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.

Ruby Range western border fault (Class A) No. 665

Last Review Date: 1994-05-05

Compiled in cooperation with the Montana Bureau of Mines and Geology

citation for this record: **Haller, K.M., compiler, 1994, Fault number 665, Ruby Range western border 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 02:04 PM.**

Synopsis	Little is known about the Quaternary history of this fault. All data are based on compilation of Johns and others (1982 #259). Published maps reveal significant differences in the location and extent of the fault.
Name comments	Name is from Johns and others (1982 #259). Fault extends from 4 km south of Ruby River southwestward to about 5.5 km east of Blacktail Creek. **Fault ID:** Refers to number 52 (unnamed fault at east edge of

	Beaverhead valley) of Witkind (1975 #317) and number 3 (Ruby Range western border fault) of Johns and others (1982 #259).
County(s) and State(s)	BEAVERHEAD COUNTY, MONTANA MADISON COUNTY, MONTANA
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* Location based on 1:500,000-scale map of Witkind (1975 #317). Geologic map of Ruppel and others (1993 #646) shows trace of the northeastern half (northeast of Stone Creek) within 1 km of location given here; however, the southwestern half is up to 2.5 km valleyward of the trace shown here. The fault is shown to extend southwestward beyond the map area of Johns and others (1982 #259), but at least as far as the Blacktail River.
Geologic setting	High-angle, down-to-the-northwest, range-front normal fault bounding the northwest side of the Ruby Range. Amount of structural throw is unknown.
Length (km)	38 km.
Average strike	N37°E
Sense of movement	Normal *Comments:* (Witkind, 1975 #317; Johns and others, 1982 #259)
Dip Direction	NW
Paleoseismology studies	
Geomorphic expression	Pardee (1950 #46) indicates that there are no scarps along this fault. The morphology of the southwestern half of the range front is generally subdued and deeply embayed; the range is generally low. The northeastern half of the range is higher and the range front is more abrupt and has a somewhat linear character (Ostenaa and Wood, 1990 #318).
Age of faulted surficial deposits	Tertiary lake beds (Pardee, 1950 #46). Map of Ruppel and others suggests that the southern half of the fault is buried by Tertiary (Pliocene-Eocene) Bozeman Group, but the fault offsets the same

	unit at the northeastern end and may displace Quaternary fan deposits. However, Tysdal (1976 #767) shows the northern part of the fault buried by Quaternary deposits.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Timing of faulting is poorly constrained. Johns and others (1982 #259) suggest that the most recent event occurred during the late Pleistocene based on a genetic response of fan building to faulting; they do not report evidence of scarps on alluvial deposits. The only hint of some surficial reflection of recent faulting is their reference to the change in gradient and sinuosity of the Ruby River. Pardee (1950 #46) documents that Tertiary deposits are faulted. Witkind (1975 #317) assigns a late Cenozoic age to this structure, but does not rule out possible Quaternary movement. Ostenaa and Wood (1990 #318) found no indication of late Quaternary displacement based on air photo and limited field reconnaissance. However, some evidence points to possible early to mid-Quaternary activity along at least the northeastern half of the fault, but the majority of movement may have been completed by the end of the Pliocene (Ostenaa and Wood, 1990 #318). Because of the conflicting interpretations, this fault is tentatively assigned a Quaternary age; although there is no constraining data.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Inferred low slip rate is based on the absence of scarps.
Date and Compiler(s)	1994 Kathleen M. Haller, U.S. Geological Survey
References	#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. #318 Ostenaa, D., and Wood, C., 1990, Seismotectonic study for Clark Canyon Dam, Pick-Sloan Missouri Basin Program,

	Montana: U.S. Bureau of Reclamation Seismotectonic Report 90-4, 78 p., 1 pl. #46 Pardee, J.T., 1950, Late Cenozoic block faulting in western Montana: Geological Society of America Bulletin, v. 61, p. 359-406. #646 Ruppel, E.T., O'Neill, J.M., and Lopez, D.A., 1993, Geologic map of the Dillon 1° x 2° quadrangle, Idaho and Montana: U.S. Geological Survey Miscellaneous Investigations Map I-1803-H, 1 sheet, scale 1;250,000. #767 Tysdal, R.G., 1976, Geologic map of northern part of Ruby Range, Madison County, Montana: U.S. Geological Survey Miscellaneous Investigations Map I-951, 1 sheet, 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.