Jump to Navigation

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.

Teton fault, Avalanche Canyon section (Class A) No. 768e

Last Review Date: 1999-12-07

citation for this record: **Pierce, K.L., compiler, 1999, Fault number 768e, Teton fault, Avalanche Canyon 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 Teton fault is a major range-bounding fault along the eastern margin of the Teton Range. Spectacular post-glacial (<15 ka) scarps are present along 60 km of the fault trace and can be seen from the valley floor owing to their large height. Post-glacial offset is as much as 30 m along the middle part of the range, but diminishes to the north and south, mimicking the overall height of the range. Although quite active in the latest Quaternary, the fault has been seismically quiet in historic time. **Sections:** This fault has 6 sections. Three sections have been defined for main range front, but we add a more northerly section and two associated subsidiary faults (herein sections) that are within the range.
Name	**General:** Referred to as the Teton fault by Love and Reed (1968

comments	#3796). This fault bounds the eastern margin of the Teton Range and Steamboat Mountain (north of Jackson Lake), and extends from Steamboat Mountain on the north to Phillips Creek on the south. The original location of the fault trace was compiled on and digitized from a 1:62,500-scale base map of Grand Teton National Park; the location was refined based on publicly available LiDAR data. Gilbert and others (1983 #1338) and Wong and others (2000 #4484) considered the inferred projection of the Hermitage Point fault to be a possible splay or continuation of the Teton fault, but it is not included herein owing to lack of associated scarps and equivocal evidence that it has been active in Quaternary time (Wong and others, 2000 #4484). **Section:** This section represents a subsidiary fault within the Teton Range, about 1.6 km west of the the middle section of the Teton fault [768c]. The Avalanche Canyon section of the Teton fault extends about 7 km through the steep eastern face of the Teton Range.
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:* Compiled at 1:62,500-scale on shaded relief base map (Grand Teton National Park); trace based on photomechanical transfer from 1:250,000 scale map by Gilbert and others (1983 #1338), fitted to topography.
Geologic setting	The Teton fault is a major range-bounding fault that forms the eastern margin of the Teton Range. Initial movement on the fault is commonly associated with the arrival of the Yellowstone hotspot in this part of northwestern Wyoming; however, there is no consensus regarding the total amount of offset and age of initiation of faulting. Reported total displacement is 2.5–3.5 km (Byrd and others, 1994 #2263), 6–9 km (Smith and others 1993 #2294), and 10 km (Love, 1977 #3796). Faulting may have begun about 5 to 6 m.y. ago (Pierce and Morgan, 1992 #2297) or during the Miocene (5–13 Ma, Smith and others, 1993 #2294). Gravity models, the about 10° westward tilting of the approximately 2-Ma Huckleberry Ridge Tuff, and the absence of basement-sourced

	Precambrian clasts in Jackson Hole sediments all suggest that the displacement on the Teton fault was small prior to about 5 Ma and that the majority of the offset has accrued since about 2 Ma (Foster and others, 2010 #7045).
Length (km)	This section is 8 km of a total fault length of 59 km.
Average strike	N21°E (for section) versus N19°E (for whole fault)
Sense of movement	Normal
Dip	60°-80° *Comments:* Dip measured in intensely sheared and altered zone in igneous and metamorphic rock (Gilbert and others, 1983 #1338).
Paleoseismology studies	
Geomorphic expression	Topographic relief thought to represent the faulting is expressed both in till and in granitic bedrock. The associated scarp is 7.9 m high and slopes 26?-27? to the east; if the scarp is fault related, it indicates 5.2-7.0 m of surface offset.
Age of faulted surficial deposits	Pinedale (latest Pleistocene) glacial deposits; area deglaciated by 15 ka.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:*
Recurrence interval	5.0-7.5 k.y (<15 ka) *Comments:* The measured 5.2-7.0 m of surface offset suggests probable multiple (3-4) offsets of 1.5-2 m in past 15,000 yrs (although this is an open-ended time interval). If so, then recurrence is probably in the range of 5.0-7.5 k.y.
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Measured 5.2-7.0 m of post Pinedale surface offset suggests slip rate of 0.3-0.5 mm/yr for past 15 k.y. (although this

	is an open-ended time interval). Thus, the section is assigned to the 0.2-1 mm/yr slip-rate category.
Date and Compiler(s)	1999 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. #3796 Love, J.D., and Reed, J.R., Jr., 1968, Creation of the Teton landscape—The geologic story of Grand Teton National Park: Grand Teton Natural History Association, 120 p. #2297 Pierce, K.L., and Morgan, L.A., 1992, The track of the Yellowstone hotspot—Volcanism, faulting, and uplift, *in* Link, P.K., Kuntz, M.A., and Platt, L.B., eds., Regional geology of eastern Idaho and western Wyoming: Geological Society of America Memoir 171, p. 1-53. #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.