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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.

Bull Lake fault (Class A) No. 702

Last Review Date: 1996-02-29

Compiled in cooperation with the Montana Bureau of Mines and Geology

citation for this record: **Haller, K.M., compiler, 1996, Fault number 702, Bull Lake 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	Virtually nothing is known about this fault. It does not have known scarps on alluvium, and its Quaternary history of displacement is inferred from equivocal relations at one location.
Name comments	Source of name is probably Calkins and MacDonald (1909 #1029), who describe the fault as a steeply dipping (45? W.) overthrust fault, which extends from Station Creek southward to the lower forks of the Bull River. Later mapping by Gibson (1948 #1030) shows the normal fault extending into bedrock at both its northern and southern ends. Fault is similarly shown by Johns (1970 #896) and Wells and others (1981 #1038), but not on subsequent compilation of 1? x 2? Kalispell sheet by Harrison and others (1983 #1032). Fault, as shown here, extends from Camp

	Creek, 3.5 km east of the range front, southward to 0.2 km northwest of East Fork Bull River. **Fault ID:** Refers to southern part of fault number 125 of Witkind (1975 #317).
County(s) and State(s)	LINCOLN COUNTY, MONTANA SANDERS COUNTY, MONTANA
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* Based on poorly located fault shown on 1:125,000-scale geologic map by Gibson (1948 #1030).
Geologic setting	Steeply to moderately dipping, down-to-west, normal fault bounding the southern part of Lake Creek valley. Witkind (1975 #317) considered the basin-bounding parts of this fault, the Savage Lake fault [703], and O'Brien Creek fault [704] to be a single feature. This interpretation is not supported by recent work; thus, we depict the faults as originally mapped. Pardee (1950 #46) suggests that the cumulative displacement across this fault is about 1.5 km.
Length (km)	22 km.
Average strike	N4°W
Sense of movement	Normal *Comments:* (Gibson, 1948 #1030)
Dip	45° W *Comments:* Dip of fault from exposure east of Bull Lake (Calkins and MacDonald, 1909 #1029; Pardee, 1950 #46).
Paleoseismology studies	
Geomorphic expression	Range front is characterized by aligned faceted spurs. Scarps on alluvium are not known.

Age of faulted surficial deposits	Unknown, fault is generally concealed by alluvium. Location of fault shown at or near bedrock-alluvial contact (Johns, 1970 #896). Wells and others (1981 #1038) show the fault entirely in bedrock.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Based on limited evidence, movement on this fault has been regarded as "recent "since the early work of Calkins and MacDonald (1909 #1029); no subsequent detailed studies have been conducted. Gibson (1948 #1030) also described places where there may be evidence of young movement, but cautiously noted that the relations also could be erosional in origin. Although evidence is inconclusive, an erosional origin is preferred in a report by the U.S. Army Corps of Engineers (1978 #1028). Pardee (1950 #46) believed the range-front morphology indicated that most of the faulting is Pleistocene in age. A conservative estimate for the timing of the most recent movement is used here.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Inferred low slip rate based on the absence of data that indicate late Quaternary slip.
Date and Compiler(s)	1996 Kathleen M. Haller, U.S. Geological Survey
References	#1029 Calkins, F.C., and MacDonald, D.F., 1909, A geological reconnaissance in northern Idaho and northwestern Montana: U.S. Geological Survey Bulletin 384, 112 p. #1030 Gibson, R., 1948, Geology and ore deposits of the Libby quadrangle, Montana: U.S. Geological Survey Bulletin 956, 131 p., 2 pls. #1032 Harrison, J.E., Cressman, E.R., and Whipple, J.W., 1983, Preliminary geologic and structure maps of part of the Kalispell 1° x 2° quadrangle, Montana: U.S. Geological Survey Open-File Report 83-502, 6 p. pamphlet, 2 sheets, scale 1:250,000. #896 Johns, W.M., 1970, Geology and mineral deposits of

	Lincoln and Flathead Counties, Montana: Montana Bureau of Mines and Geology Bulletin 79, 182 p., 3 pls., scale approx. 1:125,000. #46 Pardee, J.T., 1950, Late Cenozoic block faulting in western Montana: Geological Society of America Bulletin, v. 61, p. 359-406. #1028 U.S. Army Corps of Engineers, 1978, Libby additional units and reregulating dam—Design memorandum 7: U.S. Army Corps of Engineers, Seattle District, v. 3. #1038 Wells, J.D., Lindsey, D.A., and Van Loenen, R.E., 1981, Geology of the Cabinet Mountains Wilderness, Lincoln and Sanders Counties, Montana, *in* Mineral resources of the Cabinet Mountains Wilderness, Lincoln and Sanders Counties, Montana: U.S. Geological Survey Bulletin 1501-A, p. 9-19. #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.