

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](#).

Eagle Bay fault, southern section (Class A) No. 757c

Last Review Date: 2011-02-23

citation for this record: Pierce, K.L., and Haller, K.M., compilers, 2011, Fault number 757c, Eagle Bay fault, southern 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 01:59 PM.

Synopsis

General: The Eagle Bay fault strikes north across the margin of the 0.63-Ma Yellowstone caldera. Although the fault in Yellowstone Lake has been imaged by seismic-reflection profiles collected concurrently with multibeam bathymetric data, it is only nominally mentioned in recent publications (Finn and Morgan, 2002 #7054; Johnson and others, 2003 #7050; Morgan and others, 2003 #7053, 2007 #7051; Pierce and others, 2007 #7052).

Sections: This fault has 3 sections. The middle section of the Eagle Bay fault [757b] offsets Holocene lake sediment adjacent to and in the Eagle Bay-Flat Mountain Arm area of Yellowstone Lake. Studies concluded that there was only one post-glacial event that offsets lake sediments on this section of the fault. The main fault scarp is as much as 9 m high, but when adjusted for the vertical offset from multiple antithetic scarps, the resulting net

	<p>stratigraphic offset is less than one-half this amount. Near the northern section of the fault, seismic profiles show that post-glacial lake sediment is vertically offset, although the location and trace of the fault are not yet well controlled. The northern section of this fault probably connects to the Lake Hotel fault [755]. Vertical displacement on the southern section of the fault has formed a bedrock scarp on the 0.63-Ma Lava Creek Tuff.</p>
Name comments	<p>General: Named the Eagle Bay fault by Locke and others (1992 #308). It was previously known as the Yellowstone Lake fault of Witkind (1975 #819).</p> <p>Section: This informally named section seems older than the central section, which has reported post-glacial offset.</p> <p>Fault ID: Refers to fault 238 of Witkind (1975 #819).</p>
County(s) and State(s)	TETON COUNTY, WYOMING
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS
Reliability of location	<p>Good Compiled at 1:24,000 scale.</p> <p><i>Comments:</i> Mapped by Blank and others (1974 #2274) at 1:62,600 scale. It is also shown at 1:125,000 scale by U.S. Geological Survey (1972 #639) and by Christiansen (2001 #1784). The location is from Pierce and others (2007 #7052, fig. 2).</p>
Geologic setting	<p>This is one of several north-trending, range-front faults in the area between the 0.63-Ma Yellowstone caldera and the Teton fault to the south [768]. However, it is the only fault that cuts across the caldera's structural boundary. This fault is near a swarm of small earthquakes that occurred in 1989 (fig. 1, Peyton and Smith, 1990 #2270).</p>
Length (km)	This section is 14 km of a total fault length of 31 km.
Average strike	N0°E (for section) versus N3°E,N5°E (for whole fault)
Sense of movement	Normal
Dip Direction	E

Paleoseismology studies	
Geomorphic expression	Expressed as bedrock scarps that are several hundred meters high on 630-ka Lava Creek Tuff. The main fault dips to the east; antithetic faults that dip west are too small to show on map.
Age of faulted surficial deposits	Faults have a maximum vertical offset of 300 m on 630-ka (early middle Pleistocene) Lava Creek Tuff. No post-glacial offset has been documented.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) <i>Comments:</i> Most recent event limited to middle and late Quaternary (<750 ka) time on basis of offset of 630-ka Lava Creek Tuff. However, the presence of scarps several hundred meters high indicate many tens of small surface-rupturing events, some of which may be late Pleistocene in age.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr <i>Comments:</i> Long-term rate is calculated to be about 0.4 mm/yr based on a maximum 300 m offset of 0.63 Ma Lava Creek Tuff. Wong and others (2000 #4484) modeled fault slip rates of 0.4 mm/yr (60% weight) and 1.4 mm/yr (40% weight) for the entire fault based data from Locke and others (1992 #308) from a site along the central section [757b]. However, the apparent lack of post-glacial offset along this section of the fault raises the question of whether the fault is still this active. On this basis of the amount of post-Lava Creek offset, the fault is assigned to the 0.2-1.0 mm/yr slip rate category, although further study may show that the late Quaternary slip rate is lower.
Date and Compiler(s)	2011 Kenneth L. Pierce, U.S. Geological Survey, Emeritus Kathleen M. Haller, U.S. Geological Survey
References	#2274 Blank, H.R., Jr., Prostka, H.J., Keefer, W.R., and Christiansen, R.L., 1974, Geologic map of the Frank Island quadrangle, Yellowstone National Park, Wyoming: U.S. Geological Survey Geologic quadrangle Map GQ-1209, scale

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<http://pubs.usgs.gov/pp/1717/downloads/pdf/Front.pdf>.

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