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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.

Redlands fault complex (Class A) No. 2252

Last Review Date: 1997-06-12

Compiled in cooperation with the Colorado Geological Survey

citation for this record: **Widmann, B.L., compiler, 1997, Fault number 2252, Redlands fault complex, 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 Redlands fault complex forms the northeast margin of the Uncompahgre Uplift and consists of three faults and two monoclines. Evidence for Quaternary movement on this fault complex is cited in Witkind (1976 #2792) as a personal communication with Fred Cater. Based on the timing of abandonment of Unaweep Canyon by the Gunnison River, Cater (1966 #2671) indicated the Uncompahgre Plateau began to rise 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 Redlands fault complex, the fault has been classified as a Quaternary fault (e.g. 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 Redlands fault complex forms the northeast margin of the Uncompahgre Uplift and consists of three faults and two monoclines, all of which have a general northwest trend. The fault complex is in the Colorado National Monument, southwest of Grand Junction. It extends along the northeast boundary of the Monument then bends west toward Horsethief and Mee Canyons. Features included in this complex include from west to east, the Flume Canyon fault, an unnamed monocline, the Kodel's Canyon fault, the Lizard Canyon monocline, and the Redlands fault (Lohman, 1963 #2718). **Fault ID:** Fault 65 in Kirkham and Rogers (1981 #792); fault 283 in Witkind (1976 #2792), and fault number Q2 of Widman and others (1998 #3441).
County(s) and State(s)	MESA COUNTY, COLORADO
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* This fault and fold complex was mapped at a scale of 1:31,680 by Lohman (1963 #2718; 1965 #2719). Cashion (1973 #2662) showed this structure in much less detail at a scale of 1:250,000. The trace used herein is from Lohman (1965 #2719).
Geologic setting	The Redlands fault complex forms the northeast flank of the Uncompahgre Uplift near Grand Junction. The Uncompahgre Uplift is a northwest-trending east-tilted fault block. Faults in the northwest-trending Redlands complex are generally high-angle normal, but in some areas reverse. The faults commonly transition into faulted monoclines. The Kodel's Canyon fault extends to Fruita Canyon and gradually becomes the Lizard Canyon monocline. Near the mouth of Monument Canyon, the Lizard Canyon monocline merges with the Redlands fault. Maximum displacement on the Flume Canyon and Kodel's Canyon faults is about 100 m, and maximum displacement on the Redlands fault is 244 m (Lohman, 1965 #2719). This fault complex occurs in a tectonically weakened area above the ancestral Garmesa and

	Douglass Creek fault zones (Stone, 1977 #2749).
Length (km)	21 km.
Average strike	N54°W
Sense of movement	Normal, Reverse *Comments:* Kirkham and Rogers (1981 #792), Lohman (1965 #2719) and Witkind (1976 #2792) reported both normal and reverse movement on the faults. The Flume Creek fault was mapped as a reverse fault by Heyman (1983 #2697).
Dip	45° SW *Comments:* Measurements of reverse movement on the Redlands fault are from two locations at the mouths of Gold Star Canyon and a smaller canyon, both located in the SE 1/4 SW 1/4 of sec. 30, T1S, R1W (Lohman, 1965 #2719). Heyman (1983 #2697) measured a dip of 75?-80? on the Flume Creek fault in the vicinity of T11S, R101W.`
Paleoseismology studies	
Geomorphic expression	Geomorphic indicators of youthful faulting have not been reported.
Age of faulted surficial deposits	The Upper Triassic Kayenta Formation is the youngest deposit offset across this fault complex, with as much as 240 m of throw (Lohman, 1965 #2719). Quaternary deposits are absent along the fault trace and the entire fault is in Paleozoic to lower Mesozoic bedrock.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Quaternary deposits are generally absent in this area, making it difficult to recognize Quaternary movement on the faults. Faults associated with the Uncompahgre Uplift are often considered to have experienced Quaternary movement. Evidence for Quaternary movement is cited in Witkind (1976 #2792) based on personal communication with Fred Cater. Based on the timing of abandonment of Unaweep Canyon by the Gunnison River,

	Cater (1966 #2671) indicated uplift 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, the Redlands fault complex has been classified as a Quaternary fault (e.g. Howard and others, 1978 #312; Kirkham and Rogers, 1981 #792; Colman, 1985 #1953), and no references have been published that refute this age assignment.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Widmann and others (1998 #3441) placed this structure within the <0.2 mm/yr slip-rate category based on calculations of an overall uplift rate of 0.4 m/1000 yr since 1.8 Ma for the Uncompahgre Uplift (Perry, 1989 #2731).
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. #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. #2718 Lohman, S.W., 1963, Geologic map of Grand Junction area, Colorado: U.S. Geological Survey Miscellaneous Geologic Investigations I-404. #2719 Lohman, S.W., 1965, Geology and artesian water supply of the Grand Junction area, Colorado: U.S. Geological Survey Professional Paper 451, 149 p. #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. #2749 Stone, D.S., 1977, Tectonic history of the Uncompahgre Uplift, *in* Veal, H.K., ed., Exploration Frontiers of the central and southern Rockies: Rocky Mountain Association of Geologists, 1977 Field Conference Guidebook, p. 23-30. #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.