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.

Shirt Creek fault zone (Class A) No. 625

Last Review Date: 2010-11-09

Compiled in cooperation with the Idaho Geological Survey

citation for this record: **Personius, S.F., and Adema, G.W., compilers, 2010, Fault number 625, Shirt Creek fault zone, 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 03:03 PM.**

Synopsis	The Shirt Creek fault zone is a north-striking, east- and west-dipping normal fault system that displaces Miocene Columbia River Basalts along most of its length; the fault zone forms a Y-shaped pattern with a western branch that dips east and an eastern branch that dips west. The fault zone is part of the western Idaho fault belt. The fault zone is expressed as well defined scarps on Miocene Columbia River Basalts and locally on late Pleistocene alluvial-fan deposits, as aligned springs and seeps, deflected drainages, and as tonal, vegetation, and topographic lineaments. Intermittent fault scarps are about 4-m high on late Pleistocene deposits and about 1 m on latest Pleistocene deposits. The variable scarp-height data has been used to infer two or more

	surface-faulting events in the late Pleistocene.
Name comments	Parts of the Shirt Creek fault zone were originally mapped by Fitzgerald (1982 #5886) and Gilbert and others (1983 #5887); the fault zone was later mapped in detail and informally named after nearby Shirt Creek by Knudsen and others (1996 #5889).
County(s) and State(s)	ADAMS COUNTY, IDAHO WASHINGTON COUNTY, IDAHO
Physiographic province(s)	COLUMBIA PLATEAU
Reliability of location	Poor Compiled at 1:100,000 scale. *Comments:* Fault locations are from 1:250,000-scale mapping of Knudsen and others (1996 #5889) further constrained by satellite imagery and topography at scale of 1:100,000. Reference satellite imagery is ESRI_Imagery_World_2D with a minimum viewing distance of 1 km (1000 m).
Geologic setting	The Shirt Creek fault zone is a north-striking, east- and west-dipping normal fault system that displaces Miocene Columbia River Basalts along most of its length (Fitzgerald, 1982 #5886; Knudsen and others, 1996 #5889). The fault zone forms a Y-shaped pattern with a western branch that dips east and an eastern branch that dips west (Knudsen and others, 1996 #5889). The fault zone is part of the western Idaho fault belt of Hamilton (1963 #6040), a system of north-striking normal faults formed along the western margin of the Idaho batholith.
Length (km)	5 km.
Average strike	N6°E
Sense of movement	Normal *Comments:* The Shirt Creek fault zone is mapped as a group of normal faults by Fitzgerald (1982 #5886) and Knudsen and others (1996 #5889).
Dip Direction	E *Comments:* No actual dip measurements have been published, but Knudsen and others (1996 #5889) modeled the Shirt Creek fault

	zone as 60? dipping normal faults in their analysis of paleo-earthquake magnitudes.
Paleoseismology studies	
Geomorphic expression	The Shirt Creek fault zone is expressed as well-defined scarps on Miocene Columbia River Basalts and locally on late Pleistocene alluvial-fan deposits, as aligned springs and seeps, deflected drainages, and as tonal, vegetation, and topographic lineaments. Intermittent fault scarps are about 4-m high on late Pleistocene deposits and about 1-m on latest Pleistocene deposits (Knudsen and others, 1996 #5889).
Age of faulted surficial deposits	The Shirt Creek fault zone offsets Miocene Columbia River basalts along most of its length (Fitzgerald, 1982 #5886; Gilbert and others, 1983 #5887). In addition, Knudsen and others (1996 #5889) mapped fault scarps on late and latest Pleistocene alluvial-fan deposits; they estimated the ages of these deposits on the basis of surface morphology, height above the active channel, soil development, and apparently to correlations to better-dated deposits in nearby Long Valley by Schmidt and Mackin (1970 #512).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Knudsen and others (1996 #5889) mapped 4-m-high fault scarps on late Pleistocene alluvial-fan deposits and 1-m-high fault scarps on latest Pleistocene alluvial-fan deposits. They used this data to infer two or more surface-faulting events in the late Pleistocene on the Shirt Creek fault zone. The age assignment here is based on the 1-m-high scarps reported by Knudsen and others (1996 #5889); a more conservative estimate was make by Breckenridge and others (2003 #5878) who show the fault as a lesser late Quaternary (<130 ka) structure.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No slip rates have been described, but Knudsen and others (1994 #3594) estimated less than 100 m of total throw

	across the fault zone, presumably in Miocene Columbia River Basalts. Such data indicates very low rates of long-term slip.
Date and Compiler(s)	2010 Stephen F. Personius, U.S. Geological Survey Guy W. Adema, Idaho Geological Survey
References	#5878 Breckenridge, R.M., Lewis, R.S., Adema, G.W., and Weisz, D.W., 2003, Miocene and younger faults in Idaho: Idaho Geological Survey Map 8, 1 sheet, scale 1:1,000,000. #5886 Fitzgerald, J.E., 1982, Geology and basalt stratigraphy of the Weiser Embayment, west-central Idaho, *in* Bonnichsen, B., and Breckenridge, R.M., eds., Cenozoic geology of Idaho: Idaho Bureau of Mines and Geology Bulletin 26, p. 103-128. #5887 Gilbert, J.D., Piety, L., and LaForge, R., 1983, Seismotectonic study for Black Canyon Dam, Boise project, Idaho: U.S. Bureau of Reclamation Seismotectonic Report 83-7, 73 p., 8 pl. #6040 Hamilton, W., 1963, Metamorphism in the Riggins region, western Idaho: U.S. Geological Survey Professional Paper 436, 95 p. #3594 Knudsen, K.L., Wong, I.G., Bott, J.D.J., Weber, G.E., Silva, W.J., and Lettis, W.R., 1994, Seismotectonic evaluation, Agency Valley and Bully Creek Dams, Vale Project, east-central Oregon: Draft Report prepared for U.S. Department of the Interior, Bureau of Reclamation, 171 p., 4 pls. #5889 Knudsen, K.L., Wong, I., Sawyer, T.L., Bott, J., Silva, W., and Lettis, W.R., 1996, Seismotectonic evaluation, Cascade Dam, Boise project, west-central Idaho: Final Report prepared for U.S. Department of the Interior, Bureau of Reclamation, 198 p., 3 pls. #512 Schmidt, D.L., and Mackin, J.H., 1970, Quaternary geology of Long and Bear Valleys, west-central Idaho: U.S. Geological Survey Bulletin 1311-A, 22 p., 2 pls.

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