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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.

unnamed faults in Williams Fork Valley (Class A) No. 2300

Last Review Date: 2011-03-14

Compiled in cooperation with the Colorado Geological Survey

citation for this record: **Widmann, B.L., and Haller, K.M., compilers, 2011, Fault number 2300, unnamed faults in Williams Fork Valley, 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	These faults are on the floor of a Neogene graben that occupies the hanging wall of the Laramide Williams Fork thrust sheet. Rocks of the Miocene Troublesome Formation are offset by the graben-bounding faults and Quaternary deposits are offset by this group of faults on the floor of the graben. Topographic breaks (escarpments) as much as 75 m in height are present on rocks of the Troublesome Formation and possibly pre-Bull Lake gravel (Kirkham and Rogers, 1981 #792).
Name comments	This is a group of faults that are in the Neogene Williams Fork Valley graben. The graben is southeast of Kremmling, Colo., between the

	Williams Fork Range on the west and the Vasquez Mountains on the east. The faults trend in a variety of directions. The graben is formed in the hanging wall of the Laramide Williams Fork thrust sheet (Unruh and others, 1993 #2777). **Fault ID:** Fault 55 in Kirkham and Rogers (1981 #792) and fault number Q49 of Widman and others (1998 #3441).
County(s) and State(s)	GRAND COUNTY, COLORADO
Physiographic province(s)	SOUTHERN ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* These faults were mapped at 1:62,500 scale by Tweto and Reed (1973 #2771) and 1:250,000 scale by Tweto and others (1978 #2770). Kirkham (2004 #7056) illustrates the fault in figure 4 based on the earlier mapping noted above.
Geologic setting	These are predominately high-angle normal faults that are down to the northwest, south, and northeast. The faults lie on the floor of a Neogene graben formed in the hanging wall of the Laramide Williams Fork thrust. Orientation of the faults is roughly perpendicular to the northwest-trending graben.
Length (km)	18 km.
Average strike	N19°E
Sense of movement	Normal *Comments:* Kirkham and Rogers (1981 #792) suggested these faults are probably normal.
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	Several of the faults are marked by prominent topographic breaks (escarpments), some as much as 75 m high. The elevation of gravels of corresponding age changes across the faults, and lineaments are also noticeable (Kirkham and Rogers, 1981 #792).

Age of faulted surficial deposits	Tweto and Reed (1973 #2771) and Tweto and others (1978 #2770) showed offset of pre-Bull Lake deposits. Kirkham and Rogers (1981 #792) also recognized offset of pre-Bull Lake deposits and further stated that there is no offset of Bull Lake deposits (late middle Pleistocene). The faults bring pre-Bull Lake deposits into contact with rocks of the Miocene Troublesome Formation. Kirkham (2004 #7056) adds that Pleistocene gravels cap several mesas within the center of the graben and tilting of these gravel-capped mesas and elevation differences between adjacent mesas is due to tectonism.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Pre-Bull Lake (>130 ka) deposits are offset by these faults. Bull Lake deposits, however, are not offset thus constraining the latest movement of the fault to the middle and late Quaternary, prior to 130 ka (Kirkham and Rogers, 1981 #792). Colman (1985 #1953) also indicated the most recent paleoevent on these faults occurred during the middle to late Pleistocene. Kirkham (2004 #7056) suggests that anomalous parallel and linear drainages within the graben likely relate to late Quaternary structural deformation, but not directly attributed to the faults shown here.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Widmann and others (1998 #3441) placed these faults within the <0.2 mm/yr slip-rate category based on 75 m of offset (scarp height) of the Miocene Troublesome Formation and pre-Bull Lake gravel (Kirkham and Rogers, 1981 #792).
Date and Compiler(s)	2011 Beth L. Widmann, Colorado Geological Survey Kathleen M. Haller, U.S. Geological Survey
References	#1953 Colman, S.M., 1985, Map showing tectonic features of late Cenozoic origin in Colorado: U.S. Geological Survey Miscellaneous Geologic Investigations I-1566, 1 sheet, scale 1:1,000,000. #7056 Kirkham, R.M., 2004, Quaternary faulting in the Williams Fork valley graben, north-central Colorado, and comparison with late Quaternary deformation near Spinney Mountain, central Colorado: Technical report to U.S. Geological Survey, Reston, Virginia, under

Contract 02HQGR0102, 46 p., http://earthquake.usgs.gov/research/external/reports/02HQGR0102.pdf

#792 Kirkham, R.M., and Rogers, W.P., 1981, Earthquake potential in Colorado: Colorado Geological Survey Bulletin 43, 171 p., 3 pls.

#2771 Tweto, O., and Reed, J.C., Jr., 1973, Reconnaissance geologic map of the Ute Peak 15-minute quadrangle, Grand and Summit Counties, Colorado: U.S. Geological Survey Open-File Report 73-288.

#2770 Tweto, O., Moench, R.H., and Reed, J.C., 1978, Geologic map of the Leadville 1° x 2° quadrangle, northwestern Colorado: U.S. Geological Survey Miscellaneous Geologic Investigations I-999.

#2777 Unruh, J.R., Wong, I.G., Bott, J.D.J., Silva, W.J., and Lettis, W.R., 1993, Seismotectonic evaluation, Rifle Gap Dam, Silt Project, Ruedi Dam, Fryingpan-Arkansas Project, northwestern Colorado: U.S. Bureau of Reclamation, 154 p.

#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.