

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](#).

Paradox Valley graben (Class B) No. 2286

Last Review Date: 1997-09-04

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

citation for this record: Widmann, B.L., compiler, 1997, Fault number 2286, Paradox Valley 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 Paradox Valley graben is on the crest of a salt-cored anticline. The graben is a collapse feature that formed in response to salt migration and dissolution from beneath the anticline (Cater, 1955 #2669; 1970 #2672). Faults are generally downthrown towards the graben, but several are antithetic. Small folds and faults are described as offsetting Quaternary deposits and present-day, small-scale collapse and readjustment of the system is implied by Cater (1955 #2669). The faults may not extend to seismic depths, thus they are herein considered to be class B structures.

<p>Name comments</p>	<p>The Paradox Valley graben is comprised of multiple faults on either side of the northwest-trending Paradox Valley. Faults on the north side of the graben extend westward into Utah. Herein, only about 16 of the fault traces are shown, only two of which extend into Utah. From the Utah/Colorado border, the faults extend southeast to Dry Creek and Naturita Ridge. Kelley (1955 #3463) referred to this region as the Paradox fold and fault belt.</p> <p>Fault ID: Fault 90 in Kirkham and Rogers (1981 #792), part of Hecker's (1993 #642) Uncompahgre fault zone (number 18-6), and fault number Q36 of Widman and others (1998 #3441).</p>
<p>County(s) and State(s)</p>	<p>MONTROSE COUNTY, COLORADO SAN JUAN COUNTY, UTAH</p>
<p>Physiographic province(s)</p>	<p>COLORADO PLATEAUS</p>
<p>Reliability of location</p>	<p>Good Compiled at 1:250,000 scale.</p> <p><i>Comments:</i> Fault locations are fairly well defined by the Paradox Valley graben. The graben was mapped at a scale of 1:24,000 by Cater (1954 #2663; 1955 #2665; 1955 #2669), Cater and others (1955 #2673), and Shoemaker (1956 #2744). It was also mapped at a scale of 1:62,500 by Cater (1970 #2672), and 1:250,000 by Williams (1964 #2789). The trace used herein is from Williams (1964 #2789).</p>
<p>Geologic setting</p>	<p>The Paradox Valley graben is on the crest of a salt-cored anticline near the Colorado/Utah border. Kelley (1955 #3463) referred to this region as the Paradox fold and fault belt. Formation of the anticline is believed to be controlled by major subsurface faults that displace bedrock beneath the evaporitic Paradox Formation (Cater, 1970 #2672).</p> <p>The graben is a collapse feature which formed in response to salt migration and dissolution from beneath the area (Cater, 1954 #2663; 1955 #2665; 1955 #2669). Faults in this area are generally high-angle normal and downthrown towards the graben, although some faults are antithetic. However, the faults may not extend to seismic depths, thus they are herein considered to be class B structures.</p>
<p>Length (km)</p>	<p>56 km.</p>

Average strike	N46°W
Sense of movement	Normal <i>Comments: A cross section by Cater (1970 #2672) showed these faults as normal.</i>
Dip	75°-90° <i>Comments: A cross section by Cater (1970 #2672) showed the faults as dipping 75°-90° to the southwest and northeast in Colorado.</i>
Paleoseismology studies	
Geomorphic expression	Faults are well defined by the margins of the Paradox Valley graben. Cater (1955 #2669) and Withington (1955 #2791) alluded to small faults and folds in Quaternary deposits that may indicate continued collapse and readjustment of the system.
Age of faulted surficial deposits	The Cretaceous Mancos Shale is the youngest deposit mapped as offset by the fault system according to Cater (1954 #2663; 1955 #2665; 1955 #2669). However, in the accompanying text, Cater indicated small folds and faults are present in Quaternary deposits within the graben. The faults are primarily in Triassic to Cretaceous bedrock and were mapped as concealed beneath Quaternary deposits by Cater (1954 #2663; 1955 #2665; 1955 #2669), Cater and others (1955 #2673), and Withington (1955 #2791).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments: Although Quaternary deposits are not mapped as offset, Cater (1954 #2663; 1955 #2665; 1955 #2669), Cater and others (1955 #2673), and Withington (1955 #2791) indicated that small folds and faults are in fact present within this system. They postulated that the presence of these features in Quaternary deposits indicates possible present-day collapse and readjustment of the system. Kirkham and Rogers (1981 #792) suggested possible Holocene movement on these faults, but without more specific evidence the most recent paleoevent on this fault system is herein considered to have occurred during the Quaternary (<1.6</i>

	Ma). Howard and others (1978 #312) and Colman (1985 #1953) also indicated the latest movement on this fault system occurred during the Quaternary.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Widmann and others (1998 #3441) placed this structure within the <0.2 mm/yr slip-rate category based on the lack of evidence for offset Quaternary deposits.
Date and Compiler(s)	1997 Beth L. Widmann, Colorado Geological Survey
References	#2663 Cater, F.W., Jr., 1954, Geology of the Bull Canyon quadrangle, Colorado: U.S. Geological Survey Geologic quadrangle Map GQ-33. #2665 Cater, F.W., Jr., 1955, Geology of the Davis Mesa quadrangle, Colorado: U.S. Geological Survey Geologic quadrangle Map GQ-71. #2669 Cater, F.W., Jr., 1955, Geology of the Naturita NW quadrangle, Colorado: U.S. Geological Survey Geologic quadrangle Map GQ-65. #2672 Cater, F.W., Jr., 1970, Geology of the salt anticline region in southwestern Colorado, with a section on stratigraphy by F.W. Cater and L.C. Craig: U.S. Geological Survey Professional Paper 637, 80 p. #2673 Cater, F.W., Jr., Butler, A.P., Jr., and McKay, E.J., 1955, Geology of the Uraven quadrangle, Colorado: U.S. Geological Survey Geologic quadrangle Map GQ-78. #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. #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.

#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.

#3463 Kelley, V.C., 1955, Tectonics of the four corners region, *in* Geology of parts of Paradox, Black Mesa, and San Juan Basins: Four Corners Geological Society, Field Conference, Guidebook, p. 108-117.

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

#2744 Shoemaker, E.M., 1956, Geology of the Roc Creek quadrangle, Colorado: U.S. Geological Survey Geologic quadrangle Map GQ-83.

#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.

#2789 Williams, P.L., 1964, Geology, structure, and uranium deposits of the Moab quadrangle, Colorado and Utah: U.S. Geological Survey Miscellaneous Geologic Investigations I-360.

#2791 Withington, C.F., 1955, Geology of the Paradox quadrangle, Montrose County, Colorado: U.S. Geological Survey Geologic quadrangle Map GQ-72.

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