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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.

Fort Harrison fault (Class A) No. 685

Last Review Date: 1993-04-29

Compiled in cooperation with the Montana Bureau of Mines and Geology

citation for this record: **Machette, M.N., compiler, 1993, Fault number 685, Fort Harrison 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 Fort Harrison fault other than it forms a prominent escarpment along the northern side of pre-Tertiary bedrock at the southwestern corner of the Helena valley. The scarp is relatively short, and may be part of a longer inactive fault system that bounds the southern side of the Helena valley.
Name comments	Pardee (1950 #46) first recognized the presence of a range-bounding fault (unnamed) at the southern margin of Prickly Pear basin (Helena valley). Stickney and Bingler (1981 #559) mapped the fault, and later, Johns and others (1982 #259) show it as several faults in the southern part of a zone that they called the Scratchgravel Hills-Fort Harrison fault. We use the name of

	Stickney (1987 #251), which refers to Fort William Henry Harrison. The Fort Harrison fault is mapped from Cherry Creek eastward to Tenmile Creek. **Fault ID:** Refers to southern part of fault 37 (Scratchgravel Hills-Fort Harrison faults) of Johns and others (1982 #259).
County(s) and State(s)	LEWIS AND CLARK COUNTY, MONTANA
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* From 1:50,000-scale map of Stickney (1987 #251).
Geologic setting	West-trending, down-to-the-north, normal fault that forms a prominent escarpment at the southwestern corner of the Helena valley, southwest of Fort Harrison, which is due west of Helena. The fault is only about 1.6 km long, but may be part of the larger but inactive Prickly Pear fault system (Pardee, 1950 #46) that bounds the southern side of the Helena valley. For example, Johns and others (1982 #259) show a similar structure (State Capitol fault, no. 111) to the east that bounds bedrock south of Helena and has early Pleistocene scarps. However, Stickney (1987 #251) found no evidence to suggest that the State Capitol fault has demonstrable Quaternary movement.
Length (km)	2 km.
Average strike	N90°W
Sense of movement	Normal *Comments:* (Johns and others, 1982 #259)
Dip Direction	N *Comments:* Nearly vertical (?) (Johns and others, 1982 #259)
Paleoseismology studies	
Geomorphic	Has a single 1.6-km-long escarpment between Quaternary

expression	deposits and pre-Tertiary bedrock. Johns and others (1982 #259) showed as many as four scarps in this area and mention as many as 15 that are as much as 1.5 km long. However, only the longer east-west-trending scarp was shown by Stickney (1987 #251); it separates middle Pleistocene pediment gravel (on the north) from pre-Tertiary bedrock (on the south).
Age of faulted surficial deposits	Stickney (1987 #251) showed faulted middle Pleistocene deposits, but this is a cartographic error. He found no evidence of displacement of these deposits (Stickney, oral commun., 1993).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Stickney (1987 #251) shows the fault as early Quaternary or late Tertiary. Johns and others (1982 #259) suggest Quaternary movement.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Inferred low slip rate is based on the absence of evidence for late or middle Quaternary movement along the fault.
Date and Compiler(s)	1993 Michael N. Machette, U.S. Geological Survey, Retired
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. #46 Pardee, J.T., 1950, Late Cenozoic block faulting in western Montana: Geological Society of America Bulletin, v. 61, p. 359-406. #251 Stickney, M.C., 1987, Quaternary geologic map of the Helena valley, Montana: Montana Bureau of Mines and Geology Geologic Map 46, 1 pl., scale 1:50,000. #559 Stickney, M.C., and Bingler, E.C., 1981, Earthquake-hazard

	evaluation of the Helena valley area, Montana: Montana Bureau of Mines and Geology Open-File Report 83, 30 p., 1 pl., scale 1:24,000.