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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.

Beaverhead fault, Blue Dome section (Class A) No. 603f

Last Review Date: 2010-11-09

Compiled in cooperation with the Idaho Geological Survey

citation for this record: **Haller, K.M., Wheeler, R.L., and Adema, G.W., compilers, 2010, Fault number 603f, Beaverhead fault, Blue Dome 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 03:02 PM.**

Synopsis	**General:** Detailed mapping and reconnaissance studies of scarp morphology are the sole source of data for this fault; a segmentation model has been proposed based on these data. No detailed site studies, such as trenching, have been conducted. **Sections:** This fault has 6 sections. Haller (1988 #27) defined six segments of Beaverhead fault; however, because of reconnaissance nature of this study, the same boundaries are used in this compilation to define the extent of our sections.

Name comments	**General:** Although Beaverhead fault was mapped and discussed by numerous authors as early as 1928 (Shenon, 1928 #77), Skipp (1985 #291) may be one of the earliest to name this structure. The fault extends from east of town of Tendoy, Idaho, on the north end where range front steps to east southward to northern margin of Snake River Plain. **Section:** Defined as the Blue Dome segment by Haller (1988 #27). This section extends from near the town of Lone Pine, Idaho, to southern end of the fault at northern margin of Snake River Plain. Rodgers and Anders (1990 #279) refer to this section as Blue Dome segment of Birch Creek fault. **Fault ID:** Refers to number 112 ("unnamed fault") in Witkind (1975 #320).
County(s) and State(s)	CLARK COUNTY, IDAHO
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* Inferred location of the fault is at bedrock-alluvial contact, source of trace based on 1:250,000-scale maps of Haller (1988 #27; original mapping at 1:24,000 or 1:62,500 scale), further constrained by satellite imagery and topography at scale of 1:250,000. Reference satellite imagery is ESRI_Imagery_World_2D with a minimum viewing distance of 1 km (1,000 m).
Geologic setting	This part of east-central Idaho and southwest Montana is made of Precambrian and Paleozoic rocks that were shortened by folding and faulting and was thrust northeastward during the late Mesozoic. Mid- to late Cenozoic extension broke the thrust complex into northwest-trending basins and ranges and continues today. The Beaverhead fault is a high-angle, down-to-the-southwest, range-front, normal fault that separates the Beaverhead Mountains to the northeast from the Lemhi River and Birch Creek valleys on the southwest. Densmore and others (2005 #7016) suggest that maximum throw across the Beaverhead fault is 4-6 km.

Length (km)	This section is 20 km of a total fault length of 121 km.
Average strike	N41°W (for section) versus N39°W (for whole fault)
Sense of movement	Normal
Dip Direction	SW
Paleoseismology studies	
Geomorphic expression	Fault extends along southernmost part of range at bedrock-alluvium contact. Topographic relief is low, and scarps on alluvium rare. Locally, Paleozoic limestone is present at the surface on both sides of fault (Crone and Haller, 1991 #186).
Age of faulted surficial deposits	
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* History of this section of fault poorly understood; reconnaissance studies indicate no evidence of late Quaternary movement (Haller, 1988 #27). Crone and Haller (1991 #186) suggested that this section had Quaternary movement, but no data are available to provide more constraint.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Scott and others (1985 #76) suggest slip rate of 0.1 mm/yr for southeast end of Beaverhead fault. Clearly the general absence of scarps on alluvium (Haller, 1988 #27) supports the assignment of the lowest slip-rate category. Payne and others (2008 #7017) report high rates of right-lateral shear resulting from high strain rates in the undeforming Snake River Plain to low strain rates north of the central part of the Lost River and Lemhi Ranges and the Beaverhead Mountains based on campaign GPS surveys. Furthermore they characterize the rate of differential slip within the Centennial shear zone as increasing from 0.9 ?0.3 mm/yr near the Lost River fault [601] to 1.7 ?0.2

	mm/yr near the Beaverhead fault [603]. The rate of slip may continue to increase northeastward to the Centennial fault [643]. However, Puskas and Smith (2009 #7018) argue against the high velocities; they conclude the differential motion across this boundary is less than 0.5 mm/yr.
Date and Compiler(s)	2010 Kathleen M. Haller, U.S. Geological Survey Russell L. Wheeler, U.S. Geological Survey, Emeritus Guy W. Adema, Idaho Geological Survey
References	#186 Crone, A.J., and Haller, K.M., 1991, Segmentation and the coseismic behavior of Basin and Range normal faults—Examples from east-central Idaho and southwestern Montana, *in* Hancock, P.L., Yeats, R.S., and Sanderson, D.J., eds., Characteristics of active faults: Journal of Structural Geology, v. 13, p. 151-164. #7016 Densmore, A.L., Dawers, N.H., Gupta, S., and Guidon, R., 2005, What sets topographic relief in extensional footwalls?: Geology, v. 33, no. 6, p. 453-456. #27 Haller, K.M., 1988, Segmentation of the Lemhi and Beaverhead faults, east-central Idaho, and Red Rock fault, southwest Montana, during the late Quaternary: Boulder, University of Colorado, unpublished M.S. thesis, 141 p., 10 pls. #7017 Payne, S.J., McCaffrey, R., and King, R.W., 2008, Strain rates and contemporary deformation in the Snake River Plain and surrounding Basin and Range from GPS and seismicity: Geology, v. 36, no. 8, p. 647-650. #7018 Puskas, C.M., and Smith, R.B., 2009, Intraplate deformation and microplate tectonics of the Yellowstone hot spot and surrounding western US interior: Journal of Geophysical Research-Solid Earth, v. 114, B04410, doi:10.1029/2008JB005940. #279 Rodgers, D.W., and Anders, M.H., 1990, Neogene evolution of Birch Creek Valley near Lone Pine, Idaho, *in* Roberts, S., ed., Geologic field tours of western Wyoming and parts of adjacent Idaho, Montana, and Utah: Geological Survey of Wyoming Public Information Circular 29, p. 27-38. #76 Scott, W.E., Pierce, K.L., and Hait, M.H., Jr., 1985, Quaternary tectonic setting of the 1983 Borah Peak earthquake,

	central Idaho: Bulletin of the Seismological Society of America, v. 75, p. 1053–1066. #77 Shenon, P.J., 1928, Geology and ore deposits of the Birch Creek district, Idaho: Idaho Bureau of Mines and Geology Pamphlet 27, 25 p. #291 Skipp, B., 1985, Contraction and extension faults in the southern Beaverhead Mountains, Idaho and Montana: U.S. Geological Survey Open-File Report 85-545, 170 p. #320 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in Idaho: U.S. Geological Survey Open-File Report 75-278, 71 p. pamphlet, 1 sheet, scale 1:500,000.