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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.](#)**

## Diamond Valley fault (Class A) No. 1161

**Last Review Date: 2000-06-06**

***citation for this record:*** **Anderson, R.E., compiler, 2000, Fault number 1161, Diamond 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 02:17 PM.**

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| **Synopsis** | The Diamond Valley fault is along the precipitous east-facing bedrock escarpment of the Sulphur Spring Range adjacent to Diamond Valley near the southeastern corner of the Winnemucca 1:250,000 map. It includes a subparallel 6-km-long fault along the east margin of Union Mountain in Elko County. The Sulphur Spring Range is an east-tilted structural block similar to many ranges in the region. The range is also a north-trending horst, and the Diamond Valley fault is the east-bounding structure of the horst. The precipitous, convex-eastward bedrock escarpment along the fault is little incised by transverse drainages, and generally lacks the faceted spurs and wineglass valleys that tend to characterize the geomorphology of major active range blocks. The fault probably juxtaposes Quaternary alluvium against bedrock, but fault scarps and (or) lineaments on Quaternary surficial deposits or erosion surfaces are apparently lacking. |

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| **Name comments** | Modified from dePolo (1998 #2845), who applied the name Diamond Valley fault zone to a single-trace north-striking fault mapped by Dohrenwend and Moring (1991 #282) at the base of the precipitous east-facing bedrock escarpment of the Sulphur Spring Range adjacent to Diamond Valley.<br><br>**Fault ID:** Referred to as fault WI26 by dePolo (1998 #2845). |
| **County(s) and State(s)** | ELKO COUNTY, NEVADA<br>EUREKA COUNTY, NEVADA |
| **Physiographic province(s)** | BASIN AND RANGE |
| **Reliability of location** | Good<br>Compiled at 1:100,000 scale.<br><br>*Comments:* Fault location is based on 1:250,000-scale map of young faults in the Winnemucca 1:250,000-scale quadrangle by Dohrenwend and Moring (1991 #282) which was produced by 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. dePolo (1998 #2845) indicates that the fault extends at least another 20 km to the south into the Millett sheet, and the abrupt front of the Sulphur Springs Range extends 10-15 km south of 40? N lat. However, Dohrenwend and others (1992 #283) do not show this fault extending southward. |
| **Geologic setting** | The Sulphur Spring Range is an east-tilted structural block similar to most ranges in the Winnemucca sheet (Dohrenwend and Moring, 1991 #282). The range is also a north-trending horst, and the Diamond Valley fault is the east-bounding structure of the horst (Carlisle and Nelson, 1990 #4312). The structural relation between the main fault along the east base of the Sulphur Spring Range and the fault along the east margin of Union Mountain is not known, but they could be en-echelon parts of the same range-front fault zone with an east step at Union Summit. |
| **Length (km)** | 27 km. |
| **Average strike** | N2°W |
| **Sense of movement** | Normal<br><br>*Comments:* In a series of six E-W cross sections across the range, |

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| | Carlisle and Nelson (1990 #4312) show down-to-the-east displacement on the east-bounding fault of the horst. |
| **Dip** | 75°E<br><br>*Comments:* In a series of cross sections, Carlisle and Nelson (1990 #4312) show the fault with a 75° east dip steepening southward to about 80°. |
| **Paleoseismology studies** | |
| **Geomorphic expression** | The Sulphur Spring Range is a relatively narrow (2- to 4-km-wide) highland with a slightly sinuous crest along which there are strong variations in cross profile ranging from relatively symmetric in the north to strongly asymmetric in the south. Most east-tilted ranges in the region and surrounding areas have asymmetric cross profiles with steeper western flanks than eastern flanks resulting from the active faults localized along the western flanks. The Sulphur Spring Range is unusual in that, where asymmetric, it is steepest along its eastern flank, along the Diamond Valley fault. A precipitous, convex-east bedrock escarpment that is not deeply incised by transverse drainages (compared to the western flank) marks the eastern flank, south of Butler Canyon. It generally lacks the faceted spurs and wineglass valleys that tend to characterize the geomorphology of major active range blocks. However, dePolo (1998 #2845) reported a preferred maximum basal facet height of 122 m (110–134 m) along the Diamond Valley fault, but the location of this determination is unknown. We found that the range margin along the Diamond Valley fault generally lacks the faceted spurs and wineglass valleys that tend to characterize the geomorphology of major active range blocks. Dohrenwend and Moring (1991 #282) mapped the Diamond Valley fault as a discontinuous major range-front fault characterized by fault juxtaposition of Quaternary alluvium against bedrock, but lacking fault scarps and (or) lineaments on Quaternary surficial deposits or erosion surfaces. Similarly, Wallace (1979 #203) mapped a lineament but no young scarps along the fault. The trace of the Diamond Valley fault is at a higher elevation than the high shoreline of the late Pleistocene Diamond Valley lake (6050 ft, Wallace, 1979 #203), so the lack of scarps on Quaternary surfaces can not result from erosional removal by lacustrine processes. |

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| **Age of faulted surficial deposits** | Quaternary |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | undifferentiated Quaternary (<1.6 Ma)<br><br>*Comments:* On their 1:48,000-scale geologic map, Carlisle and Nelson (1990 #4312) did not show Quaternary deposits as faulted along the eastern base of the Sulphur Spring Range, but Dohrenwend and Moring (1991 #282), on the basis of reconnaissance photogeology, characterized the fault as juxtaposing Quaternary deposits against bedrock. Although these two studies are opposed, we suspect that the fault has Quaternary movement based on the topical nature of Dohrenwend and Moring's (1991 #282) study. |
| **Recurrence interval** | |
| **Slip-rate category** | Less than 0.2 mm/yr<br><br>*Comments:* No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.231 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. However, 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 of a lesser magnitude. In addition, because the range margin along the Diamond Valley fault generally lacks the faceted spurs and wineglass valleys that tend to characterize the geomorphology of major active range blocks, and because young fault scarps are apparently absent, the slip rate on the fault is considered poorly known. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault. |
| **Date and Compiler(s)** | 2000<br>R. Ernest Anderson, U.S. Geological Survey, Emeritus |
| **References** | #4312 Carlisle, D., and Nelson, C.A., 1990, Geologic map of the |

Mineral Hill quadrangle, Nevada: Nevada Bureau of Mines and Geology Map 97, 1 sheet, scale 1:48,000.

#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.

#282 Dohrenwend, J.C., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Winnemucca 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2175, 1 sheet, scale 1:250,000.

#283 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Millett 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2176, 1 sheet, scale 1:250,000.

#203 Wallace, R.E., 1979, Map of young fault scarps related to earthquakes in north-central Nevada: U.S. Geological Survey Open-File Report 79-1554, 2 sheet, scale 1:125,000.