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

Last Review Date: 1996-03-18

Compiled in cooperation with the Montana Bureau of Mines and Geology

citation for this record: **Haller, K.M., and Pierce, K.L., compilers, 1996, Fault number 746a, East Gallatin-Reese Creek fault system, Reese Creek 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 02:02 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 Wilson (1934 #1054). Section extends from about 0.5 km east of Corwin Springs south to the Gallatin River. **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 PARK COUNTY, MONTANA
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* All of the northern part of fault trace is mostly inferred and the location of about half of southern part is based on 1:125,000-scale geologic maps (U.S. Geological Survey, 1972 #639; 1972 #1057) based on mapping of Ruppel (1972 #470).

	The extreme northern end is from mapping by Pierce and others (1991 #1055). Fault traced complied at 1:125,000 scale in Yellowstone National Park at 1:250,000 scale in Montana.
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 13 km of a total fault length of 40 km.
Average strike	N5°E (for section) versus N2°W (for whole fault)
Sense of movement	Normal *Comments:* Shown as normal by Witkind (1975 #317; 1975 #819). Early movement on the fault may have been left lateral (Brown, 1961 #1056).
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	Much of the fault system is buried, but it is expressed by the topography from the flank of Little Quadrant Mountain southward to the flank of Mount Holmes (U.S. Geological Survey, 1972 #1057). The topographic relief across the fault along its northern part is less than that to the south as evidenced by the presence of Eocene rocks on Sepulcher Mountain, east of the fault

	(downdropped side).
Age of faulted surficial deposits	Mostly pre-Quaternary rock, including Eocene. One of the strands is mapped as concealed by Lava Creek Tuff (U.S. Geological Survey, 1972 #639), but this unit has been remapped as the 2.0 Ma Huckleberry Ridge Tuff (R.L., Christiansen, written commun., 1998). The fault is reported only as "topographically expressed" on Pinedale till, but it is not shown to offset the till on a companion map (U.S. Geological Survey, 1972 #1057). No offset of glacial deposits was noted by Pierce (1973 #3805) and Pierce and others (1991 #1055).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* There is no definitive estimate of the time of most recent movement of this fault. The Undine Falls Basalt (~600 ka) is probably not offset, within the limits of detection (about 50 m) (Pierce and others, 1991 #1055). Ruppel (1972 #470) documented post-glacial movement and is the source of the Holocene age assignment in earlier compilations (Witkind, 1975 #317; 1975 #819; Johns and others, 1982 #259), but Pierce and others (1991 #1055) reported that evidence to support post-glacial movement is absent. The age assignment of Quaternary is tentative, as its faulting history prior to 600 ka is not known.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Inferred low-slip-rate category based on absence of scarps on late Quaternary deposits.
Date and Compiler(s)	1996 Kathleen M. Haller, U.S. Geological Survey Kenneth L. Pierce, U.S. Geological Survey, Emeritus
References	#1056 Brown, C.W., 1961, Cenozoic stratigraphy and structural geology, northeast Yellowstone National Park, Wyoming and Montana: Geological Society of America Bulletin, v. 72, p. 1173-1194. #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.

#259 Johns, W.M., Straw, W.T., Bergantino, R.N., Dresser, H.W., Hendrix, T.E., McClernan, H.G., Palmquist, J.C., and Schmidt, C.J., 1982, Neotectonic features of southern Montana east of 112°30' west longitude: Montana Bureau of Mines and Geology Open-File Report 91, 79 p., 2 sheets.

#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.