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.**

## Crossgrain Valley faults (Class A) No. 1069

**Last Review Date: 1998-04-10**

***citation for this record:*** **Anderson, R.E., compiler, 1998, Fault number 1069, Crossgrain Valley faults, 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 02:18 PM.**

| | |
|---|---|
| **Synopsis** | The Crossgrain Valley faults strike east-northeast and separate Crossgrain Valley on the north from North Ridge on the south. They may be part of a generally northeast-striking structural zone (the Spotted Range-Mine Mountain structural zone) containing faults of known or suspected sinistral displacement located in and near the southern part of the Nevada Test Site. Based on recent mapping at 1:100,000 scale, Quaternary deposits ranging from early to late Pleistocene are exposed locally along the trend of the Crossgrain Valley faults and are generally not faulted. According to that mapping, only a few hundred meters of the Crossgrain Valley faults have evidence of Quaternary displacement, and that evidence is in the form of middle Pleistocene deposits faulted against bedrock. The last displacement event may be middle Pleistocene (130-750 ka) or older. |
| **Name** | Name taken from Piety (1995 #915) from position of fault in |

| | |
|---|---|
| **comments** | Crossgrain Valley.<br><br>**Fault ID:** Referred to as fault CGV by Piety (1995 #915). |
| **County(s) and State(s)** | CLARK COUNTY, NEVADA<br>NYE COUNTY, NEVADA |
| **Physiographic province(s)** | BASIN AND RANGE |
| **Reliability of location** | Good<br>Compiled at 1:100,000 scale.<br><br>*Comments:* Fault is compiled from 1:100,000-scale mapping of Reheis (1992 #1604) based on photogeologic compilation from aerial photographs at scales of 1:62,500 to 1:80,000. Other compilations show limited fault traces mapped from photos at 1:58,000 scale (Dohrenwend and others, 1991 #288). |
| **Geologic setting** | The Crossgrain Valley faults are part of a group of relatively short (<20 km) northeast-striking faults located north of the northwest part of the Spring Mountains. From south to north this group includes the Peace Camp fault [1072], Cactus Spring fault [1071], South Ridge fault (not considered a Quaternary structure), Crossgrain Valley faults, Mercury Ridge faults [1070], and the Checkpoint Pass and Ranger Mountains faults (both not considered Quaternary structures). These faults are subparallel to a group of four main predominantly sinistral low-slip-rate Quaternary faults located directly to the west and northwest. This second group of faults forms the Spotted Range-Mine Mountain structural zone (SRMM) of Carr (1984 #1472), consisting of (from south to north) the Rock Valley [1065], Cane Spring [1067], Wahmonie [1068], and Mine Mountain [1066] faults. Together, the two groups of faults comprise a broad structural zone of northeast-striking faults that intersects and extends into the Las Vegas Valley shear zone; it is as much as 50 km wide across its northeast end. It is uncertain whether these faults are conjugate to the Las Vegas shear zone (Carr, 1984 #1472) or are early normal faults that were bent clockwise and reactivated in sinistral shear as a result of drag associated with dextral displacement on the Las Vegas shear zone (Ekren and others, 1968 #1508). |
| **Length (km)** | 9 km. |
| **Average strike** | N72°E |

| | |
|---|---|
| **Sense of movement** | Left lateral<br><br>*Comments:* Displacement on the fault along the front of North Ridge is shown as down to the northwest and left lateral (Barnes and others, 1982 #1441), whereas a 2.5 km trace at the southwestern end and a 4.5 km trace at the northeastern end displacement are shown as left-lateral faults (Reheis, 1992 #1604). |
| **Dip Direction** | NW |
| **Paleoseismology studies** | |
| **Geomorphic expression** | Faults both along the front of North Ridge and within Crossgrain Valley are shown as juxtaposing Quaternary alluvium against bedrock, but not as major range-front faults (Dohrenwend and others, 1991 #288). A 2-km-long trace near the center of the fault along the front of North Ridge is portrayed as having a northwest-facing scarp (Reheis, 1992 #1604). Two strands of the fault in Crossgrain Valley at the northeastern end of North Ridge are portrayed as having north-facing scarps (Reheis, 1992 #1604). |
| **Age of faulted surficial deposits** | On the basis of geologic mapping at 1:24,000 scale, faults along North Ridge and in Crossgrain Valley are shown as displacing pre-Quaternary bedrock or buried by Quaternary/Tertiary alluvium (Barnes and others, 1982 #1441). On the basis of photogeologic mapping of Quaternary faults (Dohrenwend and others, 1991 #288; Reheis, 1992 #1604), surficial expression of faults in the Crossgrain Valley area is on surfaces of both Quaternary and Tertiary deposits. A 2-km-long section of the fault along the front of North Ridge, a 0.5-km-long section along the fault in Crossgrain Valley along the southwestern end of North Ridge, and most of the fault in Crossgrain Valley along the northeastern end of North Ridge are shown as moderately to strongly expressed lineaments or scarps on surfaces of Quaternary deposits (Reheis, 1992 #1604). On the basis of recent unpublished geologic mapping at 1:100,000 scale of the Indian Springs quadrangle, P.L. Guth and J.C. Yount show stratigraphic subdivisions of Quaternary units along the trend of the fault, and most of the deposits are unfaulted. Deposits estimated to be middle Pleistocene are faulted along only 400 m of the flank of North Ridge, and deposits estimated to be early to middle Pleistocene (130 ka to 1.6 Ma) are faulted along a 400-m-long |

| | |
|---|---|
| | trace in Crossgrain Valley. |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | middle and late Quaternary (<750 ka)<br><br>*Comments:* The unpublished mapping by P.L. Guth and J.C. Yount shows Quaternary faulting to be limited to two short traces where early to middle Pleistocene deposits are faulted against bedrock. The apparent lack of faults in or scarps on Quaternary deposits ranging from early to late Pleistocene (Dohrenwend and others, 1991 #288) suggests that the last faulting event may have been as middle (130-750 ka) Pleistocene or older. |
| **Recurrence interval** | |
| **Slip-rate category** | Less than 0.2 mm/yr<br><br>*Comments:* Unpublished geologic mapping at 1:100,000-scale shows displacement only at alluvium/bedrock contacts. The scarps on Quaternary deposits noted by Reheis (1992 #1604) have not been studied. The late Quaternary characteristics of this fault (overall geomorphic expression, lack of 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. |
| **Date and Compiler(s)** | 1998<br>R. Ernest Anderson, U.S. Geological Survey, Emeritus |
| **References** | #1441 Barnes, H., Ekren, E.B., Rodgers, C.L., and Hedlund, D.C., 1982, Geologic and tectonic maps of the Mercury quadrangle, Nye and Clark Counties, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1197, 1 sheet, scale 1:24,000.<br><br>#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.<br><br>#1472 Carr, W.J., 1984, Regional structural setting of Yucca Mountain, southwestern Nevada, and late Cenozoic rates of tectonic activity in parts of the southwestern Great Basin, Nevada and California: U.S. Geological Survey Open-File Report 84-854, 114 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.<br><br>#1508 Ekren, E.B., Rogers, C.L., Anderson, R.E., and Orkild, P.P., 1968, Age of Basin and Range normal faults in Nevada Test Site and Nellis Air Force Range, Nevada, *in* Eckel, E.B., ed., Nevada Test Site: Geological Society of America Memoir 110, p. 247-250.<br><br>#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.<br><br>#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, Pahranagat 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. |