Jump to Navigation

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 Gallatin-Reese Creek fault system, East Gallatin section (Class A) No. 746b

Last Review Date: 1996-03-18

citation for this record: **Haller, K.M., and Pierce, K.L., compilers, 1996, Fault number 746b, East Gallatin-Reese Creek fault system, East Gallatin 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 01:59 PM.**

Synopsis	**General:** The East Gallatin-Reese Creek fault system forms the >600-m-high eastern front of the Gallatin Range. At its southern end (the East Gallatin section [726b), a strand of the fault offsets 0.63-Ma Lava Creek Tuff, but along the main range front the tuff is only at the foot of the range in Gardners Hole and is not present on the upthrown side of the fault. The northern part of this fault system, the Reese Creek section [746a], is mapped as having as many as 6 strands. These extensional normal faults offset Eocene rock and younger Cenozoic movement is suspected, but not demonstrated. No scarps are known on Quaternary deposits. La Duke Hot Springs are located along the projection of the Reese Creek section, just north of the Yellowstone River.

	Sections: This fault has 2 sections. Sections are defined based on demonstrable Quaternary movement along the southern part of the fault (Gallatin Range section) and less definitive evidence of Quaternary movement along the northern part (Reese Creek section).
Name comments	**General:** This group of faults form the high eastern front of the Gallatin Range and extend northward along Reese Creek, but have been referred to by various names. The name East Gallatin-Reese Creek fault system is from Pierce and others (1991 #1055) and is preferred in this compilation because we group the various faults together for convenience. The faults include the East Gallatin and the Devils Slide faults of Ruppel (1972 #470) and the Reese Creek fault of Wilson (1934 #1054). Ruppel (1972 #470) suggested that the faults may extend much further south, beyond Old Faithful and the Upper Geyser Basin and possibly join (or be associated with) the Teton fault [768]. The extent of the fault system shown here is from about 0.5 km east of Corwin Springs south to near the southern end of the Gallatin Range. **Section:** Section name follows fault name established by Ruppel (1972 #470). Section extends from the Gallatin River south to beyond Winter Creek. Ruppel (p. A51-55, 1972 #470) and Pierce and others (p. C-18, 1991 #1055) summarized previous work and described the fault. **Fault ID:** Refers to fault number 30 (Reese Creek fault) of Witkind (1975 #317; 1975 #819); and fault numbers 64 (Reese Creek fault), 65 (East Gallatin fault), and 66 (Devils Slide fault) of Johns and others (1982 #259).
County(s) and State(s)	PARK COUNTY, WYOMING
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS NORTHERN ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:125,000 scale. *Comments:* Ruppel (1972 #470) mapped the fault at 1:62,5000 scale and the U.S. Geological Survey (1972 #639; 1972 #1057) portrayed it at 1:125,000 scale. Fault traces recompiled at 1:125,000-scale on map with topographic base.
Geologic setting	The East Gallatin-Reese Creek fault system is comprised of high-

	angle to near-vertical, down-to-the-east, normal faults along the eastern side of the Gallatin Range and a northern extension that is associated with a less prominent range front. The northern part of this fault system, the Reese Creek section [746ba], is mapped as having as many as 6 strands (Ruppel, 1972 #470; U.S. Geological Survey, 1972 #639). Various amounts of displacement across this fault are documented, but all are less than 2 km. Hague and others (1899 #1058) suggested more than 1.2 km of offset across the fault system. Later, Iddings (1904 #1059) inferred 1.8 km of offset across the Reese Creek fault. Wilson (1934 #1054) suggested about 1.2 km of offset across the easternmost strand of the system and Fraser and others (1969 #467) suggested a similar amount of offset (1.3 km). Ruppel (1972 #470) summarized previous work suggesting more than 1,200 m of post-Eocene stratigraphic displacement. At its southern end, the fault offsets 0.63-Ma Lava Creek Tuff; along the main range front, the tuff is only at the foot of the range in Gardners Hole and is not present on the upthrown side of the fault.
Length (km)	This section is 27 km of a total fault length of 40 km.
Average strike	N13°W (for section) versus N2°W (for whole fault)
Sense of movement	Normal
Dip	50°-vertical *Comments:* Ruppel (p. A51, 1972 #470) noted "The East Gallatin fault is vertical where it is exposed by the Gardner River, and its straight trace suggests that it remains vertical, or nearly so, both to the north and to the south." Pierce and others (p C18-21, 1991 #1055) suggested that at depth the fault may dip east at 50? and intercept the Norris Mammoth corridor at 10-15 km depth. Extension that had occurred on the East Gallatin fault now occurs in the Norris-Mammoth corridor.
Paleoseismology studies	
Geomorphic expression	The eastern front of the Gallatin Range is linear, moderately steep, and locally more than 600 m high. Although Ruppel (p. A54, 1972 #470) noted that glacial deposits are displaced minor amounts, Pierce and others (1991 #1055) found no evidence that glacial deposits are offset. The lack of late Quaternary offset on this major structure seems anomalous; one of the compilers

