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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.

East Mount Sheridan faults (Class A) No. 766

Last Review Date: 1998-08-08

citation for this record: **Pierce, K.L., compiler, 1998, Fault number 766, East Mount Sheridan faults, 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 02:02 PM.**

Synopsis	Three or four north-south faults are mapped along the steep, eastern face of Mount Sheridan. About one-third the way up the trail on the eastern slope of Mount Sheridan, the one of these faults has about 5.5 m of local offset above a graben. This may be the same trace that R.L. Christiansen noted as offsetting talus. An additional fault trends along the base of Mount Sheridan near Rustic Geyser, where glacial moraines have an apparent offset of 31.6 m. Near the north end of Factory Hill, hot springs of the Fissure Group are localized along this trace, and Holocene alluvial-fan deposits are offset about 9.6 m. The amount of offset of 0.63-Lava Creek Tuff and 2.0-Ma Huckleberry Ridge Tuff across the faults indicates long-term basin and range activity at rates approaching 1 mm/yr, and the steep morphology of the range front is consistent with young fault activity. Offset of Pinedale and mid-Holocene (?) deposits suggest a higher slip rate of about 2.4 mm/yr for the past 13.5 ka. This faulting is related to

	ongoing basin-and-range extension and not caldera formation, because the faults cut across the caldera margin at a high angle as seen in map view. The southern half of the fault offsets the Lava Creek Tuff (630 ka), but its trace is not easily identified. This part of the fault is shown as being mid or late Quaternary.
Name comments	Referred to as the East Sheridan fault by Love and Keefer (1975 #2285), but is comprised of a band of 3-4 faults on the eastern slope of Mount Sheridan.
County(s) and State(s)	TETON COUNTY, WYOMING
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:125,000 scale. *Comments:* Mapped at 1:62,500 scale by R.L. Christiansen (1974 #2266) and compiled at 1:125,000 (U.S. Geological Survey, 1972 #639). Locally remapped at 1:24,000-scale by Ken Pierce (field notes, Sept. 4, 1998). Recompiled at 1:125,000-scale on map with topographic base.
Geologic setting	The East Mount Sheridan faults are part of a much larger group of north-trending range-bounding normal faults, south of the Yellowstone caldera. The East Mount Sheridan faults are expressed as a large escarpment (as much as 870 m high) primarily on 2.1 Ma Huckleberry Ridge Tuff. In addition, the northern end of these faults form bedrock scarps on the Aster Creek rhyolite flow (about 150 ka). Faulting is related to ongoing extension and not caldera formation, because the faults cut across the caldera margin at a high angle.
Length (km)	21 km.
Average strike	N3°W
Sense of movement	Normal
Dip Direction	E
Paleoseismology studies	

Geomorphic expression	Factory Hill, which comprises the north end of the Mount Sheridan mass, has a well-defined fault extending through the "Fissure Group" of sinter-depositing hot springs. Locally, this fault offsets a Holocene debris fan 9.6 m (Ken Pierce, field notes of Sept. 4, 1998). The trace of the active fault extends south along the steep face of Factory Hill where it can be recognized by oversteepening. In these areas, first-order drainages cross the fault scarps causing eroded unvegetated slopes below which are formed by steep cones of modern debris. Further south, about one-third the way up the eastern face of Mount Sheridan and probably along the same fault trace, there is a scarp (with a graben) that has about 5.5 m of offset on the main fault (Ken Pierce, field notes of Sept. 4, 1998). At the base of Mount Sheridan, a high linear escarpment truncates glacial moraines of late Pinedale (?) age that has an apparent surface offset of 31.6 m near Rustic Geyser (Ken Pierce, field notes of Sept. 4, 1998), and continues for more than a kilometer north and south.
Age of faulted surficial deposits	Along the easternmost fault trace, late Pinedale glacial deposits, which are about 13,500 yr old, are offset about 30 m. At the Fissure Hotsprings Group along the next trace to the west, a mid (?) Holocene alluvial fan is offset about 10 m. The northern 2 km of three faults have formed scarps with associated grabens on the Aster Creek flow (bedrock), which is about 150 ka.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* The most recent offset forms fault scarps that are as steep as the angle of repose for the surficial deposits (ca. 33?). This relation suggests a probable late Holocene age for the most recent faulting event along the northern half of the fault. Further south, the evidence for the timing of most recent paleoevent is not clear but there is substantial offset of the Lava Creek Tuff (630 ka).
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* There is about 10 m of offset of mid Holocene (ca. 5 ? ka) debris fans. Nearby, there is about 30 m of apparent offset of

	late Pinedale (ca. 13.5 ka) moraines, suggesting about 20 m of differential offset between about 5 and 13.5 ka, or an interval of about 8.5 k.y. These data suggest a latest Quaternary slip rate greater than 2 mm/yr. For a much longer time span, the Lava Creek Tuff (630 ka) is tilted into the fault as much as 9? and offset perhaps 600 m, suggesting an average slip rate of about half that of the latest Quaternary rate. Wong and others (2000 #4484) suggested fault slip rates ranging from 0.3-2.7 mm/yr, each with separate weighting. These reported slip rates are model dependent but were based on scarp profile data of the compiler that suggested post-glacial offsets that are about 2/3rds of those observed along the Teton fault [768]. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, and offset of the three above mentioned datums) suggest that the East Mount Sheridan faults be assigned to the 1-5 mm/yr slip-rate category.
Date and Compiler(s)	1998 Kenneth L. Pierce, U.S. Geological Survey, Emeritus
References	#2266 Christiansen, R.L., 1974, Geologic map of the West Thumb quadrangle, Yellowstone National Park, Wyoming: U.S. Geological Survey Geologic quadrangle Map GQ-1191, scale 1:62,500. #2285 Love, J.D., and Keefer, W.R., 1975, Geology of sedimentary rocks in southern Yellowstone National Park, Wyoming: U.S. Geological Survey Professional Paper 729-D, 60 p. #2297 Pierce, K.L., and Morgan, L.A., 1992, The track of the Yellowstone hotspot—Volcanism, faulting, and uplift, *in* Link, P.K., Kuntz, M.A., and Platt, L.B., eds., Regional geology of eastern Idaho and western Wyoming: Geological Society of America Memoir 171, p. 1-53. #639 U.S. Geological Survey, 1972, Geologic map of Yellowstone National Park: U.S. Geological Survey Miscellaneous Geologic Investigations I-711, 1 sheet, scale 1:125,000. #4484 Wong, I., Olig, S., and Dober, M., 2000, Preliminary probabilistic seismic hazard analyses—Island Park, Grassy Lake, Jackson Lake, Palisades, and Ririe Dams: U.S. Department of the Interior, Bureau of Reclamation Technical Memorandum D8330-

	2000-17.

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