| **Physiographic province(s)** | BASIN AND RANGE |
| **Reliability of location** | Good<br>Compiled at 1:100,000 scale.<br><br>*Comments:* The northern part of the fault trace in the Las Vegas sheet is taken from unpublished geologic mapping at 1:100,000-scale (P.L. Guth and J.C. Yount, written commun., 1998), and the south part is taken from 1:250,000-scale mapping by Schell (1981 #2843, 1981 #2844). The part in the Caliente 1:250,000-scale map is taken from an u npublished map of the Caliente sheet by J.C. Dohrenwend published at 1:100,000-scale by Dohrenwend and others (1996 #2846). There is much uncertainty regarding the parts of this fault that have a Quaternary displacement history. On the basis of photogeologic study, Dohrenwend and others (1991 #288) mapped two faults, one extending quasi-continuously about 35 km along the western base of the Sheep Range and another, about 18 km long, directly west of it along the western base of Mule Deer Ridge. The unpublished geologic map of Guth and Yount (written commun., 1998) shows the fault at the western base of Mule Deer Ridge buried by Holocene and late Pleistocene deposits. Along the Sheep Range to the east, middle and early Pleistocene deposits are unfaulted, but Schell (1981 #2843; 1981 #2844) shows highly discontinuous scarps of probable Pleistocene age along the central part of the main Sheep Range |

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| | front. Because the mapping by Guth and Yount (written commun., 1998) involved field study, and that of Schell (1981 #2843; 1981 #2844) involved study of detailed aerial photography, those traces are used for this compilation. Piety (1995 #915) compiled the part of the fault in the Caliente sheet from a page-size illustration by Longwell (1930 #2391) who may have been the first to recognize fault scarps along the western side of the Sheep Range. |
| **Geologic setting** | The Sheep Range and Mule Deer Ridge are two of several north-trending ranges north of Las Vegas Valley. The unpublished mapping by Guth and Yount (written commun., 1998) shows little tilting of the rocks of the main Sheep Range compared to the more steeply east tilted rocks of Mule Deer Ridge, relations that suggest the need for a fault between the two bedrock blocks. However, no such Quaternary fault is shown. Their mapping suggests that Quaternary displacement, as it is traced southward, veers westward away from the Sheep Range toward the western boundary of Mule Deer Ridge. Dohrenwend and others (1991 #288) showed similar relations, and showed about half of the western front of the Sheep Range as tectonically active. The western front of the northern Sheep Range is described as precipitous (Longwell, 1930 #2391) and is bounded by a typical west-side-down normal fault as shown in an unpublished map of the Caliente sheet by J.C. Dohrenwend published at 1:1,000,000-scale by Dohrenwend and others (1996 #2846). At its north end in the Caliente sheet, the fault bends to the northeast, but it is not known if it connects with the Maynard Lake fault [1122] . |
| **Length (km)** | 38 km. |
| **Average strike** | N15°E |
| **Sense of movement** | Normal<br><br>*Comments:* Although no slip lines are reported, faulting in the region on north-striking faults is mostly normal (Guth, 1990 #1520). |
| **Dip** | 50–68° W.<br><br>*Comments:* Two parallel fault surfaces exposed in washes crossing the area between the Sheep Range and Mule Deer Ride are reported by Longwell (1930 #2391), the western (younger) fault dips 50° W. and the eastern fault (older) dips 68° W. |

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| **Paleoseismology studies** | |
| **Geomorphic expression** | Scarps associated with the north and northeast-striking fault's traces west of the range front are shown as down to the west (Dohrenwend and others, 1991 #288; 1996 #2846). A maximum scarp height of 34 m is reported for a west-facing scarp on an alluvial fan near the middle of the Sheep Range frontal fault (Longwell, 1930 #2391). Dohrenwend and others (1991 #288) show about half of the western front of the Sheep Range as tectonically active, characterized by juxtaposition of Quaternary alluvium against bedrock, fault scarps and lineaments on surficial deposits, a general absence of pediments, abrupt piedmont-hillslope transitions, steep bedrock slopes, faceted spurs, wineglass valleys and steep-sided canyons orthogonal to the range front. The western front of the northern Sheep Range was described as precipitous by Longwell (1930 #2391) and is marked by quasi continuous scarps (Dohrenwend and others, 1996 #2846). |
| **Age of faulted surficial deposits** | The youngest scarps along the front of the Sheep Range are on depositional or erosional surfaces that are possibly late Pleistocene (Dohrenwend and others, 1991 #288; 1996 #2846). A short section of these scarps is portrayed as Pleistocene by Schell (1981 #2843; 1981 #2844). Guth and Yount (written commun., 1998) show the fault cutting deposits that are late Pleistocene and middle Pleistocene and buried by deposits that are Holocene and late Pleistocene. |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | undifferentiated Quaternary (<1.6 Ma)<br><br>*Comments:* On the basis of unpublished mapping by Guth and Yount (written commun., 1998) and J.C. Dohrenwend (published by Dohrenwend and others, 1996 #2846), displacement appears to be pre-Holocene, despite the qualitative suggestion by Longwell (1930 #2391) that displacement probably occurred not more than a few hundred years ago. Because the timing is largely unconstrained, the best estimate for the most recent event is Quaternary. |
| **Recurrence** | |

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| **interval** | |
| **Slip-rate category** | Less than 0.2 mm/yr<br><br>*Comments:* No age data or stratigraphic details are reported that would allow for assigning a slip rate to displacement at the 34-m-high scarp reported by Longwell (1930 #2391). dePolo (1998 #2845) calculated a vertical slip rate of 0.044 mm/yr for the fault based on Longwell's data. He determined a preferred vertical offset of 22 m and an assumed age of 500 ka for the offset deposit. 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<br>R. Ernest Anderson, U.S. Geological Survey, Emeritus |
| **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.<br><br>#288 Dohrenwend, J.C., Menges, C.M., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Las Vegas 1° by 2° quadrangle, Nevada, California, and Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-2182, 1 sheet, scale 1:250,000.<br><br>#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.<br><br>#1520 Guth, P.L., 1990, Superposed Mesozoic and Cenozoic deformation, Indian Springs quadrangle, southern Nevada, *in* Wernicke, B.P., ed., Basin and Range extensional tectonics near the latitude of Las Vegas, Nevada: Geological Society of America Memoir 176, p. 237-249.<br><br>#2391 Longwell, C.R., 1930, Faulted fans west of the Sheep Range, southern Nevada: American Journal of Science, v. 20, no. 115, p. 1-13. |

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| | #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.<br><br>#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.<br><br>#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. |