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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.

Basalt Mountain fault (Class B) No. 2299

Last Review Date: 1998-01-12

Compiled in cooperation with the Colorado Geological Survey

citation for this record: **Widmann, B.L., and Kirkham, R.M., compilers, 1998, Fault number 2299, Basalt Mountain 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 Basalt Mountain fault is a major down-to-the-east Laramide reverse fault that was reactivated during the late Cenozoic in a normal sense, probably as a result of salt tectonism (Unruh and others, 1993 #2777; Kirkham and others, 1998 #2712; Streufert and others, 1998 #2754). The Basalt Mountain fault forms the eastern margin of the Carbondale collapse center, a large late Cenozoic structural depression due to flowage and dissolution of the Pennsylvanian evaporites within the Carbondale collapse center (Kirkham and Widmann, 1997 #2711; Kirkham and others, 1998 #2712). Late Cenozoic movement on the fault is related to regional collapse associated with evaporite tectonism. Late Cenozoic fault activity is evidenced by Pliocene and Miocene

	volcanic rocks that are sharply tilted westward into the collapse center along the northern end of the fault (Kirkham and others, 1998 #2712). Evidence of Quaternary movement was reported only for the south end of the Basalt Mountain fault, which extends from near the town of Basalt to Sopris Creek parallel to the Roaring Fork River Valley. Unruh and others (1993 #2777) reported that Pleistocene terraces are faulted and tilted along the south end of the fault. Streufert and others (1998 #2754) interpreted these deformed deposits as Tertiary sediments with cut terraces of Quaternary age developed on them. Widmann and others (1998 #3441) included the south end of the fault in their Quaternary fault database, but stated that evidence for Quaternary movement was equivocal. In as much as the faulting may be aseismic (salt related), we consider this to be a Class B structure.
Name comments	The Basalt Mountain fault is a curvilinear fault that extends from Cottonwood Creek southward along the west flank of Basalt Mountain to near Sopris Creek. Welder (1954 #2786) referred to this fault as the West Basalt Mountain fault. Unruh and others (1993 #2777), Streufert and others (1997 #2753; 1998 #2754) and Kirkham and others (1998 #2712) simply called the entire structure the Basalt Mountain fault, which is the terminology adopted herein. Possible Quaternary movement has only been recognized on the southern end of the fault, from the town of Basalt to near Sopris Creek. **Fault ID:** Fault number Q48 of Widman and others (1998 #3441).
County(s) and State(s)	PITKIN COUNTY, COLORADO
Physiographic province(s)	SOUTHERN ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* All or parts of the Basalt Mountain fault were mapped at a scale of 1:24,000 by Kirkham and others (1998 #2712), Streufert and others (1998 #2754), 1:31,680 by Welder (1954 #2786), 1:250,000 by Tweto and others (1978 #2770) and Unruh and others (1993 #2753), and 1:250,000 and 1:500,000 by Widmann and others (1998 #3441). The trace used herein is from Kirkham and others (1998 #2712), Streufert and others

	(1998#2754), and Unruh and others (1993 #2753).
Geologic setting	During the Laramide, the Basalt Mountain fault behaved as a down-to-the-east reverse or thrust fault (Unruh and others, 1993 #2777; Kirkham and Widmann, 1997 #2711). During the late Cenozoic, the Basalt Mountain fault has served as the eastern margin of the Carbondale collapse center, a large late Cenozoic structural depression due to flowage and dissolution of underlying Pennsylvanian evaporitic rocks. Movement during the late Cenozoic has been down to the west.
Length (km)	7 km.
Average strike	N56°W
Sense of movement	Normal *Comments:* Although Laramide movement on the fault has been interpreted as reverse by Streufert and others (1997 #2753; 1998 #2754) and as thrust or tear by Unruh and others (1993 #2753), late Cenozoic tilting along the fault is normal (Kirkham and others, 1998 #2712; Streufert and others, 1998 #2754).
Dip Direction	SW *Comments:* The dip and dip direction on the fault plane have not been definitively determined. The large amount of stratigraphic throw (about 1,300 m in pre-Miocene bedrock) favors a low-angle fault model. However, the straight map trace of the fault suggests a high-angle fault (Unruh and others, 1993 #2777).
Paleoseismology studies	
Geomorphic expression	Scarps on Pleistocene terraces and tilted Pleistocene terraces were reported on the southern end of the southern section of the Basalt Mountain fault by Unruh and others (1993 #2777).
Age of faulted surficial deposits	Unruh and others (1993 #2777) reported that Pleistocene terraces on the southern section of the fault are tilted and faulted, and they documented late Tertiary to early Quaternary offset of about 70 m. Streufert and others (1998 #2754) interpreted these deformed surfaces as Pleistocene cut terraces developed on Tertiary gravel.
Historic	

earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Possible Quaternary movement on the southern end of the fault was suggested by Unruh and others (1993 #2777), but this evidence is debatable (Streufert and others, 1998 #2754; Widmann and others, 1998 #3441). In as much as the faulting may be aseismic (salt related), the fault is considered to be a Class B structure.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Unruh and others (1993 #2777) calculated a dip-slip rate of 0.02 to 0.04 mm/yr for the south end of the Basalt Mountain fault.
Date and Compiler(s)	1998 Beth L. Widmann, Colorado Geological Survey Robert M. Kirkham, Colorado Geological Survey
References	#2711 Kirkham, R.M., and Widmann, B.L., 1997, Geologic map of the Carbondale quadrangle, Garfield County, Colorado: Colorado Geological Survey Open-File Report 97-3. #2712 Kirkham, R.M., Widmann, B.L., and Streufert, R.K., 1998, Geologic map of the Leon quadrangle, Eagle and Garfield County, Colorado: Colorado Geological Survey Open-File Report 98-3. #2753 Streufert, R.K., Kirkham, R.M., Widmann, B.L., and Schroeder, T.J., II, 1997, Geologic map of the Cottonwood Pass quadrangle, Eagle and Garfield Counties, Colorado: Colorado Geological Survey Open-File Report 97-4. #2754 Streufert, R.K., Widmann, B.L., and Kirkham, R.M., 1998, Geologic map of the Basalt quadrangle, Eagle, Garfield, and Pitkin Counties, Colorado: Colorado Geological Survey Open-File Report 98-1. #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. #2786 Welder, G.E., 1954, Geology of the Basalt area, Eagle and Pitkin Counties: Boulder, University of Colorado, unpublished M.S. thesis, 72 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.