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.

Faults south of Blacktail Butte (Class A) No. 724

Last Review Date: 2001-10-26

citation for this record: Pierce, K.L., compiler, 2001, Fault number 724, Faults south of Blacktail Butte, 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 02:03 PM.

Synopsis	An unnamed zone of faults for a graben about 1.5 km long that extends southward from Blacktail Butte across a loess-mantle late Pleistocene terrace that was deposited early in the last glacial period (Pinedale). Although the scarp height is locally as much as 5.2 m, the net surface offset across the graben is less than 0.6 m. The small length of the recognized scarps may suggest that these are secondary features, like those near Jackson Hole [725], to a more major fault in or adjacent to the valley.
Name comments	Shown as unnamed faults within the Antelope Blacktail Butte Study Areas on plate 4 of Gilbert and others (1983 #1338).
County(s) and State(s)	TETON COUNTY, WYOMING
Physiographic	

Physiographic province(s)	MIDDLE ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:125,000 scale. *Comments:* Fault traces based on geologic mapping of at 1:62,5000 scale by Gilbert and others (1983 #1338) and 1:125,000 scale by Love and others (1992 #2289) and Love and Love (1988 #4670).
Geologic setting	This fault zone extends south from Blacktail Butte into the central, sediment-filled portion of Jackson Hole and others (Gilbert and others, 1983 #1338; Love and Love, 1988 #4670; Love and others, 1992 #2289). The fault zone is rather short and has little net vertical offset across it, which suggests that it is a secondary feature related to movement on another, yet unidentified, fault within the basin (Gilbert and others, 1983 #1338).
Length (km)	1 km.
Average strike	N9°W
Sense of movement	Normal
Dip Direction	W; E *Comments:* Primary faults dip west, whereas antithetic faults generally dip east at unknown angles.
Paleoseismology studies	
Geomorphic expression	The Blacktail Buttes graben is well defined on aerial photographs but somewhat muted on the ground because of the thick loess that mantles the underlying gravel deposits. Gilbert and others (1983 #1338) mapped the scarps over a length of only 1.5 km, although lineaments continue another 0.5 km to the south. They profiled the fault zone and determined a maximum scarp height of 5.2 m, but the graben only has a net surface displacement of 0.6 m. They said "A series of short, north-trending, en echelon scarps offset the loess in the outwash channel. The zone consists of a series of irregular west-facing scarps with several grabens" (Gilbert and others, 1983 #1338).

Age of faulted surficial deposits	The terrace on which the faulting is preserved was probably deposited early during the last glaciation (K.L. Pierce, written commun., 2001). The terrace itself has a loess mantle as thick as 3 m, but no buried soil (indicating depositional stability) was found near the base of the loess, which lies on deposits of the next older (Bull Lake) glaciation. Thus, the terrace is assigned to the early part of the last glaciation (i.e., early Pinedale). This terrace was subsequently undercut by a later Pinedale fluvial terrace on which the Jackson Hole airport is built. Love and Love (1988, #4670) had previously mapped the fault and suggested that a flood associated with the Devils Elbow slide crossed this loess-mantled surface about 5,000 years ago, thus inferring middle Holocene or younger movement.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The fault offsets loess-mantled gravel that probably dates from early in the last glaciation (K.L. Pierce, written., commun., 2001). The maximum scarp angle is 17 degrees (Gilbert and others, 1983 #1338) that may indicate a Holocene age in that the loess mantle is readily erodible, which produces a more muted scarp than for the same age scarp in gravel.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* The scarp height, 5.2 m, is quite high but the surface offset is only 0.6 m (Gilbert and others, 1983 #1338). A low-slip rate is inferred by the compiler on basis of small offset of relatively old deposits, and on activity rates on other seemingly secondary late Quaternary faults in adjacent parts of the region (Gilbert and others, 1983 #1338). However, inasmuch as the faulting appears to be young, further study could lead to assignment of a faster slip rate category. Wong and others (2000 #4484) did not consider these faults in their recent appraisal of late Quaternary faulting of northwestern Wyoming.
Date and Compiler(s)	2001 Kenneth L. Pierce, U.S. Geological Survey, Emeritus
References	#1338 Gilbert, J.D., Ostenaa, D., and Wood, C., 1983,

	Seismotectonic study of Jackson Lake Dam and Reservoir, Minidoka Project, Idaho-Wyoming: U.S. Bureau of Reclamation Seismotectonic Report 83-8, 123 p., 11 pl. #4670 Love, J.D., and Love, J.M., 1988, Geologic road log of part of the Gros Ventre River Valley including the Lower Gros Ventre slide: Wyoming Geological Survey Reprint 46, 14 p. #2289 Love, J.D., Reed, J.C., Jr., and Christiansen, A.C., 1992, Geologic map of Grand Teton National Park: U.S. Geological Survey Miscellaneous Investigations Map I-2031, scale 1:62,500. #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.