

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](#).

Walnut Creek fault (Class B) No. 2339

Last Review Date: 2001-04-10

Compiled in cooperation with the Colorado Geological Survey

citation for this record: Widmann, B.L., compiler, 2001, Fault number 2339, Walnut Creek 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 03:00 PM.

Synopsis	The Walnut Creek Fault is east of the Rocky Flats Plant. The fault coincides with a strong tonal lineament on aerial photographs and offsets the contact between the Upper Cretaceous Laramie Formation and the Quaternary Rocky Flats Alluvium. The surface of the early Quaternary Rocky Flats Alluvium does not appear to be displaced, so evidence for Quaternary faulting is not strong. Therefore, the Rock Creek fault is herein considered to be a suspected (Class B) Quaternary fault.
Name comments	The Walnut Creek fault is near the Rocky Flats Plant, northwest of Denver. The fault extends northeastward from Woman Creek to just north of Walnut Creek.

County(s) and State(s)	JEFFERSON COUNTY, COLORADO
Physiographic province(s)	GREAT PLAINS
Reliability of location	Good Compiled at 1:250,000 scale. <i>Comments:</i> This fault was mapped at a scale of 1:24,000 by Risk Engineering, Inc. (1994 #6877).
Geologic setting	The Walnut Creek Fault is located in the High Plains region just east of the Rocky Mountain Front Range. The fault is downthrown to the southeast and may become listric at depth where it is apparently floored within the Upper Cretaceous Laramie Formation (Risk Engineering, Inc., 1994 #6877).
Length (km)	3 km.
Average strike	N31°E
Sense of movement	Reverse <i>Comments:</i> The Walnut Creek Fault appears to be a steeply-dipping, listric reverse fault (Risk Engineering, Inc., 1994 #6877).
Dip	75°-90° NW <i>Comments:</i> Although the fault is not clearly exposed at the surface, indirect evidence such as borehole data, geology, and topography suggest the Walnut Creek Fault dips 75° to 90° to the northwest (Risk Engineering, Inc., 1994 #6877).
Paleoseismology studies	
Geomorphic expression	The Walnut Creek Fault is marked by a strong tonal lineament. The contact between the Upper Cretaceous Laramie Formation and the overlying Quaternary Rocky Flats Alluvium appears as a fairly distinct step on aerial photographs. This contact is offset by the fault in a down-to-the-east manner. However, longitudinal profiles across the fault trace suggest that there has been little to no vertical displacement of the Rocky Flats Alluvium surface (Risk Engineering, Inc., 1994 #6877).

Age of faulted surficial deposits	Risk Engineering, Inc. (1994 #6877) concluded that the Walnut Creek fault probably offsets the contact between the Upper Cretaceous Laramie Formation and the early Quaternary Rocky Flats Alluvium, but it does not appear to offset the surface of the Rocky Flats Alluvium, which is estimated to be 900 ka to 1.9 Ma.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> The contact between the Upper Cretaceous Laramie Formation and the Quaternary Rocky Flats Alluvium is offset by the Walnut Creek fault at a depth of about 9 m, but the surface of the the Rocky Flats Alluvium does not appear to be displaced (Risk Engineering, Inc., 1994 #6877).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Risk Engineering, Inc. (1994 #6877) calculated a probable slip rate of 0.01 mm/yr based on 9 m of offset in 900 ka. Widmann and others (1998 #3441) placed this fault within the <0.2 mm/yr slip-rate category.
Date and Compiler(s)	2001 Beth L. Widmann, Colorado Geological Survey
References	#6877 Risk Engineering, Inc., 1994, Seismic hazard analysis for Rocky Flats Plant: Unpublished report prepared for EG&G Rocky Flats, Inc., Golden, Colorado. #3441 Widmann, B.L., Kirkham, R.M., and Rogers, W.P., 1998, Preliminary Quaternary fault and fold map and database of Colorado: Colorado Geological Survey Open-File Report 98-8, 331 p., 1 pl., scale 1:500,000.

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