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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.

East Gros Ventre fault (Class B) No. 756

Last Review Date: 2001-10-16

citation for this record: **Machette, M.N., and Pierce, K.L., compilers, 2001, Fault number 756, East Gros Ventre 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 01:59 PM.**

Synopsis	This controversial feature is mainly concealed beneath late Pleistocene to Holocene alluvium north and northeast of Jackson Hole. It lies along the southeastern base of East Gros Ventre Butte, and forms a scarp (tectonic or fluvial) on the west margin of the Flat Creek alluvial fan. The eastern strand is shown as extending farther northeast, along Long Hollow. As much as 46-61 m of offset has been suggested for latest Pleistocene (Pinedale) deposits, which indicates a very high slip rate. A possible alternative interpretation is that the scarp is the result of fluvial undercutting of the Bull Lake recessional outwash at the margin of the Flat Creek alluvial fan, mainly in Pinedale time. the Class B assignment is due to uncertain origin of the mapped scarp.
Name comments	Named for East Gros Ventre Butte, the eastern of two elongate N-S ridges that lie above the alluvial/glacial plain of Jackson Hole. The name first appears to have been used by Love and Taylor

	(1962 #4671). The fault extends from Jackson north-northeast along the southeast margin of the East Gros Ventre Butte (Gilbert and others, 1983 #434). From here it turns northeast and extends along the northern margin of the Flat Canyon fan and up Long Hollow.
County(s) and State(s)	TETON COUNTY, WYOMING
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:62,500 scale. *Comments:* Trace from 1:125,000-scale geologic mapping based on Love and others (1992 #2289). Originally shown on fig. 3 of Love and Love (1980 #4672) (and further republishings of the same study), and recompiled on topographic base (plate 4) at 1:62,500 scale by Gilbert and others (1983 #434).
Geologic setting	This inferred fault bounds the eastern margin of East Gros Ventre Butte, one of two glaciated (Paleozoic-cored) ridges that rise about the alluviated glacial plain of Jackson Hole. The eastern strand continues northeast of the butte where it is represented by a high, steep escarpment in loess mantled outwash of recessional Bull Lake age. The western strand is inferred in order to explain exposures of Shooting Iron Formation immediately east and below andesite (Love and Taylor, 1962 #4671). The geologic map (Love and others, 1992 #2289) shows Shooting Iron Formation in depositional relation to the andesite, but the western strand is between outcrops of Shooting Iron Formation, which may bring into question the need for faulting on the western strand.
Length (km)	20 km.
Average strike	N47°E
Sense of movement	Normal *Comments:* Inferred from topography.
Dip Direction	SE; E
Paleoseismology studies	

Geomorphic expression	The fault, as mapped, bounds the escarpment along the eastern base of East Gros Ventre Butte (Paleozoic bedrock) and extends farther northeast, along Long Hollow. Most of the fault location is largely inferred on the basis of topography and thus is shown as concealed. A western strand is 0.25 km west of (above) U.S. Highway 187 and dies out to the north. The other strand is just east of (below) the highway and extends north along the west margin of the Flat Creek alluvial fan. Late Pleistocene loess is at a higher elevation above the highway than below the highway, which leads to the interpertation that it is faulted (Love and Taylor, 1962 #4671). K.L. Pierce (written commun., 2001) suggests that these two levels of loess may result from draping of the loess across preexisting beveled topography.
Age of faulted surficial deposits	Love and Taylor (1962 #4671) described a locality based on two different levels of loess and a scarp between alluvial gravels. As much as 61 m (Love and Taylor, 1962 #4671) or 46 m (Love and Love, 1997 #4668) of offset has been suggested for latest Pleistocene (Pinedale) deposits across the eastern strand. Based on an inferred offset of 91 m for the west strand and 61 m for the east strand, a total 152 m of Quaternary (1.6 Ma) offset is inferred (Love and Taylor, 1962 #4671).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Timing based on Love and Taylor's (1962 #4671) inference of offset Pinedale (latest Pleistocene) loess that contains mollusks dated 13,890 ? 700 and 15,300 ? 500 yr B.P. K.L. Pierce (written commun., 2001) finds that the scarps can be explained by fluvial undercutting, and that a fault explanation is thus not required.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Wong and others (2000 #4484) suggested fault slip rates of 0.1 mm/yr (Quaternary) and 4 mm/yr (post-late Pleistocene). These very discrepant rates are based on Love and

	Taylor's (1962 #4671) and Love and Love's (1980 #4672) estimate of 152 m of offset of Quaternary (1.6 Ma) deposits and Love and Taylor's (1962 #4671) estimate of 46 m of offset of latest Pleistocene (Pinedale, >12 ka) deposits. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest that the latest Pleistocene slip rate of 4 mm/yr is unreasonably high. Thus, the longer-term (Quaternary) rate is used to assign this inferred fault to the <0.2-mm/yr slip-rate category.
Date and Compiler(s)	2001 Michael N. Machette, U.S. Geological Survey, Retired Kenneth L. Pierce, U.S. Geological Survey, Emeritus
References	#434 Gilbert, J.D., Ostenaa, D., and Wood, C., 1983, Seismotectonic study Island Park Dam and Reservoir, Minidoka Project, Idaho-Wyoming: U.S. Bureau of Reclamation Seismotectonic Report 83-1, 37 p., 6 pl. #4672 Love, J.D., and Love, J.M., 1980, Road log, Jackson to Dinwoody and return: 31st Annual Field Conference, Guidebook, September 6-10, 1980, p. 283-317. #4668 Love, J.D., and Love, J.M., 1997, Geologic road log, Jackson to Dinwoody and return: Wyoming Geological Survey Public Information Circular 20, 38 p. #4671 Love, J.D., and Taylor, D.W., 1962, Faulted Pleistocene strata near Jackson, Northwestern Wyoming, *in* Faulted Pleistocene Strata Near Jackson, Northwestern Wyoming: U.S. Geological Survey Professional Paper 450-D, p. D136-139. #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.