

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](#).

Log Hill Mesa graben (Class A) No. 2275

Last Review Date: 2015-10-26

Compiled in cooperation with the Colorado Geological Survey

citation for this record: Widmann, B.L., and Haller, K.M., compilers, 2015, Fault number 2275, Log Hill Mesa graben, 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 03:02 PM.

Synopsis	The Log Hill Mesa graben is at the southwest margin of the Uncompahgre Uplift. It extends northwest from the Ridgway fault [2276]. The graben is defined by well-developed fault scarps on upper Pleistocene fan deposits, however post-Pinedale (<15 ka) alluvial-fan deposits are not offset by the fault. The most recent paleoevent on this graben is herein considered to have occurred during the late Quaternary (<130 ka).
Name comments	The Log Hill Mesa graben is defined by at least three strands that form a zone about 0.7 km wide and 3 to 5 km long (Piety and Ostenaar, 2005 #7277). The intervening graben is northwest of the town of Ridgway and extends diagonally between the Busted

	<p>Boiler [2274] and Ridgway [2276] faults. This structure was named by Lettis and others (1996 #4453).</p> <p>Fault ID: Fault number Q25 of Widman and others (1998 #3441).</p>
County(s) and State(s)	OURAY COUNTY, COLORADO
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	<p>Good Compiled at 1:250,000 scale.</p> <p><i>Comments:</i> Sullivan and others (1980 #2756) mapped the western fault of the graben. Steven and Hail (1989 #2747) mapped the north half of the western fault at a scale of 1:100,000. Lettis and others (1996 #4453) showed both faults at a scale of 1:250,000. The fault trace used herein is from Lettis and others (1996 #4453).</p>
Geologic setting	The Log Hill Mesa graben is on the southeast margin of the Uncompahgre Uplift, which is a northwest-trending, east-tilted fault block. The faults that define the graben are high-angle normal faults with throw east and west into the graben. The fault is part of a 55-km-long, 12- to 15-km-wide, northwest-trending zone of geomorphic features formed by repeated Quaternary fault displacements in the southeastern Uncompahgre Plateau that includes the Busted Boiler [2274] and the Roubideau Creek [2270] faults (Piety and Ostenna, 2009 #7271).
Length (km)	9 km.
Average strike	N32°W
Sense of movement	<p>Normal</p> <p><i>Comments:</i> Lettis and others (1996 #4453) reported normal movement on the west-dipping eastern fault.</p>
Dip Direction	<p>NE; SW</p> <p><i>Comments:</i> Lettis and others (1996 #4453) reported a west-dipping fault plane for the eastern fault, although the more general dip directions are NE and SW.</p>

Paleoseismology studies	
Geomorphic expression	A well expressed fault scarp is associated with the graben-bounding faults according to Lettis and others (1996 #4453). The scarp along the western strand of the Log Hill Mesa fault zone is pronounced (up to 75 m), which may suggest the Log Hill Mesa fault zone may be the dominant geologic structure in this part of the Uncompahgre Uplift (Piety and Ostenaar, 2005 #7277).
Age of faulted surficial deposits	Sullivan and others (1980 #2756) noted zones of shingled gravel that have as much as 3 m of offset. Lettis and others (1996 #4453) reported that Pleistocene pediment surfaces are clearly offset by the graben-bounding faults and that a middle to late (?) Pleistocene fan is possibly offset by the eastern fault. Younger post-Pinedale fan deposits are not offset by the eastern fault. The fault lies almost entirely within the Cretaceous Dakota Sandstone, with less than 3 percent of the fault extending into Quaternary deposits.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) <i>Comments:</i> The most recent paleoevent on the faults bounding the Log Hill Mesa graben occurred after deposition of Pleistocene pediment deposits. The eastern fault may have moved after deposition of middle to late (?) Pleistocene fan deposits, but before deposition of post-Pinedale fan deposits. Fault movement is herein considered to have occurred during the late Quaternary.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Sullivan and others (1980 #2756) reported 3 m of offset in Quaternary gravel. On this basis, Widmann and others (1998 #3441) placed this structure within the <0.2 mm/yr slip-rate category.
Date and Compiler(s)	2015 Beth L. Widmann, Colorado Geological Survey Kathleen M. Haller, U.S. Geological Survey

References

#4453 Lettis, W., Noller, J., Wong, I., Ake, J., Vetter, U., and LaForge, R., 1996, Draft report, Seismotectonic evaluation of Colorado River storage project-Crystal, Morrow Point, Blue Mesa dams, Smith Fork project-Crawford dam, west-central Colorado: Technical report to U.S. Bureau of Reclamation, Denver, Colorado, 177 p.

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#7271 Piety, L.A., and Ostenaar, D.A., 2009, Trenching studies on the southern Busted Boiler fault zone, southeastern Uncompahgre Plateau, southwestern Colorado: U.S. Bureau of Reclamation Seismotectonic Report No. 2009-04, 294 p.

#7707 Piety, L.A., and Ostenaar, D.A., 2009, Characteristics of a northwest-trending zone of Quaternary tectonic features, southeastern Uncompahgre Plateau, southwestern Colorado: U.S. Bureau of Reclamation Seismotectonic Report No. 2009-5, 146 p.

#2747 Steven, T.A., and Hail, W.J., Jr., 1989, Geologic map of the Montrose 30' x 60' quadrangle, southwestern Colorado: U.S. Geological Survey Miscellaneous Geologic Investigations I-1939.

#2756 Sullivan, J.T., Meeder, C.A., Martin, R.A., and West, M.W., 1980, Seismic hazard evaluation-Ridgway dam and reservoir site-Dallas Creek project Colorado: U.S. Water and Power Resources Service, Seismotectonic Section, report, 43 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.

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