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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.

Leckie fault (Class B) No. 775

Last Review Date: 1999-05-11

citation for this record: **Machette, M.N., compiler, 1999, Fault number 775, Leckie 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	No detailed studies have been performed on this fault, which is considered to be of potential but unproven Quaternary age. The fault cuts Precambrian rocks and a thin veneer of Miocene(?) fanglomerate, with possible Quaternary displacement. Reconnaissance studies show no evidence (aerial or ground-based) for surface rupturing in the latest Quaternary. However, upper Pleistocene and Holocene deposits are not extensive in the area, thus making evaluation of the absence or presence of late Quaternary displacement uncertain. Likewise, on the basis of prominent lineaments, tectonic geomorphic features and associated scarps on both bedrock and the fanglomerate, we cannot preclude Quaternary movement. Thus, we consider the Leckie fault to be a Class B structure, until further studies show its of proven Quaternary age.
Name comments	Although mapped by Love and Christensen (1985 #2287), the fault was named by Geomatrix Consultants (1988 #2973) for its

	proximity to Leckie Ranch. The fault extends along the southwestern margin of the Wind River uplift, from near the East Fork River (on the northwest) to the northwest side of the Prospect Mountains (on the southeast) as shown by Case and others (1997 #3449). **Fault ID:** Referred to as normal fault 11 (Leckie) on figure 2-1 of Geomatrix Consultants (1988 #2973).
County(s) and State(s)	SUBLETTE COUNTY, WYOMING
Physiographic province(s)	WYOMING BASIN
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Bedrock fault map is shown on plate 2 in Geomatrix Consultants (1988 #2973) at 1:250,000 scale. Also shown, in generalized fashion at 1:1,000,000 scale by Case and others (1997 #3449). Trace of fault (mainly inferred to be Quaternary) transferred and fitted to 1:250,000-scale topographic base map.
Geologic setting	This southeast-striking normal fault trends along the southwestern margin of the Wind River uplift and parallels its predominant structural grain. This uplift is 220 km long and about 40 km wide, forming the largest Laramide uplift in Wyoming (Steidtmann and others, 1983 #3456; Geomatrix Consultants, 1988 #2973). The uplift is a broad northwest-trending asymmetric anticline that has been thrust to the southwest over sedimentary rocks of the Green River basin along the Wind River thrust. The timing of initial deformation along the Leckie fault is not well known, but it may be related to the middle Miocene collapse of the Wind River uplift, which is documented by Steidtmann and Middleton (1986 #3453). Love and Christensen (1985 #2287) mapped the fault entirely within Precambrian rock, but Richmond (1983 #3457) showed displacement of Miocene(?) fanglomerate that may be a facies of the upper Miocene to middle Pliocene South Pass Formation. The Leckie fault is subparallel to, but northwest of, the Continental fault [776], which is known to be late Cenozoic and may have Quaternary (but not late Quaternary) movement.
Length (km)	17 km.
Average strike	N24°W

Sense of movement	Normal *Comments:* Fault sense not well known, but Richmond (1983 #3457) noted normal displacement.
Dip Direction	SW
Paleoseismology studies	
Geomorphic expression	The fault is marked by fault-related lineaments that extend about 20 km. They are associated with a narrow linear valley (graben) in Miocene(?) fanglomerate (Richmond, 1983 #3457), as well as with aligned stream valleys, topographic escarpments and saddles, springs, and deflected drainages (Geomatrix Consultants, 1988 #2973). West of Leckie Ranch, several distinct northwest-trending lineaments were identified by Richmond (1983 #3457). Geomatrix Consultants (1988 #2973) reported that the most prominent of these lineaments has an escarpment about 37 m high that faces southwest and trends perpendicular to the Big Sandy River (and thus is not a fluvial scarp). This escarpment forms the northeastern margin of Richmond's graben, and is aligned with several springs and linear stream valleys between the East Fork and Little Sandy Rivers. However, latest Quaternary colluvium and moraines (glacial deposits) at Muddy Lake along the escarpment are not deformed, which suggests that the fault has no latest Quaternary (<35 ka) displacement.
Age of faulted surficial deposits	Precambrian rock, Miocene(?) fanglomerate, and possibly pre-latest Quaternary surficial deposits, although these are sparse along the trend of the fault.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Stratigraphic relations suggest displacement of fanglomerate that is mapped as Miocene(?) by Richmond (1983 #3457) (correlative to upper Miocene to middle Pliocene South Pass Formation). The geomorphology is suggestive of Quaternary displacement. The presence of a deep narrow graben, an escarpment as much as 37 m high, and strong control of stream drainages suggest continuing structural control by the Leckie fault. However, Geomatrix Consultants' (1988 #2973)

	reconnaissance found no strong evidence for late Quaternary displacement, and they precluded latest Quaternary faulting on the basis of undeformed sediment that lie across the fault. Thus, we consider the Leckie fault to be a Class B structure, until further studies show its of proven Quaternary age.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip-rate category assigned from lack of deformation of latest Quaternary glacial moraine and colluvial deposits.
Date and Compiler(s)	1999 Michael N. Machette, U.S. Geological Survey, Retired
References	#3449 Case, J.C., Larsen, L.L., Boyd, C.S., and Cannia, J.C., 1997, Earthquake epicenters and suspected active faults with surficial expression in Wyoming: Geological Survey of Wyoming Preliminary Hazards Report 97-1, 1 sheet, scale 1:1,000,000. #2973 Geomatrix Consultants, Inc., 1988, Northwestern Wind River Basin seismotectonic evaluation: Technical report to U.S. Department of Interior, Bureau of Reclamation, Denver, under Contract 6-CS-81-07310, 116 p., 3 pls. #2287 Love, J.D., and Christiansen, A.C., 1985, Geologic map of Wyoming: State Geologic Map, 3 sheets, scale 1:500,000. #3457 Richmond, G.M., 1983, Modification of glacial sequence along Big Sandy River, southern Wind River Range, Wyoming: Geological Society of America Abstracts with Programs, v. 15, no. 5, p. 431. #3453 Steidtmann, J.R., and Middleton, L.T., 1986, Eocene-Pliocene stratigraphy along the southern margin of the Wind River Range, Wyoming—Revisions and implications from field and fission-track studies: The Mountain Geologist, v. 23, no. 1, p. 19-25. #3456 Steidtmann, J.R., McGee, L.C., and Middleton, L.T., 1983, Laramide sedimentation, folding, and faulting in the southern Wind River Range, Wyoming, *in* Lowell, J.D., ed., Rocky

	Mountain foreland basins and uplifts: Rocky Mountain Association of Geologists, p. 161-167.