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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.

Little Dolores River fault (Class A) No. 2251

Last Review Date: 1997-06-11

Compiled in cooperation with the Utah Geological Survey and the Colorado Geological Survey

citation for this record: **Widmann, B.L., compiler, 1997, Fault number 2251, Little Dolores River 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 03:01 PM.**

Synopsis	The Little Dolores River fault extends from Utah into Colorado on the northeast flank of the Uncompahgre Uplift. Evidence for Quaternary movement on this fault was cited in Witkind (1976 #2792) as a personal communication with Fred Cater. Based on the timing of abandonment of Unaweep Canyon, Cater (1966 #2671) indicated uplift of the Uncompahgre Plateau began in the mid-Pliocene and continued into the Pleistocene, resulting in as much as 640 m of differential uplift. Despite the lack of evidence of faulted Quaternary deposits along the Little Dolores River fault, the fault has been classified as a Quaternary structure

	(Howard and others, 1978 #312; Kirkham and Rogers, 1981 #792; Colman, 1985 #1953), and no references have been published that refute this age assignment.
Name comments	The majority of the Little Dolores River fault is in Utah. This northwest-trending fault extends southeast from Westwater Canyon in Utah into Colorado along the northeast flank of Snyder Mesa. The fault crosses the Little Dolores River just before entering Colorado. The fault lies on the northeast flank of the Uncompahgre Uplift. This fault is part of Hecker's (1993 #642) Uncompahgre fault zone. **Fault ID:** Fault 75 in Kirkham and Rogers (1981 #792); fault 281 in Witkind (1976 #2792); fault number Q1 of Widman and others (1998 #3441); and part of fault number 18-3 in Hecker (1993 #642).
County(s) and State(s)	MESA COUNTY, COLORADO GRAND COUNTY, UTAH
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* The fault was mapped by Cashion (1973 #2662) at a scale of 1:250,000 and and Gualtieri (1988 #4457) at a scale of 1:100,000.
Geologic setting	This fault lies on the northeast margin of the Uncompahgre Uplift and crosses the Utah/Colorado border near the Little Dolores River. The Uncompahgre Uplift is a northwest-trending, east-tilted fault block. The Little Dolores River fault is a high-angle fault that is down to the northeast.
Length (km)	15 km.
Average strike	N55°W
Sense of movement	Reverse *Comments:* Heyman (1983 #2697) mapped this as a down-to-the-northeast reverse fault that dips 85? SW. Kirkham and Rogers (1981 #792) had listed this fault as normal.

Dip	85° SW *Comments:* Heyman (1983 #2697) measured a dip of 85? SW for the Little Dolores River fault in Utah in the vicinity of T. 20S., R.24E., but this is not believed to represent overall fault dip.
Paleoseismology studies	
Geomorphic expression	Geomorphic indicators of youthful faulting have not been reported.
Age of faulted surficial deposits	The Salt Wash Sandstone Member of the Jurassic Morrison Formation is the youngest deposit known to be offset by this fault. The majority of the fault lies in Precambrian to lower Mesozoic bedrock, and about 5 percent of the fault is concealed by Quaternary deposits (Cashion, 1973 #2662).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Despite a lack of evidence for offset in Quaternary deposits, faults associated with the Uncompahgre Uplift are often considered to have experienced Quaternary movement. Evidence for Quaternary movement on this fault was cited in Witkind (1976 #2792) based on personal communication with Fred Cater. Based on the timing of abandonment of Unaweep Canyon, Cater (1966 #2671) indicated uplift of the Uncompahgre Plateau began in the mid-Pliocene and continued into the Pleistocene, resulting in as much as 640 m of differential uplift. There is no other published evidence that Quaternary deposits are offset by this structure. Despite the lack of evidence for Quaternary movement, this fault has been classified as a Quaternary fault in numerous compilations (e.g. Howard and others, 1978 #312; Kirkham and Rogers, 1981 #792; Colman, 1985 #1953), and no published data exists to refute this age assignment.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Based on the lack of fault-related geomorphic features in Quaternary deposits and on calculations of an overall uplift rate

	of 0.4 mm/yr since 1.8 Ma for the Uncompahgre uplift (Perry, 1989 #2731; Perry and Annis, 1990 #4458), a geologic slip rate of less than 0.2 mm/yr is estimated for this fault (Widmann and others, 1998 #3441).
Date and Compiler(s)	1997 Beth L. Widmann, Colorado Geological Survey
References	#2662 Cashion, W.B., 1973, Geologic and structure map of the Grand Junction quadrangle, Colorado and Utah: U.S. Geological Survey Miscellaneous Geologic Investigations I-736. #2671 Cater, F.W., Jr., 1966, Age of the Uncompahgre Uplift and Unaweep Canyon, west-central Colorado: U.S. Geological Survey Professional Paper 550-C, 86-92 p. #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. #4457 Gualtieri, J.L., 1988, Geologic map of the Westwater 30' x 60' quadrangle, Grand and Uintah Counties, Utah and Garfield and Mesa Counties, Colorado: U.S. Geological Survey Miscellaneous Investigations Series Map I-1765, scale 1:100,000. #642 Hecker, S., 1993, Quaternary tectonics of Utah with emphasis on earthquake-hazard characterization: Utah Geological Survey Bulletin 127, 157 p., 6 pls., scale 1:500,000. #2697 Heyman, O.G., 1983, Distribution and structural geometry of faults and folds along the northwestern Uncompahgre Uplift, western Colorado and eastern Utah, *in* Averett, W., ed., Northern Paradox Basin—Uncompahgre Uplift: Grand Junction Geological Society, p. 45-57. #312 Howard, K.A., Aaron, J.M., Brabb, E.E., Brock, M.R., Gower, H.D., Hunt, S.J., Milton, D.J., Muehlberger, W.R., Nakata, J.K., Plafker, G., Prowell, D.C., Wallace, R.E., and Witkind, I.J., 1978, Preliminary map of young faults in the United States as a guide to possible fault activity: U.S. Geological Survey Miscellaneous Field Studies Map MF-916, 2 sheets, scale 1:5,000,000. #792 Kirkham, R.M., and Rogers, W.P., 1981, Earthquake

	potential in Colorado: Colorado Geological Survey Bulletin 43, 171 p., 3 pls. #4458 Perry, T.W., and Annis, D.R., 1990, Pleistocene history of the Gunnison River in Unaweep Canyon, Colorado, and implications for Colorado Plateau uplift: Geological Society of America Abstracts with Programs, v. 22, no. 3, p. 75. #2731 Perry, T.W.V., 1989, Tectonic inference and computer simulation in stream longitudinal profile evolution, Unaweep Canyon and vicinity, Colorado and Utah: Geological Society of America Abstracts with Programs, v. 21, no. 6, p. 269. #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. #2792 Witkind, I.J., 1976, Preliminary map showing known and suspected active faults in Colorado: U.S. Geological Survey Open-File Report 76-154.