	(Pierce) has suggested that earlier horizontal extension had extended to the surface on the East Gallatin fault and is now expressed as vertical feeder dikes for the 15 vents and possibly other fissures in the Norris-Mammoth corridor.
Age of faulted surficial deposits	Mostly pre-Quaternary rocks, especially Paleozoic. At southern end of the fault, one strand offsets 0.63 Ma Lava Creek Tuff.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* The geomorphic expression of the range front suggests late Cenozoic activity. Post-Eocene rocks and younger movement is suspected, but not demonstrated. Although uncertain, near the southern end of the fault system an eastern splay offsets Lava Creek Tuff (0.63 Ma), whereas near the section boundary (on the north), the easternmost strand does not offset Lava Creek Tuff.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No offset of glacial deposits has been observed (Pierce, 1973 #3805; Pierce and others, 1991 #1055); thus, the lowest slip-rate category is inferred.
Date and Compiler(s)	1996 Kathleen M. Haller, U.S. Geological Survey Kenneth L. Pierce, U.S. Geological Survey, Emeritus
References	#467 Fraser, G.D., Waldrop, H.A., and Hyden, H.J., 1969, Geology of the Gardiner area, Park County, Montana: U.S. Geological Survey Bulletin 1277, 118 p., 1 pl., scale 1:24,000. #1058 Hague, A., Iddings, J.P., Weed, W.H., Walcott, C.D., Girty, G.H., Stanton, T.W., and Knowlton, F.H., 1899, Geology of the Yellowstone National Park: U.S. Geological Survey Monograph 32, 882 p. #1059 Iddings, J.P., 1904, A fracture valley system: Journal of Geology, v. 12, p. 94-105.

#3805 Pierce, K.L., 1973, Surficial geologic map of the Mount Holmes quadrangle and parts of the Tepee Creek, Crown Buttes, and Miner quadrangles, Yellowstone National Park, Wyoming and Montana: U.S. Geological Survey Miscellaneous Geologic Investigations I-640, 1 sheet, scale 1:62,500.

#1055 Pierce, K.L., Adams, K.D., and Sturchio, N.C., 1991, Geologic setting of the Corwin Springs Known Geothermal Resources Area-Mammoth Hot Springs Area in and adjacent to Yellowstone National Park, *in* Sorey, M.L., ed., Effects of potential geothermal development in the Corwin Springs Known Geothermal Resources Area, Montana, on the thermal features of Yellowstone National Park: U.S. Geological Survey Water-Resources Investigations Report 91-4052.

#470 Ruppel, E.T., 1972, Geology of pre-Tertiary rocks in the northern part of Yellowstone National Park, Wyoming: U.S. Geological Survey Professional Paper 729-A, 66 p., 1 pl., scale 1:62,500.

#1057 U.S. Geological Survey, 1972, Surficial geologic map of Yellowstone National Park: U.S. Geological Survey Miscellaneous Geologic Investigations I-710, 1 sheet, scale 1:125,000.

#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.

#1054 Wilson, C.W., 1934, Geology of the thrust fault near Gardiner, Montana: Journal of Geology, v. 42, p. 649-663.

#317 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in western Montana: U.S. Geological Survey Open-File Report 75-285, 36 p. pamphlet, 1 sheet, scale 1:500,000.

#819 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in Wyoming: U.S. Geological Survey Open-File Report 75-279, 35 p. pamphlet, 1 sheet, scale 1:500,000.