

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](#).

Pinon Range fault zone, northern section (Class A) No. 1160a

Last Review Date: 2000-06-12

citation for this record: Anderson, R.E., compiler, 2000, Fault number 1160a, Pinon Range 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 02:17 PM.

Synopsis

General: The Pinon Range fault zone is divided into northern and southern sections on the basis of contrasts in structural setting. The sections appear to have contrasting structural settings: the northern section, although irregular, strikes about north parallel to a range block and the southern section strikes northeast slightly transverse to two range blocks. Each section may form the structural boundary between the sedimentary basin beneath Pine Valley and the adjacent mountains, although in its north-most part the fault appears to cut eastward across the north end of the Pinion Range. The western flank of the Pinon Range along the northern section is irregular and, in places, poorly defined, lacking the conspicuous precipitous west- or northwest-facing bedrock escarpments or the abrupt piedmont-to-hillslope transition characteristic of many ranges in the region. The fault scarps along this trace face west or and are formed on gently to moderately

west-facing piedmont slopes that are incised by numerous transverse drainages. Although the scarps are fairly continuous, interrupted mainly by the transverse drainages, no detailed descriptions have been made of the scarps. The southern section is marked by discontinuous northwest-facing scarps scattered in the erosionally dissected piedmont slope west and northwest of Table Mountain and by highly sinuous scarps north of the Sulphur Spring Range, between McCoy Spring and Dry Creek. The southern section includes scarps and lineaments on the west flank of the Sulphur Spring Range that mark a fault not considered to be a major range-front structure. Only the northernmost scarps, north of Bruffey Canyon, are at an abrupt piedmont/hillslope transition that resembles a major range-front setting. There are no detailed accounts of geomorphic expression and no detailed mapping of surficial deposits, so estimates of recurrence times and slip rate can not be made for either of the sections.

Sections: This fault has 2 sections. Following dePolo (1998 #2845) the fault zone is divided into two sections based on the contrasting strikes of the southern and northern parts of the fault, as well as the fact that the northern part is parallel to a range and the southern part is transverse to two separate mountain blocks.

Name comments

General: Taken from dePolo (1998 #2845) who gave the name Pinon Range fault zone to the fault that extends along the western flank of the Pinon Range (his fault WI 25A) and the fault that extends along the west flank of the Sulphur Spring Range (his fault WI 25B).

Section: Wallace (1979 #203) referred to the scarps at the western base of the Pinon Range as the "west flank Sulphur Springs Range scarps" for reasons that are unclear. As compiled here, the northern section extends from the upper reaches of Ferdelford Creek in a doglegged trace south to Dry Creek. The trace of the northern part of fault WI 25A of dePolo (1998 #2845) is taken from mapping by Dohrenwend and Moring (1991 #282). The trace of that part is in bedrock where a Quaternary history is difficult to establish.

Fault ID: Fault referred to by dePolo (1998 #2845) as WI25A.

County(s) and State(s)

EUREKA COUNTY, NEVADA
ELKO COUNTY, NEVADA

Physiographic province(s)

BASIN AND RANGE

Reliability of location	<p>Good Compiled at 1:100,000 scale.</p> <p><i>Comments:</i> Location based on map of young fault scarps at 1:125,000-scale by Wallace (1979 #203). Most of that mapping was done on 1:60,000-scale aerial photographs based on a combination of photogeology and field study. The trace of the northern part of the section is taken from 1:250,000-scale mapping by Dohrenwend and Moring (1991 #282).</p>
Geologic setting	<p>The Pinon Range fault zone is a range-bounding normal fault zone. Its northern section [1160a] apparently separates the sedimentary basin beneath Pine Valley from the irregular and poorly defined western margin of the Pinon Range. Its southern section [1160b] may mark the structural boundary between the same basin and the northernmost Sulphur Spring Range, as well as the northwest margin of Table Mountain. However, most scarps of the south section are on piedmont slopes adjacent to Pine Valley, so their relationship to a major fault is uncertain. The southern section includes scarps and lineaments on the west flank of the Sulphur Spring Range that mark a fault not considered to be a major range-front structure. Although northeast-striking, main range-bounding faults are common in the region (Stewart and Carlson, 1978 #3413), the northeast -striking faults that cut bedrock in Table Mountain and in the northern Sulphur Spring Range appear to be down to the southeast (Carlisle and Nelson, 1990 #4312), opposite in direction to any major fault between Table Mountain and Pine Valley. Also, a short scarp along the west margin of the Sulphur Spring Range is shown by Dohrenwend and Moring (1991 #282) as down to the east. The structural relation between the two sections is not clear, nor is the structural relation between the scattered scarps along the northwest flank of Table Mountain and the highly sinuous fault at the northern end of the Sulphur Spring Range.</p>
Length (km)	<p>This section is 39 km of a total fault length of 73 km.</p>
Average strike	<p>N12°E (for section) versus N16°E (for whole fault)</p>
Sense of movement	<p>Normal</p> <p><i>Comments:</i> Normal sense is inferred from location and orientation in an extensional tectonic province.</p>

Dip Direction	W <i>Comments:</i> Probably steep to west
Paleoseismology studies	
Geomorphic expression	The western flank of the Pinon Range is irregular and, in places, poorly defined, lacking the conspicuous precipitous west- or northwest-facing bedrock escarpments or the abrupt piedmont-to-hillslope transition characteristic of many ranges in the region (Wallace, 1978 #2648). At Pine Mountain, however, the fault forms a right-angle bend as it follows a precipitous bedrock escarpment with the characteristics of a major range front (Dohrenwend and Moring, 1991 #282). West of Pine Mountain, northwest-facing scarps are formed on Quaternary deposits or surfaces of the piedmont. Most scarps marking the fault trace face west and are formed on gently to moderately west-facing piedmont slopes that are incised by numerous transverse drainages. The scarps are fairly continuous, interrupted mainly by the transverse drainages. Detailed descriptions of the scarps are lacking.
Age of faulted surficial deposits	Quaternary. On the basis of a reconnaissance photogeologic study (1:58,000-scale photos) Dohrenwend and Moring (1991 #282) estimated most scarps to have formed on early to middle Pleistocene (1.6-0.13 Ma) deposits or surfaces. At one location, a scarp may be on a late Pleistocene (10-130 ka) deposits or surfaces. None of the scarps they identify are less than 15 ka, which is consistent with the 1:125,000-scale map of young fault scarps by Wallace (1979 #203) in which the scarps are estimated to be very much older than 12 ka.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> No mapping showing subdivisions of Quaternary deposits is available.
Recurrence interval	
Slip-rate	Less than 0.2 mm/yr

category	<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 0.01 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.</p>
Date and Compiler(s)	<p>2000 R. Ernest Anderson, U.S. Geological Survey, Emeritus</p>
References	<p>#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.</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>#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.</p> <p>#3413 Stewart, J.H., and Carlson, J.E., 1978, Geologic map of Nevada: U.S. Geological Survey, Special Geologic Map, 1, scale 1:500,000.</p> <p>#2648 Wallace, R.E., 1978, Geometry and rates of change of fault-generated range fronts, north-central Nevada: Journal of Research of the U.S. Geological Survey, v. 6, no. 5, p. 637-649.</p> <p>#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.</p>

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