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# 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.**

## Eastgate fault (Class A) No. 1189

**Last Review Date: 2000-09-21**

***citation for this record:*** **Lidke, D.J., compiler, 2000, Fault number 1189, Eastgate 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 02:17 PM.**

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| **Synopsis** | The southern part of this north- to northeast-striking fault is mostly characterized by a relatively continuous, down-to-the-west, fault that displaces bedrock of the Eastgate Hills against Quaternary piedmont-slope deposits. The northern part is characterized by a sinuous, northerly striking, west-facing scarp on piedmont-slope and piedmont deposits, north of the town of Eastgate. The southern part of the fault is a major, down-to-the-west, range-front fault; the west-facing direction of the scarp along the northern part of the fault also implies principally down-to-the-west offset. There is evidence along the northern part of the fault for at least one Quaternary faulting event that is no older than latest Pleistocene and probably no younger than middle Holocene in age, based on both scarp-morphology and soil age estimates. The fault has not been studied in detail; however, and little is actually known with certainty about its nature, character, and movement history. The principal sources of data consist of geologic mapping, reconnaissance photogeologic mapping, morphologic dating of fault scarps, soils development, and |

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| | reconnaissance geomorphic study of fault scarps and basal fault facets. |
| **Name comments** | Refers to fault mapped by Barrows (1971 #4361) and Dohrenwend and others (1992 #283) along the western flank of the northeast-trending Eastgate Hills. These hills are separated from the southeastern end of the Desatoya Mountains by Buffalo Creek valley. Barrows (1971 #4361) mapped and referred to this fault as the Eastgate fault, as did Pearthree (1990 #148). dePolo (1998 #2845) later portrayed and referred to this fault as the southern part (of three parts) of the Eastern Edwards Creek Valley fault system. The earlier name of Barrows (1971 #4361) and Pearthree (1990 #148), Eastgate fault, is used herein. The fault extends about 10 km north-northeast and 10 km south-southeast of the town of Eastgate.<br><br>**Fault ID:** Refers to fault that dePolo (1998 #2845) portrayed and labeled MI4C. |
| **County(s) and State(s)** | CHURCHILL COUNTY, NEVADA |
| **Physiographic province(s)** | BASIN AND RANGE |
| **Reliability of location** | Good<br>Compiled at 1:250,000 scale.<br><br>*Comments:* Location is from 1:250,000-scale map of Dohrenwend and others (1992 #283) that shows mapping based on photogeologic analysis of 1:58,000-nominal-scale, color-infrared photography, which was transferred directly to 1:100,000-scale topographic maps enlarged to the scale of the photographs. The 1:100,000-scale fault maps were reduced and compiled at 1:250,000-scale for final publication. |
| **Geologic setting** | This north- to northeast-striking fault could be divided into two parts on the basis of expression and geometry, although we don't believe that these parts actually constitute fault sections. The southern part is marked mainly by a down-to-the-west, range-front fault, and the northern part that is marked by west-facing scarps on Quaternary piedmont-slope deposits. Along the southern part, the fault places Tertiary volcanic rock of the Eastgate Hills against Quaternary piedmont-slope deposits of the adjacent valley. Barrows (1971 #4361) discussed evidence for |

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| | middle Miocene ancestry and activity along the southern part of the fault, which is based on the apparent discontinuity of Miocene lacus trine sediment across the fault. Along the northern part of the fault, there appears to be clear evidence for at least one Quaternary faulting event that probably is no older than early Holocene to latest Pleistocene (Pearthree, 1990 #148; Dohrenwend and others, 1992 #283). Stratigraphic relations across the range-front fault, as well as the west-facing direction of the scarps, imply mostly down-to-the-west Quaternary offset that probably reflects some continued Quaternary uplift of the Eastgate Hills relative to adjacent valley areas. The fault zone has not been studied in detail, however, and other estimates Quaternary offsets and slip rates have not been reported. |
| **Length (km)** | 18 km. |
| **Average strike** | N17°E |
| **Sense of movement** | Normal<br><br>*Comments:* Not specifically reported, however, the down-to-west range-front fault and west-facing scarps consistently indicate down-to-the-west offsets, which in this extensional regime probably reflects principally normal, dip-slip movement along westerly dipping faults. |
| **Dip** | 60°-90°W<br><br>*Comments:* Barrows (1971 #4361) reported that the Eastgate fault is a high-angle (dipping 60?) to vertical fault. |
| **Paleoseismology studies** | |
| **Geomorphic expression** | The southern part of fault is characterized by a relatively continuous, north- to northeast-striking, down-to-the-west, range-front fault that splays out into several short, west-facing scarps near its southern end (Pearthree, 1990 #148; Dohrenwend and others, 1992 #283). The northern part of the fault is expressed by a relatively continuous, north-striking, arcuate, west-facing scarp(s) (Dohrenwend and others, 1992 #283) on Quaternary alluvium and alluvial surfaces of several different ages (Pearthree, 1990 #148). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 110 m (98-122 m). |

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| **Age of faulted surficial deposits** | Based on reconnaissance photogeologic mapping, Dohrenwend and others (1992 #283) assigned ages as young as latest Pleistocene to Holocene to faulted Quaternary deposits and surfaces along the northern part of the fault zone. Pearthree (1990 #148) assigned an early Holocene age to soil developed on the youngest, faulted alluvial surface along the northern part of the fault, but he noted that a late Holocene terrace in the same area is not faulted. |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | latest Quaternary (<15 ka)<br><br>*Comments:* The timing of the most recent prehistoric faulting event appears to be well constrained based on relative dating criteria. Reconnaissance photogeologic mapping by Dohrenwend and others (1992 #283) indicates that the most recent prehistoric faulting event is no older than latest Pleistocene (<30 ka) age. Pearthree (1990 #148) reported Holocene scarp age (4.2-8.0 ka) based on morphologic analyses of a few scarp profiles along the northern part of the fault. Pearthree (1990 #148) also reported an early Holocene age estimate for soil developed on the youngest faulted alluvial surface of the northern part of the fault, which is in agreement with his scarp age estimates. |
| **Recurrence interval** | *Comments:* Geomorphic or stratigraphic data needed for estimating recurrence are not reported. Barrows (1971 #4361) reported the presence of at least eight terrace levels within the alluvial basin of Buffalo Creek, which is located several kilometers directly east of the Eastgate Hills and the southern part of the fault. Barrows (1971 #4361) suggested that these terrace levels, and the corresponding base levels for these terraces, may have been controlled by faulting events along the Eastgate fault. |
| **Slip-rate category** | Less than 0.2 mm/yr<br><br>*Comments:* No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.214 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate. The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many |

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| | seismic cycles, and thus the derived slip rate reflects a long-term average. However, the late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is of a lesser magnitude. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault. |
| **Date and Compiler(s)** | 2000<br>David J. Lidke, U.S. Geological Survey |
| **References** | #4361 Barrows, K.J., 1971, Geology of the southern Desatoya Mountains, Churchill and Lander Counties, Nevada: Los Angeles, University of California, unpublished Ph.D. dissertation, 348 p., 1 pl., scale 1:24,000.<br><br>#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.<br><br>#283 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Millett 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2176, 1 sheet, scale 1:250,000.<br><br>#148 Pearthree, P.A., 1990, Geomorphic analysis of young faulting and fault behavior in central Nevada: Tucson, University of Arizona, unpublished Ph.D. dissertation, 212 p. |

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