Jump to Navigation

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.

Eastern Independence Valley fault zone, northern section (Class A) No. 1553a

Last Review Date: 2016-10-05

citation for this record: **Adams, K., Sawyer, T.L., and Haller, K.M., compilers, 2016, Fault number 1553a, Eastern 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 02:35 PM.**

Synopsis	**General:** This relatively long, nearly continuous zone has: (1) range-bounding faults along the west front of the Independence Mountains, from Marble Creek south to Burns Creek and south-southwest to near Indian Creek; (2) intermontane faults within the range north of Marble Creek to Bailey Creek; and (3) subparallel piedmont faults in much of eastern Independence Valley. Reconnaissance photogeologic mapping of the fault zone and geologic mapping are the sources of data. **Sections:** This fault has 2 sections. Although the fault zone has not been studied in detail, two possible sections are suggested by the geometry and general movement history of the fault zone; southern section may be related to the Tuscarora fault zone [1552]

	on west side of southern Independence Valley. The northern section consists of north-striking faults along and near front of the Independence Mountains north of Burns Creek and the intermontane faults further to the north. The southern section consists of north-northeast-striking faults near the range front and in Independence Valley south of Burns Creek and east of the South Fork of the Owyhee River. Piedmont faults are expressed as prominent west-facing scarps on early to late Pleistocene and latest Quaternary alluvium in southern Independence Valley (southern section) and as scarps on undifferentiated Pleistocene alluvium in the northern part of the valley (northern section).
Name comments	**General:** Refers to faults mapped by Slemmons (1966, unpublished McDermitt 1:250,000-scale map), Coats (1987 #2861), Dohrenwend and Moring (1991 #284), and Henry and others (1998 #3018) along east side of Independence Valley and bordering the Independence Mountains, from Bailey Creek south to mouth of Burns Creek, and south-southwest to Road Canyon. dePolo (1998 #2845) referred to it as the Eastern Independence Valley fault and Dering and Faulds (2012 #7557) refer to the fault as the Independence Valley fault zone, which is adopted here. **Section:** This informally named section bounds the northern part of the Independence Mountains. **Fault ID:** Refers to the southern part of fault zone MD17 (Eastern Independence Valley fault) of dePolo (1998 #2845).
County(s) and State(s)	ELKO COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault locations primarily based on 1:250,000-scale map of Dohrenwend and Moring (1991 #284) 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. The location of additional faults is from 1:250,000-scale map of Slemmons (1966, unpublished McDermitt 1:250,000-scale quadrangle) and 1:250,000-scale geologic map of Coats (1987 #2861). Slemmons (1966, unpublished McDermitt 1:250,000-

	scale quadrangle) mapped from analysis of 1:60,000-scale AMS photography transferred to mylar overlaid onto a 1:250,000-scale topographic map using proportional dividers.
Geologic setting	This relatively long, nearly continuous zone has: (1) range-bounding faults along the west front of the Independence Mountains, from Marble Creek south to Burns Creek and south-southwest to near Indian Creek; (2) intermontane faults within the range north of Marble Creek to Bailey Creek; and (3) subparallel piedmont faults in much of eastern Independence Valley; southern part may be related to fault zone [1552] on west side of southern Independence Valley. The fault accommodates several kilometers of displacement (Dering and Faulds, 2012 #7557).
Length (km)	This section is 28 km of a total fault length of 42 km.
Average strike	N4°W (for section) versus N13°E (for whole fault)
Sense of movement	Normal *Comments:* (Slemmons, 1966, unpublished McDermitt 1:250,000-scale quadrangle; Dohrenwend and Moring, 1991 #284)
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	The section is expressed by range-bounding faults along west front of the Independence Mountains that are marked by the abrupt and prominent range front, and by the juxtaposition of Quaternary alluvium against bedrock (Slemmons, 1966, unpublished McDermitt 1:250,000-scale quadrangle; Coats, 1987 #2861; Dohrenwend and Moring, 1991 #284). The preferred maximum basal fault facet is reported as 122 m (98–146 m) by dePolo (1998 #2845), presumably along northern section. The intermontane faults are marked by prominent topographic lineaments, ridge-crest saddles and hillside benches. The piedmont faults are expressed as scarps on Pleistocene alluvium in the northern part of the valley (Slemmons, 1966, unpublished McDermitt 1:250,000-scale quadrangle; Coats, 1987 #2861; Dohrenwend and Moring, 1991 #284).
Age of faulted surficial	Pleistocene; Tertiary. Faults along front of Independence Mountains juxtapose undifferentiated Pleistocene alluvium

deposits	against bedrock and piedmont faults displace early to late Pleistocene deposits.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* The timing of most recent event is not well constrained. A Quaternary time is suggested based on reconnaissance photogeologic mapping of Slemmons (1966, unpublished McDermitt 1:250,000-scale quadrangle sheet) and Dohrenwend and Moring (1991 #284). Wesnousky and others (2005 #7559) identified a fault scarp about 2.9 m high and estimated the time of the most recent earthquake to be about 40,000 years ago based on fault scarp morphology. The most conservative age assignment is adopted here until more definitive studies are conducted.
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 0.231 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. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	2016 Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc. Kathleen M. Haller, U.S. Geological Survey
References	#2861 Coats, R.R., 1987, Geology of Elko County, Nevada: Nevada Bureau of Mines and Geology Bulletin 101, 112 p., 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. #7557 Dering, G., and Faulds, J., 2012, Structural controls of the Tuscarora geothermal field Elko County, Nevada: GRC Transactions, v. 36, p. 41–46, http://pubs.geothermal-library.org/lib/grc/1030208.pdf. #284 Dohrenwend, J.C., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the McDermitt 1° by 2° quadrangle, Nevada, Oregon, and Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-2177, 1 sheet, scale 1:250,000. #7559 Wesnousky, S.G., Barron, A.D., Briggs, R.W., Caskey, S.J., Kumar, Senthil, and Owen, L., 2005, Paleoseismic transect across the northern Great Basin: Journal of Geophysical Research, v. 110, B05408, 25 p.