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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.

Gunnison fault (Class A) No. 2445

Last Review Date: 2001-08-01

Compiled in cooperation with the Utah Geological Survey

citation for this record: **Black, B.D., Hylland, M.D., and Hecker, S., compilers, 2001, Fault number 2445, Gunnison 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 02:56 PM.**

Synopsis	Poorly understood Holocene fault along the west side of Sanpete Valley and eastern side of the Gunnison Plateau (San Pitch Mountains). The fault is believed to have resulted from Neogene extension affecting a weak zone of pre-existing, imbricate reverse faults, but feature related to dissolution of evaporites in the Arapien Shale. It appears to flatten into a detachment fault at a depth less than 5 km.
Name comments	**Fault ID:** Refers to fault number 13-18 of Hecker (1993 #642).
County(s) and	JUAB COUNTY, UTAH

State(s)	SANPETE COUNTY, UTAH
Physiographic province(s)	COLORADO PLATEAUS BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Mapped or discussed by Witkind (1981 #5021), Standlee (1982 #4638), Hecker (1987 #4989, 1989 #4990), Witkind and Weiss (1991 #5023), Fong (1995 #4982), Lawton and Weiss (1999 #4995), and Weiss and Sprinkel (2000 #5020). Fault traces from mapping of Hecker (1989 #4990).
Geologic setting	Northwest- to southwest-trending normal fault in western Sanpete Valley along the east side of the Gunnison Plateau (San Pitch Mountains). The fault is believed to have resulted from Neogene extension affecting a weak zone of pre-existing, imbricate reverse faults (Weiss, 2000 #5020). Alternatively, Witkind (1981 #5021) postulated that the Gunnison fault may be a subsidence feature related to dissolution of evaporites in the Arapien Shale. The fault appears to flatten into a detachment fault at a depth less than 5 km Standlee, 1982 #4638.
Length (km)	42 km.
Average strike	N2°W
Sense of movement	Normal
Dip Direction	SE; NE
Paleoseismology studies	
Geomorphic expression	Scarps on alluvium. Preliminary observations at a few locations indicate that the most recent event may be late(?) Holocene and be associated with less than about a meter of displacement. Progressively older alluvial surfaces have greater displacements, and old Quaternary (Tertiary?) surfaces have tens of meters of displacement across steep, high scarps. A set of unusual relations characterizes the north end of the fault at Birch Canyon, where a cliff-like scarp on the order of 10-15 m high is underlain by 2-4 ka fluvial and debris-flow deposits (Elliott Lips, oral commun. to Suzanne Hecker, 1989). The sequence of deposits appears to be monoclinally folded, with an apparent dip that is parallel to the

	face of the scarp and fairly uniform throughout the section. These relations suggest locally intense, recent deformation along this portion of the range front (Hecker, 1987 #4989).
Age of faulted surficial deposits	Holocene
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* The top of a tufa deposit that contains wood debris 14C dated at 370 yr B.P. is found at different elevations across the inferred trace of the fault of Birch Canyon, suggesting fault movement during the past 370 years (Fong, 1995 #4982).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr
Date and Compiler(s)	2001 Bill D. Black, Utah Geological Survey Michael D. Hylland, Utah Geological Survey Suzanne Hecker, U.S. Geological Survey
References	#4982 Fong, A.W., 1995, Geologic map of the Fountain Green South quadrangle, Sanpete and Juab Counties, Utah: Utah Geological Survey Miscellaneous Publication MP-95-1, 18 p. pamphlet, 2 sheets, scale 1:24,000. #4989 Hecker, S., 1987, May 26, 1987, Reconnaissance of late Quaternary fault along west side of Sanpete Valley, by S. Hecker, K.M. Harty, and G.E. Christenson: Utah Geological and Mineral Survey, memorandum, p. 2. #4990 Hecker, S., 1989, November 16, 1989, Reconnaissance of range-front fault on west side of Sanpete Valley by Suzanne Hecker and Susan S. Olig: Utah Geological and Mineral Survey, memorandum, p. 3. #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.

#4995 Lawton, T.F., and Weiss, M.P., 1999, Geologic map of the Wales quadrangle, Juab and Sanpete Counties, Utah: Utah Geological Survey Miscellaneous Publication 99-2, 28 p. pamphlet, 2 sheets, scale 1:24,000.

#4638 Standlee, L.A., 1982, Structure and stratigraphy of Jurassic rocks in central Utah—Their influence on tectonic development of the Cordilleran foreland thrust belt, *in* Powers, R.B., ed., Geologic studies of the Cordilleran thrust belt: Rocky Mountain Association of Geologists, v. 1, p. 357-382.

#5020 Weiss, M.P., and Sprinkel, D.A., 2000, Interim geologic map of the Manti 7.5' quadrangle, Sanpete County, Utah: Utah Geological Survey Open-File Report 372, 37 p. pamphlet, scale 1:24,000.

#4450 Willis, G.C., and Higgins, J.M., 1995, Interim geologic map of the Washington quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 324, 108 p., 1 pl., scale 1:24,000.

#5021 Witkind, I.J., 1981, Reconnaissance geologic map of the Redmond quadrangle, Sanpete and Sevier Counties, Utah: U.S. Geological Survey Miscellaneous Investigations Map I-1304-A, 1 sheet, scale 1:24,000.

#5023 Witkind, I.J., and Weiss, M.P., 1991, Geologic map of the Nephi 30' x 60' quadrangle, Carbon, Emery, Juab, Sanpete, Utah, and Wasatch Counties, Utah: U.S. Geological Survey Miscellaneous Investigations Map I-1937, 16 p. pamphlet, 1 sheet, scale 1:100,000.