

# 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](#).

## Morgan fault, northern section (Class A) No. 2353a

Last Review Date: 1999-10-01

## Compiled in cooperation with the Utah Geological Survey

*citation for this record:* Black, B.D., DuRoss, C.B., Hylland, M.D., and Hecker, S., compilers, 1999, Fault number 2353a, Morgan fault, northern section, 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 02:57 PM.

### Synopsis

**General:** Range-front normal fault along the eastern side of Morgan Valley in the Wasatch Range. The central section has evidence of Holocene movement, whereas the northern and southern sections only show evidence for late Quaternary movement, although scarp morphology for all three fault traces is similar. The earthquake-timing, recurrence-interval, and slip-rate estimates for the central section of the Morgan fault reflect the consensus values of the Utah Quaternary Fault Parameters Working Group (Lund, 2004 #6733). Lund (2004 #6733) did not

evaluate the northern and southern sections due to a lack of fault-trench data. The preferred values reported in Lund (2004 #6733) approximate mean values based on available paleoseismic-trenching data, and the minimum and maximum values approximate two-sigma (5th and 95th percentile) confidence limits. The confidence limits incorporate both epistemic (e.g., data limitation) and aleatory (e.g., process variability) uncertainty (Lund, 2004 #6733).

**Sections:** This fault has 3 sections. The northern section consists of a main western fault trace and an older eastern fault trace. The central section consists of a main fault trace and an antithetic fault trace inferred to the west. The southern section is a single, short, northwest-trending fault trace. The earthquake-timing, recurrence-interval, and slip-rate estimates for the central section of the Morgan fault reflect the consensus values of the Utah Quaternary Fault Parameters Working Group (Lund, 2004 #6733). Lund (2004 #6733) did not evaluate the northern and southern sections due to a lack of fault-trench data. The preferred values reported in Lund (2004 #6733) approximate mean values based on available paleoseismic-trenching data, and the minimum and maximum values approximate two-sigma (5th and 95th percentile) confidence limits. The confidence limits incorporate both epistemic (e.g., data limitation) and aleatory (e.g., process variability) uncertainty (Lund, 2004 #6733).

<p><b>Name comments</b></p>	<p><b>General:</b></p> <p><b>Section:</b> Refers to Hecker's (1993 #642) Morgan fault, northern section.</p> <p><b>Fault ID:</b> Refers to fault number 11-18 of Hecker (1993 #642).</p>
<p><b>County(s) and State(s)</b></p>	<p>MORGAN COUNTY, UTAH</p>
<p><b>Physiographic province(s)</b></p>	<p>MIDDLE ROCKY MOUNTAINS</p>
<p><b>Reliability of location</b></p>	<p>Good Compiled at 1:125,000 scale.</p> <p><i>Comments:</i> Mapped or discussed by Sullivan and others (1988 #4508) and Sullivan and Nelson (1992 #615). Mapping from Sullivan and others (1988 #4508).</p>

<b>Geologic setting</b>	North- to northeast-trending range-front normal fault along the eastern side of Morgan Valley in the Wasatch Range.
<b>Length (km)</b>	This section is 8 km of a total fault length of 17 km.
<b>Average strike</b>	N24°W (for section) versus N16°W (for whole fault)
<b>Sense of movement</b>	Normal
<b>Dip Direction</b>	SW
<b>Paleoseismology studies</b>	
<b>Geomorphic expression</b>	Escarpment morphology is similar to the central section of the fault. Tectonically tilted pediments cut into the Huntsville Fanglomerate (Eardley, 1944; estimated by Sullivan and Nelson, 1992 #615, to possibly be 5-35 Ma) are likely much older than a lower surface dated at >730 ka. Projection of the tilted surfaces yields a minimum Quaternary displacement estimate of 150 m. These faults lie along projection of, and thus may be related to, the central section of the Morgan fault.
<b>Age of faulted surficial deposits</b>	Middle to late Pleistocene.
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	middle and late Quaternary (<750 ka)  <i>Comments:</i> Undeformed Bonneville shorelines near the projection of the fault argue against, but do not preclude, Holocene faulting. A narrow graben and eroded escarpment about 1 km east of the main fault are interpreted as subsidiary faults and are suspected of having Quaternary movement on the basis of linearity and crosscutting relationship with respect to regional drainage.
<b>Recurrence interval</b>	
<b>Slip-rate category</b>	Less than 0.2 mm/yr  <i>Comments:</i> 0.03 to 0.15 mm/yr (<1-5 my).
<b>Date and</b>	1999

<b>Compiler(s)</b>	Bill D. Black, Utah Geological Survey Christopher B. DuRoss, Utah Geological Survey Michael D. Hylland, Utah Geological Survey Suzanne Hecker, U.S. Geological Survey
<b>References</b>	<p>#4644 Eardley, A.J., 1944, Geology of the north-central Wasatch Mountains, Utah: Utah Society of America Bulletin, v. 55, p. 819-894.</p> <p>#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.</p> <p>#6733 Lund, W.R., 2005, Consensus preferred recurrence interval and vertical slip rate estimates—Review of Utah paleoseismic-trenching data by the Utah Quaternary Fault Parameters Working Group: Utah Geological Survey Bulletin 134, compact disk.</p> <p>#615 Sullivan, J.T., and Nelson, A.R., 1992, Late Quaternary displacement on the Morgan fault, a back valley fault in the Wasatch Range of northeastern Utah, <i>in</i> Gori, P.L., and Hays, W.W., eds., Assessment of regional earthquake hazards and risk along the Wasatch front, Utah: U.S. Geological Survey Professional Paper 1500, p. I1-I19.</p> <p>#4508 Sullivan, J.T., Nelson, A.R., LaForge, R.C., Wood, C.K., and Hansen, R.A., 1988, Central Utah regional seismotectonic study for USBR dams in the Wasatch Mountains: Bureau of Reclamation Seismotectonic Report 88-5, 269 p.</p>

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