

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](#).

Buffalo Fork fault, middle section (Class A) No. 767b

Last Review Date: 1998-03-26

Compiled in cooperation with the California Geological Survey

citation for this record: Pierce, K.L., and Machette, M.N., compilers, 1998, Fault number 767b, Buffalo Fork fault, middle section, 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

General: The Laramide Buffalo Fork thrust fault is an important crustal feature that thrusts upper Paleozoic sedimentary rocks westward onto Cretaceous rocks. Parts of this thrust have been reactivated in Cenozoic time with down-to-the-east normal faulting, including one site of observed post-glacial fault scarps and another of tilted late Quaternary lake sediment. This fault is in a remote area seldom visited by geologists that are experienced in neotectonics; thus, evidence of Quaternary movement may have been missed. Because of its older history, this structure might serve to accommodate ongoing tectonic activity. There

	<p>have been several Quaternary basalt extrusions in the hanging wall of the fault.</p> <p>Sections: This fault has 3 sections. Fault divided on basis of young activity in the middle section [767b] and older movement on the ends [northern section, 767a; southern section, 767c].</p>
<p>Name comments</p>	<p>General: Referred to as the Buffalo Fork thrust (fault) by Love and Keefer (1975 #2285). The Buffalo Fork thrust bounds the east margin of the Two Oceans Plateau and extends from Yellowstone Lake on the north to Togowotee Pass area on the south. The northern part [767a] represents normal-fault reactivation of Buffalo Fork thrust fault. Although this fault was also referred to as the South Arm fault by Wong and others (2000 #4484), the Buffalo Fork fault name has precedence and is used herein.</p> <p>Section: This informally named middle section of the Buffalo Fork fault is near the southern boundary of Yellowstone Park.</p> <p>Fault ID: Refers to fault 237 (unnamed) of Witkind (1975 #819).</p>
<p>County(s) and State(s)</p>	<p>TETON COUNTY, WYOMING</p>
<p>Physiographic province(s)</p>	<p>MIDDLE ROCKY MOUNTAINS</p>
<p>Reliability of location</p>	<p>Good Compiled at 1:125,000 scale.</p> <p><i>Comments:</i> Mapped by Love and Keefer (1975 #2285) at 1:62,500 scale and compiled by Christiansen (2001 #1784) at 1:125,000 scale. However, these faults are in remote backcountry, and the trace is based on sparse observations of fault scarps and tilted lake sediment (Richmond and Pierce, 1971 #2288). Fault traces recompiled at 1:125,000-scale on map with topographic base.</p>
<p>Geologic setting</p>	<p>The Buffalo Fork thrust is a major Laramide structure in northwest Wyoming (Love and Keefer, 1975 #2285). Late Cenozoic extension may have been accommodated along or near this zone of structural weakness (p. D45-46 in Love and Keefer, 1975 #2285). Christiansen (2001 #1784) has recently affirmed this reactivation. Because of its older history, this structure might serve to accommodate ongoing tectonic activity. There have been several Quaternary basalt extrusions in the hanging wall of the</p>

	fault (U.S. Geological Survey, 1972 #639; Christiansen, 2001 #1784).
Length (km)	This section is 3 km of a total fault length of 30 km.
Average strike	N22°W (for section) versus N1°E (for whole fault)
Sense of movement	Normal <i>Comments:</i> Love and Keefer (1975 #2285) and by Christiansen (2001 #1784) showed this as a Laramide thrust fault with later (Quaternary) normal fault movement.
Dip Direction	NE
Paleoseismology studies	
Geomorphic expression	This is the only section where scarps have been observed on surficial materials (Richmond and Pierce, 1971 #2288). Near the southern end of section, post-glacial scarps are on Pinedale till; near north end of section late Quaternary lake sediment is tilted 25-30 degrees (Richmond and Pierce, 1971 #2288).
Age of faulted surficial deposits	Pinedale, about 15 ka.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) <i>Comments:</i> Near southern end of section, post-glacial scarps have been observed on Pinedale till (Richmond and Pierce, 1971 #2288).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> This section of the fault has scarps estimated to be 3 m high (probably less offset) on materials about 15,000 years old. Conversely, Wong and others (2000 #4484) suggested fault slip rates ranging from 0.4-1.4 mm/yr, each with separate weighting. However, these rates are based on an assumption of activity

	<p>identical to their appraisal of the Yellowstone Lake (Eagle Bay [757]) fault. Wong and others' (2000 #4484) reported slip rates are model dependent and do not represent actual measured values. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is of a lesser magnitude. Accordingly, the <0.2 mm/yr slip-rate category has been assigned to this fault.</p>
<p>Date and Compiler(s)</p>	<p>1998 Kenneth L. Pierce, U.S. Geological Survey, Emeritus Michael N. Machette, U.S. Geological Survey, Retired</p>
<p>References</p>	<p>#1784 Christiansen, R.L., 2001, The Quaternary and Pliocene Yellowstone Plateau volcanic field of Wyoming, Idaho, and Montana: U.S. Geological Survey Professional Paper 729-G, 145 p., 3 pls., scale 1:125,000.</p> <p>#2285 Love, J.D., and Keefer, W.R., 1975, Geology of sedimentary rocks in southern Yellowstone National Park, Wyoming: U.S. Geological Survey Professional Paper 729-D, 60 p.</p> <p>#2288 Richmond, G.M., and Pierce, K.L., 1971, Surficial geologic map of the Mount Hancock quadrangle, Yellowstone National Park and adjoining areas, Wyoming: U.S. Geological Survey Miscellaneous Geologic Investigations I-636, scale 1:62,500.</p> <p>#639 U.S. Geological Survey, 1972, Geologic map of Yellowstone National Park: U.S. Geological Survey Miscellaneous Geologic Investigations I-711, 1 sheet, scale 1:125,000.</p> <p>#819 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in Wyoming: U.S. Geological Survey Open-File Report 75-279, 35 p. pamphlet, 1 sheet, scale 1:500,000.</p> <p>#4484 Wong, I., Olig, S., and Dober, M., 2000, Preliminary probabilistic seismic hazard analyses—Island Park, Grassy Lake, Jackson Lake, Palisades, and Ririe Dams: U.S. Department of the Interior, Bureau of Reclamation Technical Memorandum D8330-2000-17.</p>

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