

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](#).

Eleana Range fault (Class A) No. 1082

Last Review Date: 1998-12-04

citation for this record: Anderson, R.E., compiler, 1998, Fault number 1082, Eleana Range 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 Eleana Range fault strikes north to northeast near the east base of the Eleana Range and west margin of Yucca Flat, Nevada Test Site. Along the trace, the range slopes gently east and is transected by numerous cross drainages giving it a mature appearance. The trace is discontinuous and rocks of similar age are found on both sides the trace. A map of the surficial deposits in Yucca flat, at a scale of 1:48,000 (Swadley and Hoover, 1990 #1663), shows that most of the discontinuous trace is on deposits of early Pleistocene and Pliocene age; only along about 200 m of the trace is on younger deposits mapped as late and middle Pleistocene and these younger deposits are mapped as crossing the fault trace in several places, suggesting little if any activity since early Pleistocene time. A photogeologic map, however, shows a short scarp on deposits assigned a late Pleistocene age.
Name	Name taken from Piety (1995 #915). Refers to northeast-striking

comments	<p>fault segments and scarps along the southeast flank of the Eleana Range, which have been mapped by Swadley and Hoover (1990 #1663), Dohrenwend and others (1992 #289), and Reheis (1992 #1604). Piety (1995 #915) shows the fault on her compilation of Quaternary faults. The fault extends northeastward from about Grouse Canyon to east of Captain Jack Spring along the southeastern flank of the Eleana Range.</p> <p>Fault ID: Referred to as ER by Piety (1995 #915).</p>
County(s) and State(s)	<p>NYE COUNTY, NEVADA</p>
Physiographic province(s)	<p>BASIN AND RANGE</p>
Reliability of location	<p>Good Compiled at 1:100,000 scale.</p> <p><i>Comments:</i> Location is from (Reheis, 1992 #1604) and based on photogeologic mapping on 1:60,000 and 1:80:000 scale aerial photographs compiled on 100,000 scale topographic maps.</p>
Geologic setting	<p>The Eleana Range fault is in the western part of the northern Basin and Range. It is a northerly striking, east-dipping(?) fault with a slightly convex east trace at the east base of the Eleana Range and west margin of Yucca Flat, Nevada Test Site. The uplifted Eleana Range consists mainly of Paleozoic sedimentary rocks overlain by Tertiary volcanic rocks. The Paleozoic rocks generally dip east or southeast towards Yucca Flat, and the fault trace generally does not mark the east margin of the outcrops of Paleozoic rock, suggesting that the mapped trace does not mark a major range-front fault. Total displacement is not reported, but cannot be very large along the mapped trace because the contact between the Tertiary volcanic rocks and the Paleozoic rocks is exposed on both sides of the trace (Swadley and Hoover, 1990 #1663). Gravity data compiled at 1:250,000 (Healey and others, 1980 #3876) may show a small subbasin in western Yucca Flat that has a moderate gravity gradient against the Eleana Range. A moderate-displacement range-front fault may lie buried beneath the alluvium directly east of the mapped trace (Swadley and Hoover, 1990 #1663).</p>
Length (km)	<p>8 km.</p>
Average strike	<p>N22°E</p>

Sense of movement	Normal <i>Comments:</i> No specific slip data are reported, but the trend and position in the Basin and Range probably suggests primarily normal slip along a down-to-the-east, east-dipping fault as indicated by Carr (1974 #1470).
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	The eastern flank of the Eleana Range near the fault trace slopes gently eastward and is strongly incised by numerous cross drainages giving the range front a mature appearance. Scarps are discontinuous and generally do not mark the Paleozoic/alluvium contact (Swadley and Hoover, 1990 #1663). No scarp height data are reported, but the fault has no perceptible expression on a topographic map with a 20 foot contour interval.
Age of faulted surficial deposits	A map of the surficial deposits of the Yucca flat area at a scale of 1:48,000 (Swadley and Hoover, 1990 #1663) shows that most of the discontinuous fault trace is on deposits of early Pleistocene and Pliocene age (their QTa unit). Along only about 200 m of the trace length do they show the fault cutting younger deposits that are assigned a late and middle Pleistocene age (their Qap unit). These younger deposits (Qap) are also mapped as crossing the fault trace in several places, suggesting little if any activity since early Pleistocene time. Photogeologic mapping by Dohrenwend and others (1992 #289), however, shows one scarp on deposits or erosional surfaces assigned a late Pleistocene (10-130 ka) age.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> Geologic mapping by Swadley and Hoover (1990 #1663) suggests the most recent event is no older than early Pleistocene in age. Photogeologic mapping by Dohrenwend and others (1992 #289) suggests the most recent event may be as young as late Pleistocene in age. Age assignment is based on Swadley and Hoover (1990 #1663).

Recurrence interval	
Slip-rate category	<p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> Not reported; low slip rate selected on the basis of the faults geomorphic expression. The fault has a very weak geomorphic expression and its expression in Quaternary deposits is discontinuous.</p>
Date and Compiler(s)	<p>1998</p> <p>R. Ernest Anderson, U.S. Geological Survey, Emeritus</p>
References	<p>#1470 Carr, W.J., 1974, Summary of tectonic and structural evidence for stress orientation at the Nevada Test Site: U.S. Geological Survey Open-File Report 74-176, 53 p.</p> <p>#289 Dohrenwend, J.C., Schell, B.A., McKittrick, M.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Goldfield 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2183, 1 sheet, scale 1:250,000.</p> <p>#3876 Healey, D.L., Wahl, R.R., and Currey, F.E., 1980, Bouguer gravity map of Nevada-Goldfield and Mariposa sheets: Nevada Bureau of Mines and Geology Map 68, scale 1:250,000.</p> <p>#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.</p> <p>#1604 Reheis, M.C., 1992, Aerial photographic interpretation of lineaments and faults in late Cenozoic deposits in the Cactus Flat and Pahute Mesa 1:100,000 quadrangles and the western parts of the Timpahute Range, Pahrangat Range, Indian Springs, and Las Vegas 1:100,000 quadrangles, Nevada: U.S. Geological Survey Open-File Report 92-193, 14 p., 3 pls., scale 1:100,000.</p> <p>#1663 Swadley, W., and Hoover, D.L., 1990, Geologic map of the surficial deposits of the Yucca Flat area, Nye County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-2047, 1 sheet, scale 1:48,000.</p>

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