

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-East Desert Ranges fault (Class A) No. 1060

Last Review Date: 1998-02-12

citation for this record: Anderson, R.E., compiler, 1998, Fault number 1060, Sheep-East Desert Ranges 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 02:19 PM.

Synopsis

The Sheep-East Desert Range fault is a major range-bounding structure at the western base of the southern Sheep Range and East Desert Range. Discontinuous west-facing scarps are formed on Quaternary deposits or surfaces along a 3-km-long central part of the trace; elsewhere, Quaternary deposits are faulted against bedrock. No paleoseismic data are available. The northwest-striking and north-northeast-striking southern parts of the fault along the western Sheep Range are shown on unpublished geologic maps as displacing deposits of late Quaternary age (<130 ka). By contrast, the northern part of the fault along the East Desert Range displaced deposits of early to possibly late Pleistocene age, suggesting it has been inactive longer than the southern part.

Name comments	Name applied by Piety (1995 #915) to the western range-front fault that bounds the southern Sheep Range and southern East Desert Range. Fault ID: Equivalent to fault SEDR of Piety (1995 #915) and LV2 of dePolo (1988 #2845).
County(s) and State(s)	CLARK COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. <i>Comments:</i> Traces were compiled at 1:100,000-scale from 1:58,000-scale photographs and recompiled for publication at 1:250,000-scale (Dohrenwend and others, 1991 #288).
Geologic setting	The Sheep-East Desert Ranges fault is a continuous, more than 40-km-long, generally north-striking but conspicuously sinuous, west-side-down fault linking the western parts of two major range fronts. The southern part of the fault bounds the precipitous high southern Sheep Range and the northern part bounds the equally precipitous but lower East Desert Range. Between these two range blocks, the fault forms the western margin of a topographically low bedrock block (Longwell and others, 1965 #4694; Dohrenwend and others, 1991 #288). The trace bounding the southern Sheep Range is strongly concave eastward, which is an unusual shape for faults north of Las Vegas Valley, most of which are concave west, reflecting clockwise bending into the Las Vegas shear zone. Included with this range-bounding fault is a 2.7-km-long fault that bounds the short relatively low Black Hills on the east, forming a narrow graben between the Black Hills and the southern Sheep Range.
Length (km)	42 km.
Average strike	N2°E
Sense of movement	Normal <i>Comments:</i> Normal displacement is inferred on the basis of the extensional tectonic setting defined by the north-trending basins and ranges north of Las Vegas Valley.

Dip Direction	W
Paleoseismology studies	
Geomorphic expression	<p>Scarps are shown as primarily west-facing and are developed mainly along 3 km of the topographically low medial trace between the two range blocks and along a short (0.5 km) trace in the southernmost East Desert Range (Dohrenwend and others, 1991 #288). Most of the fault is depicted as bounding a tectonically active front of a major mountain range that is characterized by "fault juxtaposition of Quaternary alluvium against bedrock, fault scarps and lineaments on surficial deposits along or immediately adjacent to range front, a general absence of pediments, abrupt piedmont-hillslope transitions, steep bedrock slopes, faceted spurs, wineglass valleys, and subparallel systems of high-gradient, narrow, steep-sided canyons orthogonal to range front" (Dohrenwend and others, 1991 #288). The fault along the eastern base of the Black Hills is characterized as juxtaposing Quaternary alluvium and bedrock, but is not shown as a major range-front fault (Dohrenwend and others, 1991 #288). The morphology of the eastern side of the Black Hills would be similar to that along a major range-front fault, but would be significantly less extensive and fault scarps would be substantially lower, shorter, and less continuous than those along a major range-front fault (Dohrenwend and others, 1991 #288).</p>
Age of faulted surficial deposits	<p>Scarps at four localities, at the range front and 1 to 2 km west of the front, are mapped on depositional or erosional surfaces that are early to middle and (or) late Pleistocene age (the Q1-2 surfaces of Dohrenwend and others, 1991 #288) with estimated ages between 10 ka and 1.6 Ma. Along the range front, the fault is shown by Dohrenwend and others (1991 #288) as fault-related lineaments on depositional or erosional surfaces of Quaternary age, which they define as <1.6 Ma. The northwest-striking south part of the fault is shown on a recently compiled unpublished map of the 1:100,000-scale Las Vegas quadrangle (R. Page, written commun., 1998). In places, the fault cuts Quaternary deposits with an estimated age range of Holocene and late Pleistocene and, in places, it is buried by those same mapped deposits. Similarly, the north-northeast-striking part of the fault adjacent to the southern Sheep Range is shown in a recently compiled unpublished geologic map of the Indian Springs 1:100,000-scale quadrangle (P.L. Guth and J.C. Yount, written commun., 1998) as</p>

	cutting deposits with estimated age of Holocene and late Pleistocene. By contrast, the northern part of the fault adjacent to the East Desert Range apparently displaced deposits of early to possibly late Pleistocene age (Dohrenwend and others, 1991 #288).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) <i>Comments:</i> The northwest-striking and north-northeast-striking southern parts of the fault along the western Sheep range are shown on separate unpublished geologic maps as displacing deposits with estimated ages of Holocene and late Pleistocene (<130 ka). By contrast, the northern part of the fault along the East Desert Range apparently displaced deposits of early to possibly late Pleistocene age (Dohrenwend and others, 1991 #288), suggesting it has been inactive longer than the southern part. If these timing estimates are correct, the fault may be a candidate for having northern and southern sections.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <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. No data available on offset amounts, height or shape of scarps to guide slip-rate estimate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	1998 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. #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.

#4694 Longwell, C.R., Pampeyan, E.H., Bowyer, B., and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p., 16 pls.

#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.

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