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.**

## Cactus Spring faults (Class A) No. 1071

**Last Review Date: 1998-04-15**

***citation for this record:*** **Anderson, R.E., compiler, 1998, Fault number 1071, Cactus Spring 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 Cactus Spring faults bound part of an unnamed east-trending ridge located directly north of an east-striking part of the dextral-slip Las Vegas Valley shear zone. They are also located at the southern margin of a group of generally northeast-striking faults that appear to be an extension of a 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. Despite their proximity to and parallelism with strike-slip faults, they are reported to be normal faults. Recent unpublished mapping shows Quaternary expression of the main fault at the northern margin of the ridge restricted to Pleistocene deposits faulted against bedrock or older Quaternary deposits and apparently does not include scarps developed on along-strike Pleistocene deposits. This restriction to contact areas (and the apparent lack of scarps in the along-strike Pleistocene deposits) suggests that the last displacement event |

| | |
|---|---|
| | was before the latest Pleistocene (>30 ka). The last displacement event can not be constrained closer than Quaternary, and no estimates of recurrence intervals or slip rates can be made. |
| **Name comments** | Name modified from Piety (1995 #915) who applied the name Cactus Spring fault to a single fault. Here, the name applies to a group of faults located between Indian Springs and Mercury, Nev.<br><br>**Fault ID:** Fault referred to as CAC 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:* The traces are compiled from Reheis (1992 #1604) who mapped at 1:100,000 scale from aerial photos at 1:60,000 and 1:80,000 scales. They are in poor agreement with traces shown on a recent unpublished geologic map of the 1:100,00-scale Indian Springs quadrangle by P.L. Guth and J.C. Yount. |
| **Geologic setting** | The easterly striking Cactus Spring faults are located directly north of an east-striking portion of the Las Vegas Valley shear zone, a major structure with presumed dextral displacement. Several of the north-trending major mountain ranges north of the shear zone have southern parts that bend clockwise into approximate parallelism with the shear zone. The easterly trending unnamed ridge along which the Cactus Spring faults are located may be an extreme example of this clockwise bending. The Cactus Spring faults appear to be the southernmost structures of a group of relatively short (<20 km) mainly northeast-striking faults located north of the northwest part of the Spring Mountains. From the Cactus Spring faults northward, this group includes the Peace Camp fault [1072], 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 and 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). According to Piety (1995 #915) the Cactus Spring faults have Quaternary expression continuously for about 12 km in a concave-southward arcuate trace at the northern margin of the ridge. According to recent unpublished 1:100,000-scale mapping by P.L. Guth and J.C. Yount, Quaternary expression is discontinuous and exists only along the western part of the arc. |
| **Length (km)** | 16 km. |
| **Average strike** | N78°E |
| **Sense of movement** | Normal<br><br>*Comments:* The main fault at the northern margin of an unnamed east-trending bedrock ridge that is characterized as dip slip, down to north (Reheis, 1992 #1604). Displacement sense is not reported for the minor faults along the southern side of the ridge. These faults are located directly north of the Las Vegas shear zone. A dextral slip component associated with the shear zone might be expected. |
| **Dip Direction** | Unknown<br><br>*Comments:* Not reported, probably north for the main fault at the northern margin of the unnamed ridge. |
| **Paleoseismology studies** | |
| **Geomorphic expression** | Most of the main fault is portrayed as juxtaposing Quaternary alluvium against bedrock, but not as a major range-front fault (Dohrenwend and others, 1991 #288). Thus, the morphology of the northern side of the unnamed ridge would be similar to that along a major range front but any fault scarps would be |

| | |
|---|---|
| | substantially lower, shorter, and less continuous than those along a major range-front fault (Dohrenwend and others, 1991 #288). Most of this same fault is shown by Reheis (1992 #1604) as a topographic lineament bounding a linear range front, with only a short (<2 km) trace shown as a lineament or scarp on Quaternary deposits. The geomorphic expression of faults along the southern margin of the ridge is not reported. |
| **Age of faulted surficial deposits** | Part of the main fault along the northern margin of the unnamed ridge is shown as weakly to moderately expressed lineaments or scarps on surfaces of Quaternary deposits (Reheis, 1992 #1604). Recent mapping at 1:100,000 scale by P. Guth and J. Yount shows the main fault as a set of discontinuous short (<2 km) traces restricted to the western part of the north flank of the ridge rather than along the entire ridge. One of those traces is on early Pleistocene alluvium and the others separate a mixed unit consisting of young (Holocene and late Pleistocene) and intermediate (middle and late Pleistocene) alluvium from older bedrock and Quaternary deposits. The only fault shown within the mixed stratigraphic unit is a short (700 m long) trace south of the ridge. That trace is located near two shorter traces (< 400 m long) that cut the intermediate-age unit (middle and late Pleistocene) but not the mixed unit. |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | undifferentiated Quaternary (<1.6 Ma)<br><br>*Comments:* The unpublished mapping by P.L. Guth and J.C. Yount shows that the restriction of faulting to contact areas (and the apparent lack of scarps in the along-strike Pleistocene deposits) suggests that the last displacement event was before the latest Pleistocene (>30 ka). The last displacement event can not be constrained closer than Quaternary. |
| **Recurrence interval** | |
| **Slip-rate category** | Less than 0.2 mm/yr<br><br>*Comments:* There are no published scarp-height data or stratigraphic relations that allow for estimates of slip rate. Low slip-rate category is assigned on the basis of poor geomorphic preservation and relative inactivity of similar distributed faults in |

| | |
|---|---|
| | the Basin and Range province. |
| **Date and Compiler(s)** | 1998<br>R. Ernest Anderson, U.S. Geological Survey, Emeritus |
| **References** | #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.<br><br>#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. |

Search...
Search
HomeAbout UsContactsLegal