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.

Bridger fault (Class A) No. 691

Last Review Date: 2006-06-12

Compiled in cooperation with the Montana Bureau of Mines and Geology

citation for this record: **Haller, K.M., compiler, 2006, Fault number 691, Bridger 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 02:02 PM.**

Synopsis	Little is known about the Quaternary history of this fault because of its poor surficial expression.
Name comments	Source of the name is probably Pardee (1950 #46). Also referred to as Bridger Creek-Bear Canyon fault (McMannis, 1955 #513; Witkind, 1975 #317) Bridger frontal fault zone by Hackett and others (1960 #267), Bridger range-front fault by Lageson (1989 #261), and Bridger Range fault by Brodowy (1991 #257). Fault as shown here includes southern part of Morgan fault of Skipp and Peterson (1965 #472); ends of the fault are based on overall range-front morphology and are similar to those shown by Johns and others (1982 #259). Fault extends from Blacktail Creek southeastward to north of U.S. Highway 10.

	Fault ID: Refers to number 38 (Bridger Creek-Bear Canyon fault) and south part of number 43 (Morgan fault) of Witkind (1975 #317) and number 98 (Bridger range-front fault) of Johns and others (1982 #259).
County(s) and State(s)	GALLATIN COUNTY, MONTANA
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* Location is based on trace from 1:500,000-scale map of Witkind (1975 #317), but because the fault is not known to reach the surface, its location is speculative. Gravity data indicate the fault is about 2 km west of the range front (Davis and others, 1965 #263).
Geologic setting	High-angle, down-to-the-west, normal fault bounding the western side of the Bridger Range. Fault may have a listric geometry based on proximal dip of Tertiary basin fill (Brodowy and others, 1991 #257). Segments discussed by Lageson (1989 #261) address parts of the fault that are bounded by intersecting structures, which may or may not be related to seismogenic segments. Lageson (1989 #261) documents the possibility of 2.2 km of throw across this fault since mid-Eocene to early Oligocene. McMannis (1955 #513) indicates faulting initiated during the Oligocene with an episode of quiescence during the Pliocene. Davis and others (1965 #263) suggest about 750 m of throw based on gravity data.
Length (km)	48 km.
Average strike	N9°W
Sense of movement	Normal *Comments:* (Witkind, 1975 #317)
Dip Direction	W
Paleoseismology studies	

Geomorphic expression	No scarps on alluvium (McMannis, 1955 #513; Lageson, 1989 #261; Ruleman, 2002 #5133), fault is inferred from steep gravity gradient (Davis and others, 1965 #263), precipitous range front, and aligned faceted spurs (Pardee, 1950 #46; McMannis, 1955 #513).
Age of faulted surficial deposits	No surficial deposits are displaced, but Tertiary lake beds dip toward the range (Pardee, 1950 #46).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Post-Tertiary movement is suggested by the rangeward dip of Tertiary lake beds; however, no data are available to provide better constraints. Pierce and Morgan (1992 #539) indicate that this fault was active during the Tertiary but do not preclude Quaternary movement. Bartholomew and Stickney and Ruleman (2002 #5133) examined sites along the fault and found no evidence suggesting late Quaternary faulting (M.J. Bartholomew, written commun. 1997). Because details are lacking, the fault is included in this compilation. Due to the lack of agreement in the timing of the most recent movement, a Quaternary age is assigned here.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Absence of scarps suggests low (<0.1 mm/yr) slip rates according to Ruleman (2002 #5133).
Date and Compiler(s)	2006 Kathleen M. Haller, U.S. Geological Survey
References	#257 Brodowy, J.M., Lageson, D.R., Ryan, C., and Snyder, B., 1991, Structure and neotectonics of the eastern Three Forks Basin, northern Intermountain seismic belt, southwest Montana: Geological Society of America Abstracts with Programs, v. 23, no. 5, p. A233-A234. #263 Davis, W.E., Kinoshita, W.T., and Robinson, G.D., 1965, Bouguer gravity, aeromagnetic, and generalized geologic map of

the eastern part of the Three Forks Basin, Broadwater, Madison, and Gallatin Counties, Montana: U.S. Geological Survey Geophysical Investigations Map GP-498, 5 p. pamphlet, 2 pls., scale 1:62,500.

#267 Hackett, O.M., Visher, F.N., McMurtrey, R.G., and Steinhilber, W.L., 1960, Geology and ground-water resources of the Gallatin Valley, Gallatin County, Montana: U.S. Geological Survey Water Supply Paper 1482, 282 p., 1 pl., scale 1:63,360.

#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.

#261 Lageson, D.R., 1989, Reactivation of a Proterozoic continental margin, Bridger Range, southwestern Montana, *in* French, C.E., and Grabb, R.F., eds., Geologic resources of Montana: Montana Geological Society, 1989 Field Conference Guidebook, Montana Centennial Edition, v. 1, p. 279-298.

#513 McMannis, W.J., 1955, Geology of the Bridger Range, Montana: Geological Society of America Bulletin, v. 66, p. 1385-1430.

#46 Pardee, J.T., 1950, Late Cenozoic block faulting in western Montana: Geological Society of America Bulletin, v. 61, p. 359-406.

#539 Pierce, K.L., and Morgan, L.A., 1992, The track of the Yellowstone hot spot—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 179, p. 1-53, 1 pl.

#5133 Ruleman, C.A., III, 2002, Quaternary tectonic activity within the northern arm of the Yellowstone tectonic parabola and associated seismic hazards, southwest Montana: Bozeman, Montana State University, unpublished M.S. thesis, 158 p.

#472 Skipp, B., and Peterson, A.C., 1965, Geologic map of the Maudlow quadrangle southwestern Montana: U.S. Geological Survey Miscellaneous Geologic Investigations I-452, 2 sheets,

	scale 1:24,000. #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.