

# 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](#).

## Independence Valley fault zone, northern section (Class A) No. 1582a

Last Review Date: 1998-10-05

*citation for this record:* Sawyer, T.L., Oswald, J.A., Rowley, P.C., and Anderson, R.E., compilers, 1998, Fault number 1582a, Independence Valley fault zone, northern section, 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 02:36 PM.

### Synopsis

**General:** This zone of subparallel normal faults includes intermontane bedrock faults within the northern Pequop Mountains and range bounding faults separating the west flank of the range from the basin beneath Independence Valley. The fault extends from east of Holborn south, across Interstate 80, south to Brush Creek. Reconnaissance photogeologic mapping of fault related features and compilation geologic mapping are the sources of data; scarp profiles adequate for regression of scarp height against maximum scarp slope angle are reported for the southern section of the fault.

**Sections:** This fault has 2 sections. The general movement history and geometry of the fault zone suggest two possible sections. The

|   |  |
|---|--|
|   | <p>northern section extends from the north end of the Pequop Mountains southward as range-front, intermontane, and short piedmont faults to about 13 km south of Interstate 80. The southern section extends from near lat 41° N. south to Brush Creek and is expressed almost entirely by west facing scarps on surficial deposits or erosion surfaces along the west base of the range.</p>  |
| <p><b>Name comments</b></p>             | <p><b>General:</b> Refers to faults mapped by Slemmons (1964, unpublished Wells 1:250,000-scale map), Coats (1987 #2861), and Dohrenwend and others (1991 #290; 1991 #286). Named the Independence Valley fault zone by Barnhard (1985 #428). The fault zone extends within, along, and near the western front of the Pequop Mountains from east of Holborn, south across Interstate 80, to Brush Creek.</p> <p><b>Section:</b> This unnamed section refers to the northern part of the Independence Valley fault zone of Barnhard (1985 #428) and dePolo (1998 #2845). Section extends within, along, and near western front the Pequop Mountains from east of Holborn south, across Interstate 80, to about 13 km south of the highway.</p> <p><b>Fault ID:</b> Refers to fault EK11B (Independence Valley fault zone) of dePolo (1998 #2845).</p> |
| <p><b>County(s) and State(s)</b></p>    | <p>ELKO COUNTY, NEVADA</p>   |
| <p><b>Physiographic province(s)</b></p> | <p>BASIN AND RANGE</p>   |
| <p><b>Reliability of location</b></p>   | <p>Good<br/>Compiled at 1:100,000 scale.</p> <p><i>Comments:</i> Location based on 1:250,000-scale geologic map of Coats (1987 #2861) and 1:250,000-scale map of Dohrenwend and others (1991 #290). Dohrenwend and others (1991 #290) 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.</p>   |
| <p><b>Geologic setting</b></p>          | <p>This zone of subparallel normal faults includes intermontane faults within the northern Pequop Mountains, relatively continuous range-front faults along west front of the range from east of Holborn south to Brush Creek, and piedmont faults in</p>  |

|  |  |
|--|--|
|  | <p>eastern Independence Valley. Where it is located at the base of the range, it is apparently a major range-front fault separating the Pequops from the basin beneath Independence Valley; topographic relief is as much as 1 km (Wesnousky and others, 2006 #7559). Geology of part of the Pequop Mountains of the southern section mapped at 1:24,000 scale by Fraser and others (1983 #4323), but they showed only two faults cutting Quaternary sediments. Most of the Pequop Range consists of Paleozoic sedimentary rocks, but the north part has Tertiary rocks down faulted to the west along the west base of the range.</p> |
| <b>Length (km)</b>                         | This section is 26 km of a total fault length of 61 km.  |
| <b>Average strike</b>                      | N9°W (for section) versus N5°W (for whole fault)   |
| <b>Sense of movement</b>                   | <p>Normal</p> <p><i>Comments:</i> As shown on geologic maps (Slemmons, 1964, unpublished Wells 1?x2? sheet; Dohrenwend and others, 1991 #290).</p>   |
| <b>Dip Direction</b>                       | W; E   |
| <b>Paleoseismology studies</b>             |  |
| <b>Geomorphic expression</b>               | <p>The section is expressed by intermontane faults within the northern Pequop Mountains that are associated with low topographic escarpments. Discontinuous faults along the west front of the range juxtapose Quaternary alluvium against bedrock and piedmont faults are marked by short west-facing scarps in eastern Independence Valley (Coats, 1987 #2861; Dohrenwend and others, 1991 #290). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 146 m (122-171 m).</p>   |
| <b>Age of faulted surficial deposits</b>   | <p>Early to middle Pleistocene, Quaternary. The range-front faults displace undifferentiated Quaternary alluvium and the piedmont faults displace early to middle Pleistocene alluvium; age interpretations based on photogeologic analysis (Dohrenwend, 1991 #290).</p>   |
| <b>Historic earthquake</b>                 |  |
| <b>Most recent prehistoric deformation</b> | <p>undifferentiated Quaternary (&lt;1.6 Ma)</p> <p><i>Comments:</i> Age assignment is based on mapping of Dohrenwend</p>   |

|                             |  |
|-----------------------------|--|
|                             | and others (1991 #290).  |
| <b>Recurrence interval</b>  |  |
| <b>Slip-rate category</b>   | <p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.267 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. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.</p>   |
| <b>Date and Compiler(s)</b> | <p>1998</p> <p>Thomas L. Sawyer, Piedmont Geosciences, Inc.<br/> John A. Oswald, Piedmont Geosciences, Inc.<br/> Peter C. Rowley, U.S. Geological Survey, Retired<br/> R. Ernest Anderson, U.S. Geological Survey, Emeritus</p>  |
| <b>References</b>           | <p>#428 Barnhard, T.P., 1985, Map of fault scarps formed in unconsolidated sediments, Elko 1° x 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1791, 1 sheet, scale 1:250,000.</p> <p>#2861 Coats, R.R., 1987, Geology of Elko County, Nevada: Nevada Bureau of Mines and Geology Bulletin 101, 112 p., scale 1:250,000.</p> <p>#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.</p> <p>#290 Dohrenwend, J.C., McKittrick, M.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Wells 1° by 2° quadrangle, Nevada, Utah, and Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-2184, 1 sheet, scale 1:250,000.</p> |

#286 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Elko 1° by 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2179, 1 sheet, scale 1:250,000.

#4323 Fraser, G.D., Ketner, K.B., and Smith, M.C., 1983, Preliminary geologic map of the Spruce Mountain 4 quadrangle, Elko County, Nevada: U.S. Geological Survey Open-File Report 83-301, scale 1:24,000.

[Questions or comments?](#)

[Facebook](#) [Twitter](#) [Google](#) [Email](#)

[Hazards](#)

[Design](#) [Ground Motions](#) [Seismic Hazard Maps & Site-Specific Data](#) [Faults](#) [Scenarios](#)

[Earthquakes](#) [Hazards](#) [Data](#) [Education](#) [Monitoring](#) [Research](#)

[Home](#) [About Us](#) [Contacts](#) [Legal](#)